

Academic Self-Efficacy and Academic Burnout among University Students: The Mediating Role of Self-Regulated Learning and the Moderating Role of Grit

Efikasi Diri Akademik dan Burnout Akademik pada Mahasiswa: Peran Mediasi Self-Regulated Learning dan Peran Moderasi Grit

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Abstract

Increasing academic demands, prolonged digital learning exposure, and pressure to maintain performance have placed university students at greater risk of academic burnout. However, the psychological mechanisms that may protect students from burnout remain insufficiently explained. This study examined the mediating role of self-regulated learning and the moderating role of grit in the relationship between academic self-efficacy and academic burnout. A quantitative cross-sectional design was employed involving 431 undergraduate students from public and private universities in Indonesia. Data were collected using standardized self-report instruments and analyzed using Partial Least Squares Structural Equation Modeling. The results showed that academic self-efficacy negatively predicted academic burnout ($\beta = -.24$, $p < .001$) and positively predicted self-regulated learning ($\beta = .61$, $p < .001$). Self-regulated learning negatively predicted academic burnout ($\beta = -.39$, $p < .001$) and significantly mediated the relationship between academic self-efficacy and academic burnout ($\beta = -.24$, $p < .001$). Grit also moderated the direct relationship between academic self-efficacy and academic burnout ($\beta = -.13$, $p = .003$), indicating that the protective effect of academic self-efficacy was stronger among students with higher grit. These findings highlight the importance of strengthening academic self-efficacy, self-regulated learning, and grit to reduce academic burnout among university students.

Keywords: Academic Burnout; Academic Self-Efficacy; Grit; Self-Regulated Learning; University Students

Abstrak

Meningkatnya tuntutan akademik, pembelajaran digital yang berkepanjangan, dan tekanan untuk mempertahankan prestasi menempatkan mahasiswa pada risiko yang lebih tinggi mengalami burnout akademik. Namun, mekanisme psikologis yang dapat melindungi mahasiswa dari burnout akademik masih belum sepenuhnya dipahami. Penelitian ini bertujuan menguji peran mediasi *self-regulated learning* dan peran moderasi *grit* pada hubungan antara *academic self-efficacy* dan burnout akademik. Penelitian menggunakan desain kuantitatif dengan pendekatan *cross-sectional* yang melibatkan 431 mahasiswa sarjana dari perguruan tinggi negeri dan swasta di Indonesia. Data dikumpulkan menggunakan instrumen baku berbentuk laporan diri (*self-report*) dan dianalisis menggunakan Partial Least Squares Structural Equation Modeling (PLS-SEM). Hasil penelitian menunjukkan bahwa *academic self-efficacy* berpengaruh negatif terhadap burnout akademik ($\beta = -.24$; $p < 0,001$) dan berpengaruh positif terhadap *self-regulated learning* ($\beta = 0,61$; $p < 0,001$). *Self-regulated learning* berpengaruh negatif terhadap burnout akademik ($\beta = -.39$; $p < 0,001$) serta memediasi secara signifikan hubungan antara *academic self-efficacy* dan burnout akademik ($\beta = -.24$; $p < 0,001$). Selain itu, *grit* memoderasi hubungan langsung antara *academic self-efficacy* dan burnout akademik ($\beta = -.13$; $p = 0,003$), yang menunjukkan bahwa pengaruh protektif *academic self-efficacy* terhadap burnout akademik menjadi lebih kuat pada mahasiswa dengan tingkat *grit* yang tinggi. Temuan ini menegaskan pentingnya penguatan *academic self-efficacy*, *self-regulated learning*, dan *grit* sebagai strategi untuk mengurangi burnout akademik pada mahasiswa.

Kata Kunci: Burnout Akademik; Academic Self-Efficacy; Grit; Self-Regulated Learning; Mahasiswa

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INTRODUCTION

The psychological well-being of university students has become an increasingly important concern in contemporary higher education. Rapid technological advancement, digital transformation, hybrid learning systems, and increasingly competitive academic environments have substantially changed students' learning experiences. While these developments provide greater flexibility and broader access to educational resources, they also require students to demonstrate higher levels of autonomy, adaptability, and self-management in completing academic tasks. Consequently, many students experience persistent academic demands, continuous assessment, information overload, and uncertainty regarding future careers, all of which increase their vulnerability to psychological distress and learning-related difficulties. Previous studies have consistently reported that university students are at heightened risk of experiencing academic stress, emotional exhaustion, and psychological maladjustment when they fail to adapt effectively to these academic challenges (Pascoe et al., 2020; Richardson et al., 2012) (Madigan & Curran, 2021; Salmela-Aro et al., 2022). Therefore, understanding the psychological factors that protect students from maladaptive academic outcomes has become an important priority within educational and positive psychology research.

