



From Growth Mindset to Academic Resilience: Grit as a Mediator and Academic Stress as a Boundary Condition

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ABSTRACT

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This study examines how growth mindset contributes to academic resilience by investigating grit as a mediating mechanism and perceived academic stress as a moderating condition in the grit-resilience relationship. The study integrates Conservation of Resources Theory and Broaden-and-Build Theory to explain how resources operate under demands. A quantitative explanatory design with a cross-sectional survey was conducted among 210 university students. Participants were selected using criterion-based purposive sampling. Data were collected through a questionnaire and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with 5,000 bootstrap resamples. Growth mindset positively predicted academic resilience ($\beta = 0.368$, $p < 0.001$) and grit ($\beta = 0.609$, $p < 0.001$), while grit positively predicted academic resilience ($\beta = 0.412$, $p < 0.001$). Grit significantly mediated the relationship between growth mindset and academic resilience ($\beta = 0.251$, $p < 0.001$), indicating partial mediation. Perceived academic stress negatively affected resilience ($\beta = -0.120$, $p = 0.022$), whereas its interaction with grit was positive and significant ($\beta = 0.103$, $p = 0.025$). The findings indicate that academic resilience is strengthened through the combination of beliefs and persistence, while grit becomes more important under academic stress. Universities should therefore integrate growth mindset, persistence strategies, and stress-management support.

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INTRODUCTION

Higher education has become an important educational environment in which students face intensive assessment, changing technologies, performance

expectations, and career uncertainty (Fauzi et al., 2025; Maulidy & Zaini, 2025; Sholehah & Ichsan, 2025). Academic resilience therefore matters beyond individual achievement because students who can recover from setbacks are more likely to sustain learning, complete goals, and contribute to society. Recent research conceptualizes resilience as a dynamic adaptive process shaped by interactions between personal resources and environmental demands (Bagdziuniene et al., 2025; Setlogelo & Nyoni, 2024; Tan et al., 2024). This perspective is important because academic difficulties can affect motivation, persistence, psychological functioning and educational continuity. Understanding the resources that help students remain functional under pressure can inform universities, families, and policymakers seeking supportive learning environments. Thus, examining psychological resources associated with academic resilience is relevant because strengthening adaptive capacity may help students navigate demanding educational systems without treating resilience as a fixed personal characteristic.

The study is grounded in two theories that explain how students interpret demands, mobilize resources, and sustain adaptive behavior. Conservation of Resources (COR) Theory proposes that individuals seek to obtain, retain, and protect valued resources, with stress emerging when resources are threatened, lost, or inadequate for environmental demands (Hobfoll, 1989). Accordingly, growth mindset can represent a cognitive resource, grit a motivational resource, and perceived academic stress a contextual demand. Broaden-and-Build Theory further proposes that adaptive orientations broaden cognitive and behavioral repertoires and build enduring resources through repeated experiences (Fredrickson, 2001). Growth mindset may broaden students' willingness to seek feedback and adjust strategies, while grit can sustain these behaviors. Together, these theories provide a coherent explanation of academic resilience as a resource-based and developmental process. They also support examining both direct psychological effects and conditional relationships under varying levels of academic stress within contemporary higher education.

The problem is that students frequently encounter academic demands that may exceed their perceived coping resources, including workloads, examinations, time pressure, and performance expectations. Perceived academic stress can undermine well-being and increase psychological vulnerability, weakening students' ability to recover from setbacks (Barbayannis et al., 2022; Yang et al., 2025; Schmidt et al., 2021). At the same time, students differ substantially in how they respond to similar demands. Growth mindset may encourage adaptive interpretations of failure, whereas grit may sustain effort when improvement requires prolonged investment. Yet possessing a positive belief or persistence does not guarantee resilience under all circumstances.

Academic conditions may determine resource sufficiency. Consequently, the central societal problem is not simply academic stress, but unequal capacity to mobilize psychological resources when demands rise. Identifying these mechanisms is therefore essential for effective educational support across universities. A clearer understanding may help institutions distinguish between students' internal resources and environmental pressures when developing resilience-oriented interventions and support systems for diverse learners.

