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Impact of Growth Mindset on Grit and Academic Flow of University Students: Mediating Role of Self-Efficacy

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ABSTRACT
The current article examined the impact of a growth mindset on grit and academic flow among university students, with a specific focus on the mediating role of self-efficacy. Employing an explanatory and correlational research design, data were collected from a purposive sample of university students (N = 360), comprising equal numbers of males (n = 180) and females (n = 180). Standardized self-report questionnaires were used to measure growth mindset, grit, academic flow, and self-efficacy. Correlational analysis and multiple regression were used to test the hypotheses via the latest version of the Statistical Package for Social Sciences (SPSS). Results revealed significant positive correlations among growth mindset, grit, academic flow, and self-efficacy. Regression analysis indicated that a growth mindset significantly predicted both grit and academic flow. Furthermore, self-efficacy was found to mediate the relationship between growth mindset and the outcome variables. A comparative analysis also revealed that male students reported higher levels of growth mindset than their female counterparts. These findings have insightful outcomes for academicians, psychologists, career counselors, and academic institutions, aiming to cultivate a growth mindset and self-efficacy to enhance perseverance and optimal learning experiences in higher education settings.

***Keywords**: Grit, Growth Mind-set, Academic Flow, Self-efficacy.*

Introduction

In current educational environments, university students frequently encounter cognitive, emotional, and motivational challenges that require more than just intellectual ability to overcome. In response, researchers and educators have focused their attention on non-cognitive factors, such as mindset, perseverance, and motivational engagement that influence academic success (Credé et al., 2017; Dweck, 2006). The *growth mindset* is the belief that intellect and aptitudes can be cultivated through effort and learning, and has been found to enhance students' academic resilience, motivation, and willingness to confront challenges (Dweck, 2006). Closely related is the *grit*, defined as an individual's sustained hard work and persistence for bigger life

goals (Duckworth et al., 2007). Together, these traits provide a robust foundation for academic persistence and achievement.

Although previous studies have established positive correlations between growth mindset and grit (Wahidah & Royanto, 2023; Park et al., 2020), there is a growing interest in understanding how these psychological factors contribute to students' *flow experience,* a state of deep engagement, focus, and intrinsic motivation during academic tasks (Csikszentmihalyi, 1990). Academic flow is associated with increased learning, creativity, and positive effects (Oliveira et al., 2021), yet its predictors in university settings are still not fully understood. It is hypothesized that a growth mindset and grit may facilitate flow by enhancing students' motivational engagement, particularly when tasks are challenging. A potential mediator in this relationship is *academic self-efficacy*, which refers to students' belief in their capacity to successfully execute academic tasks (Bandura, 1997). Self-efficacy influences motivation, goal setting, persistence, and ultimately, academic performance (Honicke & Broadbent, 2016). It is shaped by skill, command, verbal influence, remote learning, and functional states, and it mediates the influence of both growth mindset and grit on academic success (Usher et al., 2019; Zhao et al., 2023). Students with high self-efficacy are more likely to take on difficult tasks, persist in the face of obstacles, and experience flow, especially when they believe their efforts will lead to success.

Moreover, the role of gender in these concepts has produced mixed results in previous studies. While some studies indicate that male students tend to report higher grit and self-efficacy levels (Whitcomb et al., 2020), others suggest no significant gender differences in growth mindset or motivational traits (Yeager et al., 2019). Exploring gender as a demographic factor concerning these psychological variables may provide nuanced insights into how motivational constructs operate across diverse student populations.

Growth Mindset and Grit

Growth mindset theory posits that people who are confident about the malleability of their capabilities are more likely to exert effort, persist after failure, and embrace challenges as learning opportunities (Dweck, 2006). Numerous empirical studies have demonstrated a positive association between a growth mindset and grit, particularly in academic settings. Duckworth et al. (2007) took grit as a construct that overlaps with the motivational tenets of a growth mindset. Park et al. (2020) conducted a longitudinal study indicating that adolescents who possessed a growth mindset showed increased levels of grit over time. Similarly, a meta-analysis by Credé et al. (2017) found that students with a growth mindset were more likely to exhibit higher levels of grit, particularly the perseverance component. Research by Wahidah and Royanto (2023) also supports the assertion that individuals who believe in the development of abilities through effort are more likely to persist in the face of academic adversity. These findings underscore the psychological interplay between cognitive beliefs about learning and the behavioral manifestation of sustained effort. Such relationships suggest that interventions fostering a growth mindset may have the added benefit of enhancing grit, thereby improving students' long-term academic engagement.