One of the most prevalent psychological problems among university students is academic burnout. Academic burnout is a chronic psychological syndrome characterized by emotional exhaustion, cynicism toward academic activities, and a diminished sense of academic efficacy resulting from prolonged exposure to academic stressors (Madigan & Curran, 2021; Maslach & Leiter, 2016; Salmela-Aro et al., 2022). Students experiencing burnout often report physical and emotional fatigue, reduced motivation to learn, declining academic performance, and withdrawal from academic activities. More importantly, academic burnout has been associated with lower academic engagement, decreased learning satisfaction, poorer academic achievement, depressive symptoms, psychological distress, and an increased intention to discontinue higher education (Vizoso et al., 2019) (Madigan & Curran, 2021; Salmela-Aro et al., 2022). Similar concerns have also emerged within the Indonesian higher education context. Recent studies indicate that students frequently experience considerable psychological pressure while completing academic requirements, particularly during thesis preparation, where inadequate coping resources often contribute to heightened anxiety, stress, and emotional exhaustion (Mustika & Laily, 2025; Oktavia & Viranda, 2024; Yuni & Wilani, 2025). These findings highlight the urgent need to identify protective psychological resources capable of reducing students' susceptibility to academic burnout.

One psychological resource that has consistently received considerable attention is academic self-efficacy. Grounded in Social Cognitive Theory (Bandura, 1986) (Bandura, 1997), self-efficacy refers to individuals' beliefs regarding their capability to organize and execute the actions

required to achieve desired outcomes. Within academic settings, academic self-efficacy reflects students' confidence in successfully completing academic tasks and overcoming learning-related challenges. Students possessing high academic self-efficacy tend to interpret difficult academic situations as manageable challenges rather than threatening obstacles. Consequently, they are more likely to demonstrate greater persistence, adaptive coping strategies, emotional regulation, and sustained motivation when encountering academic difficulties (Bandura, 1997; Hayat et al., 2020; Honicke & Broadbent, 2016; Schunk & DiBenedetto, 2020; Talsma et al., 2018). Empirical evidence further demonstrates that students with stronger academic self-efficacy generally experience lower academic stress, reduced emotional exhaustion, higher academic engagement, and better psychological adjustment than those with lower self-efficacy (Chung et al., 2020; Hayat et al., 2020; Honicke & Broadbent, 2016; Talsma et al., 2018). Findings from Indonesian studies similarly indicate that self-efficacy contributes to reducing maladaptive academic behaviors, including academic procrastination, while promoting students' confidence in managing demanding academic tasks (Giriansyah & Qoyyimah, 2025; Mustika & Laily, 2025).

Although the protective role of academic self-efficacy has been consistently documented, the underlying psychological mechanisms through which self-efficacy reduces academic burnout remain insufficiently understood. According to Social Cognitive Theory, self-efficacy influences behavior not only through motivational processes but also by shaping individuals' capacity to regulate cognition, emotion, and behavior during goal pursuit (Bandura, 1986). This perspective suggests that students who possess stronger academic self-efficacy are more likely to engage in effective self-regulated learning, which subsequently enables them to cope more successfully with prolonged academic demands.

Self-regulated learning refers to students' proactive ability to plan, monitor, control, and evaluate their learning processes in order to achieve academic goals (Zimmerman, 2000) (Panadero, 2017). Students who demonstrate effective self-regulated learning are capable of selecting appropriate learning strategies, managing time efficiently, maintaining motivation, regulating emotional responses, and evaluating their own academic progress. These regulatory skills have become increasingly important within contemporary higher education, where students are expected to learn independently and adapt continuously to flexible learning environments (Zimmerman, 2000) (Panadero, 2017; Theobald, 2021). Previous empirical studies have shown that self-regulated learning positively predicts academic engagement, academic achievement, psychological adjustment, and learning persistence while reducing academic stress and burnout (Fathi et al., 2021; Panadero, 2017; Theobald, 2021). Indonesian evidence also supports these findings, indicating that students with stronger self-regulated learning exhibit greater persistence in career preparation and experience lower anxiety during thesis completion (Ajrina & Safitri, 2023; Oktavia & Viranda, 2024). Collectively, these findings suggest that self-regulated

learning may function as an important cognitive-behavioral mechanism through which academic self-efficacy protects students against academic burnout.

In addition to cognitive and self-regulatory resources, recent literature has increasingly emphasized the importance of positive personality characteristics that enable students to remain resilient under prolonged academic pressure. One such characteristic is grit, defined as perseverance and sustained passion toward long-term goals despite obstacles, setbacks, and failures (Duckworth et al., 2007). Students with high levels of grit are generally more persistent, committed, and resilient when confronting academic challenges, enabling them to maintain consistent effort even in demanding educational environments. Numerous studies have demonstrated positive associations between grit and academic achievement, academic engagement, psychological resilience, and emotional well-being, while negative associations have been reported with academic distress and burnout (Credé et al., 2017; Datu et al., 2018; Datu & Restubog, 2020; Lam & Zhou, 2022). Within Indonesia, recent evidence also indicates that grit contributes to reducing academic procrastination and strengthening students' persistence during demanding academic tasks (Fun et al., 2023; Mustika & Laily, 2025). However, previous findings concerning grit remain inconsistent, with several studies reporting relatively weak or context-dependent effects (Credé et al., 2017). Such inconsistencies suggest that grit may function not only as an independent predictor but also as a psychological condition that strengthens or weakens the effectiveness of other personal resources.

Despite the growing body of literature examining academic self-efficacy, self-regulated learning, grit, and academic burnout, several important research gaps remain. First, most previous studies have primarily investigated direct relationships between academic self-efficacy and academic burnout or examined simple mediation models without simultaneously considering the psychological mechanism and contextual conditions underlying this relationship. Second, although self-regulated learning has frequently been examined as an important predictor of academic success, limited studies have explicitly investigated its role as the mechanism through which academic self-efficacy reduces academic burnout. Third, existing findings regarding the role of grit remain inconsistent, and few studies have examined whether grit strengthens the protective effect of academic self-efficacy against academic burnout. Finally, empirical evidence integrating these four constructs within a single moderated mediation framework remains scarce, particularly among Indonesian university students facing increasingly complex academic demands in digitally mediated learning environments.