Previous studies provide important but fragmented evidence about the relationships among the focal constructs. Growth mindset has been associated with engagement, motivation, self-efficacy, and adaptive functioning (Liang & Wu, 2025; Liu, 2025; Meyer & Stutts, 2024; Tao et al., 2022), while grit has been connected with engagement, persistence, resilience, and adaptive functioning (Calo et al., 2024; Mosanya, 2021; Cui et al., 2023). Lam and Zhou (2025) further demonstrated a positive relationship between growth mindset and grit. These findings establish that cognitive beliefs and persistence are relevant to academic adaptation. However, much of the literature has examined these associations separately or focused on single outcomes. Such fragmentation makes it difficult to explain how growth-oriented beliefs become persistent behavior and subsequently support resilience. An integrated model should clarify how growth-oriented beliefs become persistent behavior and support resilience. A more integrated explanation is therefore needed to position cognitive and motivational resources within one process and strengthen understanding of academic resilience.

Another gap concerns the role of academic stress as a contextual condition. Although stress is associated with poorer well-being and psychological vulnerability (Barbayannis et al., 2022; Yang et al., 2025; Li et al., 2023), less attention examines whether stress changes the grit-resilience relationship. Liu and He (2026) showed that grit can mediate the relationship between growth mindset and academic resilience, providing evidence for a motivational mechanism. Nevertheless, their mediation perspective does not explain when grit may become consequential under demanding academic conditions. COR Theory suggests that resource value can become more salient when resources are threatened (Hobfoll, 1989), yet empirical tests combining cognitive resources, motivational mechanisms, and contextual demands remain limited in Indonesia. Addressing this gap is essential because resilience interventions may require both resource development and attention to stressful academic environments. This issue is particularly relevant for universities seeking interventions that recognize both students' psychological capacities and the conditions surrounding their academic experiences.

The state of the art is an integrated resource-process model in which growth mindset provides a cognitive foundation, grit converts that foundation into sustained motivational action, and perceived academic stress determines the conditions under which persistence becomes especially consequential. The novelty lies in testing these relationships together rather than treating these constructs as isolated. This approach moves beyond asking whether students possess protective characteristics and instead examines how resources operate together within an academic context. Resolving this issue matters because interventions based only on promoting positive beliefs may have limited effects if students cannot translate those beliefs into persistent action, while persistence-focused interventions may overlook the contextual pressures that shape its relevance. By integrating cognitive, motivational, and contextual dimensions, the study seeks to provide a more precise explanation of academic resilience and a stronger basis for coordinated student support. Such integration can guide more comprehensive resilience interventions in higher education and inform institutional strategies for student development.

The research problem is whether growth mindset strengthens academic resilience directly and through grit, and whether perceived academic stress changes the contribution of grit to resilience. The proposed argument is that students who view ability as developable are more likely to sustain effort, making grit a pathway through which growth-oriented cognition supports resilience. However, when academic demands become stronger, persistence may become more consequential for maintaining adaptive functioning, even though stress itself remains detrimental. This model contributes theoretically by positioning resilience as a dynamic outcome produced through interactions among cognitive resources, motivational processes, and contextual demands. It also contributes practically by suggesting that universities should combine mindset-oriented learning practices, persistence-building strategies, and stress-reduction measures rather than relying on a single approach. It explains how resources work together and when their relevance becomes most pronounced for universities. The study therefore addresses whether, how, and when psychological resources support academic resilience among university students.

RESEARCH METHODS

The study employed a quantitative explanatory design with a cross-sectional survey to examine the relationships among growth mindset (GM), grit (GR), academic resilience (AR), and perceived academic stress (PAS). This design was selected to test direct, mediating, and moderating relationships within an integrated model. PLS-SEM was appropriate because the model included direct effects, mediation, interaction effects, and predictive analysis (Hair et al., 2022; Richter et al., 2022; Sarstedt et al., 2022). The research was conducted among university students in Bekasi, Indonesia, because the academic environment

provides a relevant context for examining students' psychological resources and academic demands. The sample comprised 210 active university students selected through purposive sampling. Participants were required to be at least 18 years old, have completed at least one academic semester, and voluntarily consent to participate.

Data were collected through a structured self-administered questionnaire administered directly to eligible students. Participants received information regarding the study purpose, voluntary participation, confidentiality, and their right to discontinue participation. Responses were screened according to the inclusion criteria and checked for completeness, producing 210 usable responses. Growth mindset was measured using six indicators derived from implicit theories of intelligence, including reverse-coded items. Grit was measured using the eight-item Short Grit Scale (Grit-S) developed by Duckworth and Quinn (2009). Academic resilience was assessed using 12 items adapted from the Academic Resilience Scale (ARS-30), while perceived academic stress was measured using nine items adapted from the Perception of Academic Stress Scale. All items used a six-point Likert scale from 1 = strongly disagree to 6 = strongly agree.