The Mediating Role of Academic Self Efficacy

Self-efficacy, as per Bandura's (1997) social cognitive theory, influences how individuals approach goals, tasks, and challenges. It is not merely influencing academic achievement but also a potential mediator between growth mindset and academic outcomes (Honicke & Broadbent, 2016). Growth mindset fosters self-efficacy by promoting the belief that success results from effort and learning strategies, not fixed ability (Zhao et al., 2023). In turn, self-efficacy strengthens grit and motivates students to persist through academic challenges. Usher et al. (2019) demonstrated that self-efficacy pointedly mediates the link between motivational beliefs and academic performance in university students. Moreover, Zhao et al. (2023) found that grit and self-efficacy sequentially mediated the correlation of growth mindset with students' subjective well-being. These findings suggest that self-efficacy may serve as a cognitive bridge that transforms growth-oriented beliefs into behavioral persistence and engagement.

Academic Flow and Its Predictors

The concept of flow, first introduced by Csikszentmihalyi (1990). He explained it as a psychological phenomenon in which people become completely absorbed in an activity. In academic contexts, flow is characterized by deep focus, a loss of self-consciousness, and a sense of intrinsic reward (Schüler & Brunner, 2009). Achieving flow in learning environments is associated with enhanced academic performance, motivation, and emotional well-being (Oliveira et al., 2021). Flow is more likely to occur when students perceive a balance between task difficulty and their skills, an area where self-efficacy plays a critical role. According to Cho and Lee (2017), elevated academic self-efficacy in scholars is often likely to experience flow due to increased confidence and reduced anxiety. While flow is traditionally considered a state rather than a trait, psychological characteristics such as growth mindset and grit may predispose individuals to experience flow more frequently, particularly when they are confident in their academic abilities.

Gender Differences in Mindset, Grit, and Self-Efficacy

Gender differences in psychological constructs related to academic motivation remain a debated topic. Some studies suggest that male students may exhibit higher grit and self-efficacy levels compared to female students (Whitcomb et al., 2020), while other research indicates that such differences are minimal or context-dependent (Yeager et al., 2019). For instance, females often outperform males academically, despite reporting lower confidence in their abilities. Understanding how gender influences the relationship between mindset, grit, self-efficacy, and flow is essential for developing gender-sensitive educational interventions.

Given these gaps in the literature, the current study aims to investigate the association of growth mindset, grit, and academic flow in university students, with a particular focus on the mediating role of academic self-efficacy. Additionally, it examines whether gender differences exist in these relationships. Understanding these pathways can contribute to developing effective psychological and educational interventions that promote academic persistence and deep engagement in higher education.

Methodology

Objectives:

- To see the correlation among study variables.

- To study the influence of growth mindset on grit and academic flow in university students.
- To explore the mediating effect of academic self-efficacy in the association of growth mindset and grit.
- To analyze the mediating role of academic self-efficacy in the relationship between growth mindset and academic flow.
- To assess gender differences among study variables.

Hypotheses:

H1: Growth mindset will be positively correlated with grit, academic self-efficacy, and academic flow among university students.

H2: Growth mindset will significantly predict grit and academic flow among university students.

H3: Academic self-efficacy will mediate the correlation between growth mindset, grit, and academic flow.

H4: There will be significant gender differences among study variables in university students.

Research Design & Sample

The present study employed a quantitative, correlational research design to examine the predictive relationship between growth mindset, grit, and academic flow, as well as the mediating role of academic self-efficacy. This explanatory design was appropriate for exploring relationships among psychological variables and testing mediation pathways using statistical models. A purposive sample of 360 university students (*n* = 360) was recruited from various public and private universities in Pakistan. The sample comprised 180 males and 180 females, with ages ranging from 18 to 26 years. Inclusion criteria pointed out that all participants to be currently enrolled undergraduate or graduate students with at least one semester of academic experience. Participants with self-reported psychological or cognitive impairments were excluded from the study to avoid confounding influences on psychological variables such as flow or self-efficacy.

Instruments

Growth Mindset Scale assessed growth mindset scores using the Implicit Theories of Intelligence Scale developed by Dweck (2006). This 8-item scale was rated on a 6-point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree). Higher scores indicate a sounder growth mindset. The standard internal consistency in past studies was recorded as (α = .82), and currently, Cronbach's alpha is .85.

The Short Grit Scale (Grit-S) was constructed by Duckworth and Quinn (2009) and has 8 items measuring two dimensions: persistence of effort and steadiness of interest. A 5-point Likert scale from 1 (not at all like me) to 5 (very much like me) was used to rate items. The overall reliability coefficient of α = .81 in the current sample.

Academic Self-Efficacy Scale by Chemers et al. (2001) used for measuring academic self efficacy, includes 8 items rated on a 7-point scale from 1 (not at all true) to 7 (very true). Higher scores reflect stronger academic self-efficacy. The scale has been widely validated and demonstrated good internal reliability (α = .86); Cronbach's alpha for this study was .88.

Academic Flow Scale, Flow was measured using the Academic Flow Scale developed by Bakker (2008), which is a domain-specific adaptation of Csikszentmihalyi's (1990) original flow model for

educational settings. It comprises 13 items rated on a 5-point Likert scale. The scale assesses concentration, enjoyment, and intrinsic motivation during academic tasks. Cronbach's alpha in the current study was .87.