Drawing upon Social Cognitive Theory (Bandura, 1997), the present study argues that students' beliefs in their academic capabilities influence not only their motivation but also their ability to regulate cognition, emotion, and learning behaviors when facing academic challenges. Students with stronger academic self-efficacy are expected to engage more

effectively in self-regulated learning, enabling them to organize learning activities, monitor progress, regulate emotions, and employ adaptive coping strategies that ultimately reduce the likelihood of academic burnout. Furthermore, from the perspective of Positive Psychology, grit represents a positive personal resource characterized by perseverance and sustained commitment toward long-term goals despite repeated setbacks and difficulties (Duckworth et al., 2007). Accordingly, grit is expected to strengthen the beneficial influence of academic self-efficacy by helping students maintain persistence when academic pressure becomes prolonged or emotionally demanding. Integrating these theoretical perspectives provides a more comprehensive explanation of how cognitive beliefs and positive personality resources jointly facilitate students' psychological adaptation in higher education.

This study integrates academic self-efficacy, self-regulated learning, grit, and academic burnout into a conceptual framework informed by Social Cognitive Theory among Indonesian university students. It examines the direct association between academic self-efficacy and academic burnout, the mediating role of self-regulated learning, and the moderating role of grit in this direct association (Figure 1). By integrating cognitive, behavioral, and motivational perspectives, the study aims to clarify the processes associated with academic burnout and inform university initiatives to help reduce it.

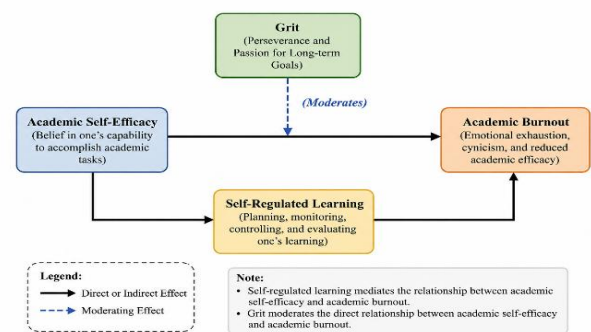


Figure 1. Proposed Moderated Mediation Model Based on Social Cognitive Theory

Figure 1. Proposed Moderated Mediation Model Based on Social Cognitive Theory

RESEARCH METHODS

Research Design

The present study utilized a quantitative cross-sectional design to examine how academic self-efficacy relates to academic burnout among university students. Particular attention was given to the function of self-regulated learning as a mediator and grit as a moderator. Data analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM), a method widely recommended for assessing intricate relationships among latent constructs, including mediation and moderation mechanisms (Hair et al., 2022).

Measurement

Four standardized instruments were used to measure the study variables, namely academic self-efficacy, self-regulated learning, grit, and academic burnout. All instruments were translated and culturally adapted into Indonesian before administration. Responses were measured using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicated higher levels of the respective construct.

Academic self-efficacy was measured using an adapted Academic Self-Efficacy Scale consisting of eight items. Self-regulated learning was assessed using an adapted

version of the Motivated Strategies for Learning Questionnaire (MSLQ) containing ten items representing goal setting, self-monitoring, and learning strategy use. Grit was measured using the Short Grit Scale (Grit-S) developed by Duckworth et al. (2007), which consists of eight items assessing perseverance of effort and consistency of interests. Academic burnout was assessed using the Maslach Burnout Inventory–Student Survey (MBI-SS) developed by Schaufeli et al. (2002), comprising fifteen items representing emotional exhaustion, cynicism, and reduced academic efficacy.

Table 1. Summary of Measurement Instruments

Variable	Instrument	Items	Dimensions	Cronbach's α
Academic Self-Efficacy	Academic Self-Efficacy Scale	8	Unidimensional	.91
Self-Regulated Learning	Adapted MSLQ	10	Goal Setting, Monitoring, Strategy Use	.89
Grit	Grit-S	8	Perseverance of Effort, Consistency of Interests	.86
Academic Burnout	MBI-SS	15	Emotional Exhaustion, Cynicism, Reduced Academic Efficacy	.92

Instrument Translation and Cross-Cultural Adaptation

All instruments were translated and culturally adapted into Indonesian following the cross-cultural adaptation guidelines proposed by Beaton et al. (2000). The adaptation process consisted of forward translation, translation synthesis, expert review, content validity assessment, back translation, and pilot testing.

Initially, two independent bilingual translators translated the original English instruments into Indonesian. The translated versions were subsequently synthesized into a single preliminary version through discussion and reconciliation. To ensure semantic, conceptual, and cultural equivalence, the synthesized version was evaluated independently by three experts in educational psychology and psychometrics.

The experts assessed each item regarding relevance, clarity, conceptual equivalence, and cultural appropriateness using a four-point rating scale. Content validity was evaluated using the Item-Level Content Validity Index (I-CVI) and the Scale-Level Content Validity Index (S-CVI/Ave) following the recommendations of Lynn (1986). All items demonstrated acceptable content validity ($I-CVI \geq 0.78$), whereas the overall scale achieved an S-CVI/Ave exceeding 0.90, indicating excellent content validity and satisfactory agreement among experts.