Data analysis followed a two-stage PLS-SEM procedure. The measurement model was evaluated using indicator loadings, Cronbach's alpha, composite reliability, average variance extracted (AVE), heterotrait-monotrait ratio (HTMT), and variance inflation factor (VIF). These assessments established indicator reliability, internal consistency, convergent validity, discriminant validity, and the absence of problematic multicollinearity. The structural model was then assessed using path coefficients, t-values, p-values, R^2 , f^2 , Q^2 , indirect effects, and the GR $\times$ PAS interaction. Statistical significance was evaluated using bootstrapping with 5,000 resamples. Mediation was examined through the indirect effect of GM on AR via GR, while moderation was tested through the GR $\times$ PAS interaction. Simple slopes at low (-1 SD), mean, and high ($+1$ SD) PAS levels were used to interpret the moderation effect.

RESULTS AND DISCUSSION

Results

Measurement Model

Table 1. Reliability and convergent validity of the measurement model

Construct	Indicators	Loading range	Cronbach alpha	Composite reliability	AVE
Academic resilience (AR)	AR1-AR12	0.702-0.817	0.934	0.943	0.578
Growth mindset (GM)	GM1-GM6	0.805-0.860	0.911	0.931	0.693
Grit (GR)	GR1-GR8	0.709-0.812	0.899	0.919	0.587
Perceived academic stress (PAS)	PAS1-PAS9	0.773-0.875	0.939	0.947	0.665

As presented in Table 1, indicator loadings ranged from 0.702 to 0.875. Although AR7 had a loading of 0.702, it was retained because the value was close to the commonly used 0.708 threshold and the construct already met reliability and convergent validity requirements. Cronbach's alpha and composite reliability values for all constructs exceeded 0.70, while AVE values were above 0.50. These results indicate satisfactory internal consistency and convergent validity.

Discriminant validity was also adequate. The highest HTMT value was 0.671 for GM-AR, followed by 0.670 for GR-AR and 0.667 for GM-GR; all values were below the conservative 0.85 threshold. VIF values ranged from 1.668 to 3.074, indicating no substantive multicollinearity concern. The SRMR value of 0.054 further supported acceptable model fit for structural analysis.

Structural Model and Hypothesis Testing

Table 2. Structural model results.

Path/Hypothesis	beta	t	p	Decision
H1: GM -> AR	0.368	5.645	<0.001	Supported
H2: GM -> GR	0.609	14.393	<0.001	Supported
H3: GR -> AR	0.412	6.234	<0.001	Supported
PAS -> AR	-0.120	2.292	0.022	Significant negative effect
H5: PAS x GR -> AR	0.103	2.239	0.025	Supported

Table 2 shows that growth mindset had a positive effect on academic resilience (beta = 0.368, $t = 5.645$, $p < 0.001$), supporting H1. Growth mindset also had a strong positive effect on grit (beta = 0.609, $t = 14.393$, $p < 0.001$), supporting H2. Grit positively affected academic resilience (beta = 0.412, $t = 6.234$, $p < 0.001$), supporting H3. Perceived academic stress had a significant negative direct effect on academic resilience (beta = -0.120, $p = 0.022$). The PAS x GR interaction was positive and significant (beta = 0.103, $p = 0.025$), supporting H5.

The model explained 37.1% of the variance in grit ($R^2 = 0.371$; adjusted $R^2 = 0.368$) and 50.8% of the variance in academic resilience ($R^2 = 0.508$; adjusted $R^2 = 0.498$). Effect sizes were $f^2 = 0.590$ for GM -> GR, 0.171 for GM -> AR, 0.209 for GR -> AR, 0.029 for PAS -> AR, and 0.020 for the PAS x GR interaction. Thus, the interaction effect was statistically significant but incrementally small, which is common in moderation analysis.

Mediation Analysis

Table 3. Mediation effect of grit

Effect	beta	t	p	Interpretation
GM -> GR -> AR	0.251	5.430	<0.001	Significant indirect effect
GM -> AR (direct)	0.368	5.645	<0.001	Significant direct effect
GM -> AR (total)	0.619	14.215	<0.001	Significant total effect

Table 3 indicates that the indirect effect of growth mindset on academic resilience through grit was significant ($\beta = 0.251$, $t = 5.430$, $p < 0.001$), while the direct GM $\rightarrow$ AR effect remained significant. This pattern indicates complementary partial mediation and supports H4. Descriptively, approximately 40.5% of the total effect of growth mindset on academic resilience was transmitted through grit, indicating that persistence represents a substantial mechanism through which mindset is translated into resilience.