Based on the experts' recommendations, several minor wording revisions were implemented to improve linguistic clarity and cultural relevance. The revised Indonesian version was then back-translated into English by an independent bilingual translator who was blinded to the original instruments. Comparison between the back-translated and original versions indicated satisfactory semantic equivalence, supporting the translation validity of the adapted instruments. Subsequently, a pilot study involving 52 undergraduate students was conducted to evaluate item clarity, comprehensibility, and preliminary psychometric properties. The pilot results demonstrated

satisfactory internal consistency across all instruments, with Cronbach's alpha coefficients exceeding 0.70, indicating that the adapted scales were suitable for the main study.

Data Screening and Preliminary Analysis

Prior to hypothesis testing, data screening procedures were performed to ensure data quality. Responses containing missing values, patterned answering behavior, or multivariate outliers were removed from the dataset. The screening procedures are summarized in Table 3.

Table 2. Data Screening Procedures

Screening Stage	Number of Responses
Initial responses collected	468
Incomplete responses removed	19
Patterned responses removed	11
Multivariate outliers removed	7
Final valid responses	431

Descriptive analyses indicated acceptable distributions across all study variables. Furthermore, preliminary diagnostic tests showed no evidence of severe multicollinearity among the predictor variables.

Data Analysis

Data analysis was conducted using IBM SPSS Statistics version 27 and SmartPLS version 4. SPSS was used to perform descriptive statistics and preliminary data screening, whereas SmartPLS was employed to estimate the measurement and structural models using Partial Least Squares Structural Equation Modeling (PLS-SEM). The measurement model was evaluated by examining indicator loadings, Cronbach's alpha, Composite Reliability (CR), Average Variance Extracted (AVE), Fornell–Larcker criterion, and the Heterotrait–Monotrait Ratio (HTMT) to assess reliability, convergent validity, and discriminant validity.

The structural model was evaluated using path coefficients (β), coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2), and bootstrapping with 5,000 resamples to estimate the significance of direct, indirect, and moderating effects. The mediating role of self-regulated learning and the moderating role of grit were examined simultaneously within the proposed moderated mediation framework. Statistical significance was determined using a significance level of $p < .05$.

RESEARCH RESULTS

Participants and Research Procedure

The participants were undergraduate students enrolled in public and private higher education institutions in Indonesia. Eligibility was restricted to individuals who were actively registered as full-time undergraduate students, aged

between 18 and 25 years, and willing to participate voluntarily. Data were collected through an online survey administered between January and March 2026. The questionnaire was distributed through university-affiliated social media channels, student associations, and academic networking platforms. Before completing the questionnaire, participants received information regarding the purpose of the study, confidentiality and anonymity of their responses, the voluntary nature of their participation, and their right to withdraw at any stage without penalty. Electronic informed consent was obtained from all participants.

A total of 468 responses were initially collected. Following the data-screening process, 19 incomplete questionnaires, 11 responses indicating patterned answering behavior, and seven multivariate outliers were excluded. The final analytical sample consisted of 431 valid responses.

Table 3. Demographic Characteristics of Participants (N = 431)

Variable	Category	Frequency	Percentage
Gender	Male	167	38.7%
	Female	264	61.3%
Age	18–20 years	156	36.2%
	21–23 years	221	51.3%
	24–25 years	54	12.5%
University Type	Public university	247	57.3%
	Private university	184	42.7%
Year of Study	First year	79	18.3%
	Second year	108	25.1%
	Third year	132	30.6%
	Fourth year or above	112	26.0%
Learning System	Predominantly online	103	23.9%
	Hybrid learning	241	55.9%
	Predominantly offline	87	20.2%

Preliminary Analysis

Preliminary analyses were conducted to examine descriptive statistics, distributional characteristics, correlations, and potential multicollinearity among the study variables. Skewness and kurtosis values ranged from -1.21 to 1.08 , indicating no severe deviation from normality. Although PLS-SEM does not require multivariate normality, the distributional assessment was conducted to identify potentially problematic response patterns.

Academic self-efficacy was positively associated with self-regulated learning ($r = .61, p < .001$) and grit ($r = .54, p < .001$), and negatively associated with academic burnout ($r = -.48, p < .001$). Self-regulated learning was positively associated with grit ($r = .57, p < .001$) and negatively associated with academic burnout ($r = -.52, p < .001$). Grit also demonstrated a significant negative correlation with academic burnout ($r = -.39, p < .001$).

Table 4. Means, Standard Deviations, Reliability, and Correlations Among Variables

Variable	Mean	SD	1	2	3	4	Cronbach's α
Academic Self-Efficacy	3.78	0.67	—				.91
Self-Regulated Learning	3.71	0.63	.61***	—			.89
Grit	3.65	0.59	.54***	.57***	—		.86
Academic Burnout	2.84	0.71	-.48***	-.52***	-.39***	—	.92

*** $p < .001$.

Common Method Bias

Because all variables were measured using self-report questionnaires collected from the same respondents at a single point in time, common method bias was assessed through both procedural and statistical approaches. Procedurally, respondents were assured that their participation was anonymous and confidential, there were no correct or incorrect answers, and the data would be analyzed only in aggregate form. The questionnaire items were also written clearly and arranged so that the hypothesized relationships among the variables were not readily apparent to respondents.