Moderation Analysis

As illustrated in Figure 1, the interaction between grit and perceived academic stress had a positive and significant effect on academic resilience ($\beta = 0.103$, $p = 0.025$). The simple slope of grit predicting academic resilience was approximately 0.309 at low academic stress (-1 SD), 0.412 at the mean, and 0.515 at high academic stress ($+1$ SD). The interaction therefore indicates that the positive grit-resilience relationship becomes stronger as perceived academic stress increases. Importantly, the main effect of stress on resilience remained negative, so the interaction should not be interpreted as evidence that academic stress is beneficial. Rather, grit becomes more consequential as demands become more intense.

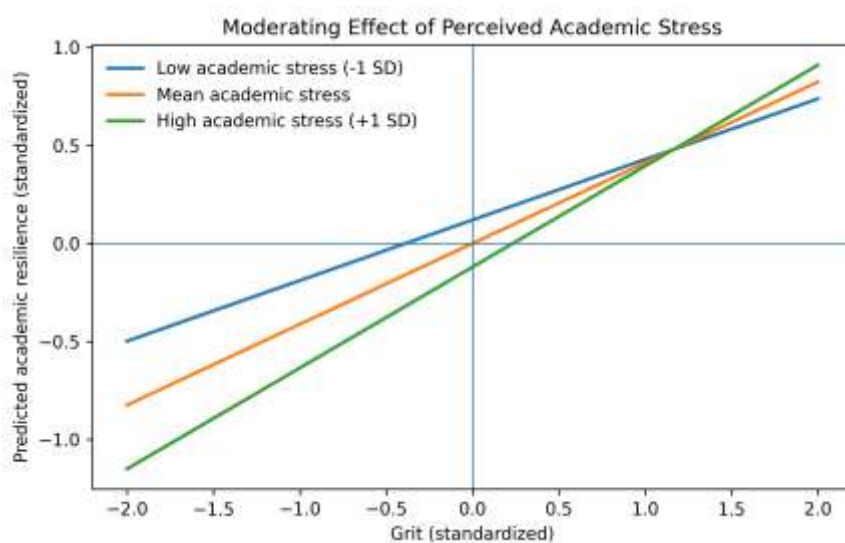


Figure 1. Moderating effect of perceived academic stress on the relationship between grit and academic resilience

Predictive Relevance

The Q2 values were 0.276 for academic resilience and 0.210 for grit. Because both values were greater than zero, the model demonstrated predictive relevance for the endogenous constructs. This suggests that the model has explanatory and predictive utility within the study sample

Discussion

The positive effect of growth mindset on academic resilience indicates that students' beliefs about the malleability of ability function as a cognitive resource for coping with academic setbacks. This finding is consistent with Liu (2025), Meyer and Stutts (2024), and Tao et al. (2022), who associated growth mindset with adaptive adjustment, motivation, and psychological functioning. The present result extends this literature by demonstrating a significant direct association specifically with academic resilience, rather than only with motivation or adjustment outcomes. From the Conservation of Resources (COR) perspective, growth mindset may preserve psychological resources because students are less likely to interpret failure as evidence of fixed incompetence. Thus, the finding confirms previous evidence while highlighting growth-oriented beliefs as a resilience-supporting resource in academic contexts.

The strongest structural relationship occurred between growth mindset and grit, demonstrating that beliefs about personal development are closely connected with sustained persistence. This finding supports Lam and Zhou's (2025) meta-analysis and Liang and Wu (2025), who identified positive relationships between growth mindset, grit, and academic engagement. However, the present study contributes beyond these associations by positioning grit as a behavioral-motivational consequence of growth-oriented cognition within an integrated resilience model. Students who believe that competence can improve may perceive effort as productive rather than futile, making persistence more likely after failure. Therefore, the finding suggests that growth mindset does not merely encourage positive thinking; it may provide a cognitive rationale for continued effort, thereby linking beliefs about development with persistent academic behavior.