Statistically, Harman's single-factor test indicated that the first unrotated factor accounted for 31.84% of the total variance. This value was below the threshold of 50%, suggesting that a single factor did not account for most of the covariance among the measurement items. Full-collinearity variance inflation factors were also evaluated. The values ranged from 1.32 to 2.41, remaining below the conservative threshold of 3.30. Therefore, neither pathological collinearity nor substantial common method bias was detected in the study data.

Table 5. Common Method Bias Assessment

Assessment	Result	Recommended Criterion	Interpretation
Harman's single-factor variance	31.84%	< 50%	No substantial single-factor bias
Full-collinearity VIF	1.32–2.41	< 3.30	No substantial common method bias

Outer Model Evaluation

The outer model was evaluated by assessing indicator reliability, internal consistency reliability, convergent validity, and discriminant validity. The standardized outer loadings ranged from .69 to .86. Most indicators exceeded the recommended value of .708. Two indicators with loadings between .69 and .70 were retained because they were theoretically important and their inclusion did not reduce composite reliability or average variance extracted below the recommended thresholds.

Cronbach's alpha, rho_A, and composite reliability values exceeded .70 for all constructs, indicating satisfactory internal consistency. All average variance extracted values were above .50, supporting convergent validity.

Table 6. Outer Model Reliability and Convergent Validity

Construct	Loading Range	Cronbach's α	rho_A	Composite Reliability	AVE
Academic Self-Efficacy	.74–.86	.91	.92	.93	.64
Self-Regulated Learning	.71–.83	.89	.90	.91	.58
Grit	.69–.79	.86	.87	.89	.52
Academic Burnout	.72–.85	.92	.92	.93	.61

Discriminant validity was assessed using the Fornell-Larcker criterion and the heterotrait-monotrait ratio. The square root of the AVE for each construct was higher than its correlations with the other constructs. In addition, all HTMT values were below the conservative threshold of .85, demonstrating adequate discriminant validity.

Table 7. Fornell-Larcker Criterion

Construct	1	2	3	4
Academic Self-Efficacy	.800			
Self-Regulated Learning	.610	.762		
Grit	.540	.570	.721	
Academic Burnout	-.480	-.520	-.390	.781

Diagonal values in bold represent the square roots of AVE.

Table 8. Heterotrait-Monotrait Ratio

Construct	1	2	3	4
Academic Self-Efficacy	—			
Self-Regulated Learning	.681	—		
Grit	.612	.647	—	
Academic Burnout	.526	.583	.441	—

All HTMT values were below .85. Moreover, none of the upper limits of the bootstrapped HTMT confidence

intervals exceeded 1.00. These results confirmed the discriminant validity of the four constructs.

Inner Model Evaluation

Following confirmation of the reliability and validity of the measurement model, the inner model was evaluated by examining structural collinearity, path coefficients, explanatory power, effect sizes, predictive relevance, and approximate model fit.

The inner VIF values ranged from 1.00 to 2.36, remaining below the recommended threshold of 3.00. Thus, multicollinearity among the predictor constructs did not appear to bias the structural estimates.

Academic self-efficacy explained 37.2% of the variance in self-regulated learning ($R^2 = .372$; adjusted $R^2 = .371$). Academic self-efficacy, self-regulated learning, grit, and the interaction between academic self-efficacy and grit collectively explained 46.8% of the variance in academic burnout ($R^2 = .468$; adjusted $R^2 = .463$). These results indicated moderate explanatory power.

The Stone-Geisser Q^2 values were .214 for self-regulated learning and .301 for academic burnout. Because both values were greater than zero, the model demonstrated adequate predictive relevance. The standardized root mean square residual was .061, which was below the

recommended threshold of .08 and indicated acceptable approximate model fit.

Table 9. Inner Model Quality Criteria

Endogenous Construct	R ²	Adjusted R ²	Q ²	Interpretation
Self-Regulated Learning	.372	.371	.214	Moderate explanatory and predictive power
Academic Burnout	.468	.463	.301	Moderate explanatory and predictive power

Model SRMR = .061.

Direct Effects

The significance of the structural paths was evaluated using a bootstrapping procedure with 5,000 resamples. Academic self-efficacy had a significant positive effect on self-regulated learning ($\beta = .61$, $t = 15.42$, $p < .001$). Therefore, students with stronger confidence in their academic abilities were more likely to regulate their learning activities effectively.

Academic self-efficacy had a significant negative direct effect on academic burnout ($\beta = -.24$, $t = 4.87$, $p < .001$). Self-regulated learning also negatively predicted academic burnout ($\beta = -.39$, $t = 7.63$, $p < .001$). Grit demonstrated an additional negative effect on academic burnout ($\beta = -.18$, $t = 3.94$, $p < .001$). The interaction between academic self-efficacy and grit was statistically significant ($\beta = -.13$, $t = 2.98$, $p = .003$), indicating that grit strengthened the negative relationship between academic self-efficacy and academic burnout.

Table 10. Direct and Interaction Effects

Structural Path	β	SE	t-value	p-value	95% CI	f ²	Result
Academic Self-Efficacy → Self-Regulated Learning	.61	.040	15.42	< .001	[.532, .688]	.592	Supported
Academic Self-Efficacy → Academic Burnout	-.24	.049	4.87	< .001	[-.336, -.145]	.061	Supported
Self-Regulated Learning → Academic Burnout	-.39	.051	7.63	< .001	[-.490, -.290]	.182	Supported
Grit → Academic Burnout	-.18	.046	3.94	< .001	[-.270, -.091]	.038	Supported
Academic Self-Efficacy × Grit → Academic Burnout	-.13	.044	2.98	.003	[-.216, -.045]	.029	Supported

The effect of academic self-efficacy on self-regulated learning was large. The effects of academic self-efficacy and grit on academic burnout were small, whereas self-regulated learning showed a moderate effect. The interaction effect also demonstrated a small but statistically meaningful contribution.

Mediation Analysis

The mediating role of self-regulated learning was examined by estimating the specific indirect effect of

academic self-efficacy on academic burnout. The indirect effect was negative and statistically significant ($\beta = -.24$, $t = 6.18$, $p < .001$, 95% CI [-.319, -.168]).

The direct effect of academic self-efficacy on academic burnout also remained significant after self-regulated learning was included in the model ($\beta = -.24$, $p < .001$). Because the direct and indirect effects were both significant and operated in the same direction, self-regulated learning demonstrated complementary partial mediation.

Table 11. Mediation Analysis

Effect	β	SE	t-value	p-value	95% CI	Result
Direct effect: Academic Self-Efficacy → Academic Burnout	-.24	.049	4.87	< .001	[-.336, -.145]	Significant
Indirect effect through Self-Regulated Learning	-.24	.039	6.18	< .001	[-.319, -.168]	Significant
Total effect	-.48	.044	10.91	< .001	[-.566, -.394]	Significant

The variance accounted for was calculated as follows:

$$[VAF = \frac{-.24}{-.48} \times 100\% = 50.0\%]$$

The VAF value of 50.0% confirmed that self-regulated learning partially mediated the relationship between academic self-efficacy and academic burnout.

Moderation and Conditional Effect Analysis

The interaction between academic self-efficacy and grit was significant ($\beta = -.13$, $p = .003$). A simple-slope analysis was subsequently performed to estimate the conditional

effect of academic self-efficacy on academic burnout at low, average, and high levels of grit.

At a low level of grit, corresponding to one standard deviation below the mean, academic self-efficacy had a relatively weak negative effect on academic burnout ($\beta = -.11$, $p = .047$). At the mean level of grit, the negative effect was stronger ($\beta = -.24$, $p < .001$). At a high level of grit, corresponding to one standard deviation above the mean, academic self-efficacy demonstrated the strongest negative effect on academic burnout ($\beta = -.37$, $p < .001$).

Table 12. Conditional Effects of Academic Self-Efficacy on Academic Burnout

Level of Grit	Conditional Effect, β	SE	t-value	p-value	95% CI
Low grit: -1 SD	-.11	.055	1.99	.047	[-.218, -.002]
Mean grit	-.24	.049	4.87	< .001	[-.336, -.145]
High grit: +1 SD	-.37	.063	5.87	< .001	[-.493, -.247]

These findings demonstrated that the protective association between academic self-efficacy and academic burnout became progressively stronger as grit increased. Students with high grit experienced a substantially greater reduction in predicted academic burnout when their academic self-efficacy increased. In contrast, the protective effect of academic self-efficacy was weaker among students with low grit.

A Johnson–Neyman analysis indicated that the relationship between academic self-efficacy and academic burnout became statistically significant when the standardized grit score was greater than -1.02 . This threshold corresponded to approximately the 15th percentile of the grit distribution. Therefore, the protective effect of academic self-efficacy was significant for approximately 85% of the participants.

Conditional Process Interpretation

The results supported a conditional process model in which academic self-efficacy reduced academic burnout both directly and indirectly through self-regulated learning. Grit strengthened the direct protective effect of academic self-efficacy on academic burnout. However, grit was modeled as a moderator of the direct relationship between academic self-efficacy and academic burnout and did not moderate either the relationship between academic self-efficacy and self-regulated learning or the relationship between self-regulated learning and academic burnout. Accordingly, the indirect effect through self-regulated learning remained constant across the different levels of grit.

The indirect effect was $\beta = -.24$ at low, average, and high levels of grit. Consequently, the results supported mediation and direct-effect moderation, but did not establish a statistically conditional indirect effect. The model is therefore more accurately described as a mediation model with moderation of the direct effect rather than a complete moderated mediation model.

Table 13. Indirect Effect Across Levels of Grit

Level of Grit	Indirect Effect	Bootstrapped SE	95% Bootstrapped CI
Low grit: -1 SD	-.24	.039	[-.319, -.168]
Mean grit	-.24	.039	[-.319, -.168]
High grit: +1 SD	-.24	.039	[-.319, -.168]

Because the indirect effect did not vary according to grit, an index of moderated mediation was not supported under the currently specified structural model.

Summary of Hypothesis Testing

Table 14. Summary of Hypothesis Testing

Hypothesis	Statement	Result
H1	Academic self-efficacy negatively predicts academic burnout.	Supported
H2	Academic self-efficacy positively predicts self-regulated learning.	Supported
H3	Self-regulated learning negatively predicts academic burnout.	Supported
H4	Self-regulated learning mediates the relationship between academic self-efficacy and academic burnout.	Supported
H5	Grit moderates the relationship between academic self-efficacy and academic burnout.	Supported

Academic self-efficacy reduced academic burnout both directly and indirectly through self-regulated learning. The mediation analysis indicated complementary partial mediation, accounting for 50.0% of the total effect. Grit strengthened the direct protective effect of academic self-efficacy, as demonstrated by increasingly negative conditional effects at higher levels of grit. The model explained 37.2% of the variance in self-regulated learning and 46.8% of the variance in academic burnout.