The positive effect of grit on academic resilience further confirms that sustained commitment and perseverance are important resources for maintaining academic functioning under challenging conditions. This result corresponds with Mosanya (2021), Setlogelo and Nyoni (2024), and Liu and He (2026), whose studies connected persistence-related characteristics with adaptive functioning and resilience. The agreement indicates that resilience involves not only how students cognitively interpret difficulties but also whether they continue investing effort despite obstacles. Nevertheless, the present findings add an important relational perspective by demonstrating that grit remains a significant predictor after growth mindset is incorporated into the same structural model. This suggests that persistence provides an additional explanatory pathway for resilience, strengthening the argument that students' adaptive responses emerge from the interaction between cognitive beliefs and sustained goal-directed behavior.

The mediation analysis provides the study's central theoretical contribution by showing that grit partially mediates the relationship between growth mindset and academic resilience. The significant indirect effect demonstrates that growth mindset influences resilience not only directly but also by strengthening students' persistence. This complements previous research by integrating relationships that have often been examined separately: growth mindset with adaptive functioning, growth mindset with grit, and grit with resilience (Liu, 2025; Lam & Zhou, 2025; Liu & He, 2026). The finding therefore advances a process-oriented explanation of resilience. Growth-oriented beliefs can shape how students interpret setbacks, while grit translates those beliefs into sustained behavioral investment. The coexistence of significant direct and indirect effects indicates complementary partial mediation rather than a single mechanism.

The mediation finding also suggests that academic resilience should not be conceptualized as the product of an isolated psychological characteristic. Instead, resilience may develop through a sequence in which adaptive beliefs encourage persistence, and persistence subsequently supports continued functioning during adversity. This interpretation is consistent with Meyer and Stutts (2024) and Liang and Wu (2025), who emphasized the adaptive implications of growth-oriented beliefs and engagement, while also complementing the persistence-resilience relationships reported by Mosanya (2021) and Setlogelo and Nyoni (2024). The novelty of the present study lies in empirically connecting these mechanisms within one model. Accordingly, interventions designed to strengthen resilience may be more effective when growth mindset development is accompanied by goal-setting, persistence strategies, and reflection on sustained effort rather than relying exclusively on changing students' beliefs.

Perceived academic stress produced a significant negative direct effect on academic resilience, confirming that greater academic demands can undermine students' capacity to maintain adaptive functioning. At the same time, the positive interaction between grit and perceived academic stress indicates that the relationship between persistence and resilience became stronger as stress increased. This finding introduces an important qualification to a simple stress-deficit explanation. Consistent with COR Theory (Hobfoll, 1989), personal resources may become particularly consequential when contextual demands threaten available resources. However, the moderation effect should not be interpreted as evidence that stress improves resilience. Rather, increasing demands appear to make persistence more consequential for maintaining resilience. The finding therefore integrates environmental pressure and individual resources instead of treating them as independent explanations of academic adaptation.

Overall, the findings contribute a more integrated explanation of academic resilience by combining cognitive beliefs, motivational persistence, and contextual stress within a single model. The significant pathways from growth mindset to grit and resilience, the partial mediation through grit, and the moderating role of perceived academic stress collectively extend earlier evidence from Liu (2025), Meyer and Stutts (2024), Tao et al. (2022), Lam and Zhou (2025), Mosanya (2021), Setlogelo and Nyoni (2024), and Liu and He (2026). The study's principal novelty is therefore not merely confirming these individual relationships, but demonstrating how they operate together: growth mindset provides a cognitive foundation, grit converts that foundation into persistent action, and stress determines when persistence becomes especially consequential. Practically, educational institutions should reduce avoidable stress while simultaneously cultivating growth-oriented beliefs and sustained goal-directed behavior.

CONCLUSION

This study demonstrates that academic resilience is shaped by the interaction of cognitive beliefs, motivational persistence, and contextual demands. The most important finding is that growth mindset strengthens academic resilience both directly and indirectly through grit, while perceived academic stress reduces resilience but makes grit more consequential in maintaining adaptive functioning. Scientifically, the study contributes by integrating these mechanisms within a single PLS-SEM framework, extending COR Theory through a layered resource perspective in which growth mindset represents a cognitive resource and grit a motivational resource, while stress functions as a contextual boundary condition. Nevertheless, the cross-sectional design limits causal inference, self-report measures may introduce common method bias, and the sample of 210 university students in Bekasi limits broader generalizability. Future research should employ longitudinal or multi-wave designs, incorporate behavioral or academic indicators, test diverse student populations through multi-group analysis, and examine emerging contextual factors such as digital learning demands and artificial intelligence use.

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