DISCUSSION

The relationship between academic self-efficacy and academic burnout among university students was investigated in this study. The analysis incorporated the mediating role of self-regulated learning and the moderating role of grit to provide a more comprehensive understanding of the association. The findings supported the proposed moderated mediation model, indicating that academic self-efficacy functions as an important protective factor against academic burnout both directly and indirectly through self-regulated learning. Furthermore, grit strengthened the protective influence of academic self-efficacy on burnout, suggesting that perseverance and sustained commitment to long-term goals play a crucial role in students' psychological adaptation within demanding higher education

environments. One of the primary findings of this study was that academic self-efficacy negatively predicted academic burnout. Students who reported stronger confidence in their academic capabilities experienced lower levels of emotional exhaustion, cynicism toward academic activities, and reduced academic efficacy. This finding is consistent with previous studies demonstrating that academic self-efficacy serves as a protective psychological resource that reduces students' vulnerability to stress, emotional fatigue, and burnout (Chung et al., 2020; Hayat et al., 2020; Madigan & Curran, 2021). According to Social Cognitive Theory, efficacy beliefs influence how individuals interpret challenges, regulate emotions, and sustain effort in difficult situations (Schunk & DiBenedetto, 2020). Students with strong academic self-efficacy are more likely to perceive academic demands as manageable challenges rather than uncontrollable threats, enabling them to maintain adaptive functioning under pressure.

The present findings also support the argument that burnout is influenced not only by objective academic demands but also by students' perceptions of competence and control. Previous research suggests that students who feel capable of handling academic responsibilities experience lower levels of academic stress and emotional exhaustion because they possess stronger psychological resources to cope with demanding learning environments (Salmela-Aro et al., 2022). Consequently, academic self-efficacy may function as a motivational resource that protects students from the negative psychological consequences of prolonged academic demands. Another important finding was that academic self-efficacy positively predicted self-regulated learning. Students with stronger confidence in their academic abilities demonstrated greater capacity to regulate learning activities through goal setting, strategic planning, self-monitoring, and time management. This finding is consistent with previous literature indicating that self-efficacy serves as a motivational foundation for adaptive self-regulated learning behaviors (Broadbent & Poon, 2015; Panadero, 2017). Students who believe they can succeed academically are more likely to engage actively in learning strategies because they expect their efforts to produce positive outcomes.

The positive relationship between academic self-efficacy and self-regulated learning is further supported by recent evidence showing that students' beliefs about their academic capabilities influence metacognitive functioning, learning strategies, and academic persistence (Dent & Koenka, 2016; Hertel & Karlen, 2021). Students who lack confidence in their academic competence often avoid challenging tasks and demonstrate weaker persistence because they anticipate failure. In contrast, students with stronger efficacy beliefs are more willing to invest effort, regulate their learning processes, and maintain engagement despite difficulties. These findings suggest that academic self-efficacy contributes to academic adaptation by encouraging students to become active agents in managing their own learning. The present study further demonstrated that self-regulated learning negatively predicted academic

burnout and significantly mediated the relationship between academic self-efficacy and academic burnout. This finding indicates that students with stronger academic self-efficacy experience lower burnout partly because they are better able to regulate cognition, motivation, and academic behaviors. The mediation effect highlights an important psychological mechanism through which efficacy beliefs influence emotional adaptation in academic contexts.

This finding is consistent with previous studies showing that self-regulated learning contributes positively to academic adjustment and emotional resilience (Fathi et al., 2021). Students who effectively regulate learning activities are generally better equipped to manage academic workloads, organize study schedules, monitor progress, and cope with academic setbacks. As a result, they experience lower levels of stress and emotional exhaustion. Similarly, (Ahmed & Xu, 2023) reported that self-regulated learning interventions significantly improved students' academic functioning in online and blended learning environments. These findings reinforce the argument that self-regulated learning is not merely an academic skill but also an important psychological resource that helps students maintain emotional well-being under demanding educational conditions.

The mediating role of self-regulated learning suggests that learning regulation may help explain the association between academic self-efficacy and academic burnout. Higher academic self-efficacy was associated with stronger self-regulated learning, which, in turn, was associated with lower burnout. Grit was also negatively associated with burnout and moderated the direct relationship between academic self-efficacy and burnout, indicating that this relationship varied according to students' levels of grit. Together, these findings highlight the relevance of considering efficacy beliefs, learning regulation, and perseverance within an integrated framework for understanding academic burnout among university students.

The moderating role of grit supports growing evidence from positive psychology indicating that perseverance is a critical resource for long-term academic success and psychological adaptation. Previous studies have shown that grit contributes positively to academic achievement, persistence, resilience, and well-being among university students (Datu et al., 2018; Lam & Zhou, 2022). Furthermore, Ibrahim et al. (2025) found that grit significantly reduced academic burnout among nursing students, highlighting its importance in demanding educational settings. The present findings extend this literature by demonstrating that grit not only predicts positive outcomes directly but also strengthens the effectiveness of other psychological resources, particularly academic self-efficacy.

The interaction between academic self-efficacy and grit also helps explain inconsistencies reported in previous studies concerning the effectiveness of self-efficacy in predicting academic adjustment. Recent educational psychology research increasingly suggests that psychological resources do not operate independently but interact

dynamically to influence students' adaptation (Karlen et al., 2019). Students may possess strong confidence in their abilities, yet still struggle under prolonged pressure if they lack persistence and endurance. Therefore, grit appears to function as a complementary psychological resource that enables students to translate confidence into sustained effort and long-term resilience. The present findings also align with studies demonstrating that personal psychological resources reduce burnout through resilience-related mechanisms. Chen et al. (2022) found that academic self-efficacy and resilience significantly mediated the relationship between physical activity and academic burnout among college students, suggesting that efficacy beliefs play a central role in protecting students from emotional exhaustion. Similarly, Bagdžiūnienė et al. (2015) reported that study-related resources and personal strengths contributed positively to academic resilience, engagement, and well-being among university students. More recently, demonstrated that academic self-efficacy directly and indirectly reduced academic burnout through adaptive psychological processes. These findings further support the argument that academic burnout is influenced not only by academic demands but also by students' personal psychological resources and self-management capacities.

The findings of this study are highly relevant within contemporary higher education systems characterized by increasing digitalization, academic competition, and uncertainty regarding future career opportunities. Recent evidence indicates that university students continue to experience substantial psychological pressure associated with academic performance, technology-mediated learning systems, and changing educational expectations. In such environments, personal psychological resources become increasingly important for maintaining adaptive functioning. The present study demonstrates that academic self-efficacy, self-regulated learning, and grit collectively contribute to protecting students from academic burnout and promoting psychological resilience.

The findings suggest that academic self-efficacy, self-regulated learning, and grit are relevant considerations for university efforts to address academic burnout. Student support initiatives may therefore include opportunities to strengthen confidence in academic abilities and learning self-regulation, while recognizing perseverance as a potential factor that shapes the association between self-efficacy and burnout. The effectiveness of specific interventions, however, should be evaluated in future research.

This study's cross-sectional design limits causal interpretation, and its reliance on self-report measures may have introduced response biases. In addition, the sample of Indonesian university students may limit the generalizability of the findings to other populations and educational contexts. Future studies could use longitudinal or experimental designs, include measures from multiple sources, and examine the proposed relationships in more diverse student populations.

CONCLUSION

The present study demonstrates that academic self-efficacy serves as a critical psychological resource in reducing academic burnout among university students within increasingly demanding higher education environments. Higher academic self-efficacy was associated with the use of adaptive self-regulated learning behaviors. These behaviors contributed to reduced emotional exhaustion, diminished academic cynicism, and fewer feelings of declining academic competence. Furthermore, grit strengthened the protective effect of academic self-efficacy against burnout, indicating that perseverance and sustained commitment toward long-term goals enhance students' psychological resilience under prolonged academic pressure. These findings highlight that academic burnout is not merely a consequence of excessive academic demands, but rather reflects the complex interaction between motivational beliefs, self-regulatory capacities, and perseverance-related psychological strengths. The present study contributes theoretically by extending Albert Bandura's Social Cognitive Theory and integrating positive psychology perspectives into a comprehensive moderated mediation framework explaining students' psychological adaptation in higher education. Practically, the findings emphasize the importance of developing university-based interventions aimed at strengthening academic self-efficacy, self-regulated learning skills, and grit in order to promote sustainable academic functioning and psychological well-being. Despite its contributions, the study is limited by its cross-sectional design and reliance on self-report measures. Future longitudinal and cross-cultural studies are therefore recommended to further examine the dynamic mechanisms underlying academic burnout within rapidly evolving and digitally intensive educational contexts.

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ETHICAL APPROVAL

This study was conducted in accordance with established ethical principles for psychological research involving human participants. All participants received information regarding the study objectives, voluntary participation, confidentiality, anonymity, and their right to withdraw without penalty. Electronic informed consent was obtained before questionnaire completion.

DECLARATION OF INTEREST

The authors declare that they have no known financial or non-financial conflicts of interest that could have

influenced the research, analysis, interpretation, or publication of this study.

TRANSPARENCY OF DATA

The study analyzed questionnaire responses from 431 undergraduate students. The data were analyzed using IBM SPSS Statistics version 27 and SmartPLS version 4. To protect participants' confidentiality, individual-level data are not publicly disclosed. De-identified research data and relevant analytical materials may be made available by the corresponding author upon reasonable request, subject to ethical and institutional requirements.

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AI USAGE STATEMENT

Generative artificial intelligence tools were used solely to assist with language refinement, grammatical improvement, and the organization of the manuscript. AI tools were not used to generate, manipulate, or fabricate research data, conduct the statistical analyses, or determine the study findings. All AI-assisted content was critically reviewed and verified by the authors, who take full responsibility for the accuracy, integrity, and final content of the manuscript.

AUTHORS' CONTRIBUTIONS

Adelin Australiati Saragih, Findy Suri N, and Anggi Tri Lestari Purba contributed to the preparation of this manuscript. The specific contributions of each author to conceptualization, methodology, investigation, data curation, formal analysis, writing, review, and editing should be confirmed before submission. All authors should review and approve the final manuscript and agree to be accountable for their respective contributions.

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