Procedure

Data collection was started by obtaining ethical approval from the university's Institutional Review Board (IRB). A collection of participants' responses was carried out through online and paper-based questionnaires. The sample was given information about the purpose of the study, assured confidentiality and secrecy, and provided informed consent before participation. Data collection was conducted over six weeks, and no compensation was offered to participants.

Ethical Considerations

All procedures followed the ethical rules highlighted by the American Psychological Association (APA). Participation was intended, and students were given the right to withdraw at any point exclusive of penalty. The collected data was kept confidential and used solely for research purposes.

Results

Table 1 *Descriptive Statistics and Correlations Among Study Variables (N = 360)*

Variable	*M*	*SD*	α	1	2	3	4
1. Growth Mindset	4.82	0.74	.85	-			
2. Grit	3.89	0.68	.81	.46**	-		
3. Academic Self-Efficacy	5.12	0.81	.88	.43**	.49**	-	
4. Academic Flow	4.02	0.65	.87	.41**	.52**	.55**	-

*Note. ** p < .01 (2-tailed).*

Table 1 shows descriptives, including means, standard deviations, and intercorrelations for all study variables. Pearson's correlation coefficients revealed significant positive relationships among the main study variables. Growth mindset was significantly correlated with grit (r = .46, p < .001), academic self-efficacy (r = .43, p < .001), and academic flow (r = .41, p < .001). Grit also showed significant positive associations with self-efficacy (r = .49, p < .001) and flow (r = .52, p < .001). Self-efficacy was significantly positively related to flow (r = .55, p < .001), indicating that students with higher self-belief also report more frequent flow experiences.

Table 2 *Multiple Regression Analysis Predicting Grit and Academic Flow from Growth Mindset (N = 360)*

Dependent Variable	Predictor	*B*	*SE B*	*β*	*t*	*p*	R^2
Grit	Growth Mindset	0.48	0.05	.46	9.69	< .001	.21
Academic Flow	Growth Mindset	0.39	0.05	.41	8.21	< .001	.17

Note. B = unstandardized regression coefficient; SE B = standard error of B; β = standardized coefficient; R^2 = coefficient of determination.

To examine whether a growth mindset significantly predicts grit and academic flow, two separate regression analyses were conducted. Results indicated that growth mindset significantly predicted grit, β = .46, t = 9.69, p < .001, R^2 = .21, with 21% of the variance in grit explained by growth

mindset. Similarly, growth mindset effectively predicted academic flow, $\beta = .41$, $t = 8.21$, $p < .001$, $R^2 = .17$.

Mediation Analysis

To test whether academic self-efficacy mediates the relationship between growth mindset and the two outcomes, grit and academic flow, Hayes' PROCESS Macro (Model 4) was used with 5,000 bootstrap samples.

Growth Mindset → Grit → Self-Efficacy (Mediator)

The indirect effect of growth mindset on grit through academic self-efficacy was significant (indirect effect = 0.15, 95% *CI* [0.09, 0.22]), suggesting partial mediation. The direct effect of growth mindset on grit remained significant (β = .31, $p < .001$), indicating partial mediation.

Growth Mindset → Flow → Self-Efficacy (Mediator)

Similarly, the indirect effect of growth mindset on academic flow through academic self-efficacy was also significant (indirect effect = 0.19, 95% *CI* [0.12, 0.27]), with the direct effect remaining significant (β = .22, $p < .01$). This also indicates partial mediation, supporting the mediating role of academic self-efficacy in both outcome paths.

Table 3 *Mediation Analysis of Academic Self-Efficacy Between Growth Mindset and Grit (N = 360)*

Path	*B*	*SE*	*95% CI (LL, UL)*	*β*	*p*
Total Effect (GM → Grit)	0.48	0.05	[0.39, 0.58]	.46	< .001
Direct Effect (GM → Grit)	0.31	0.06	[0.20, 0.42]	.31	< .001
Indirect Effect (GM → SE → Grit)	0.15	0.03	[0.09, 0.22]	-	-

Note. GM = Growth Mindset; SE = Academic Self-Efficacy; CI = Confidence Interval. Indirect effect estimated via 5,000 bootstrap samples. CI does not contain zero, indicating significant mediation.

Table 4 *Mediation Analysis of Academic Self-Efficacy Between Growth Mindset and Academic Flow (N = 360)*

Path	*B*	*SE*	*95% CI (LL, UL)*	*β*	*p*
Total Effect (GM → Flow)	0.39	0.05	[0.29, 0.49]	.41	< .001
Direct Effect (GM → Flow)	0.20	0.06	[0.08, 0.32]	.22	.002
Indirect Effect (GM → SE → Flow)	0.19	0.04	[0.12, 0.27]	—	—

Note. GM = Growth Mindset; SE = Academic Self-Efficacy; CI = Confidence Interval. Indirect effect estimated via 5,000 bootstrap samples. CI does not include zero, indicating significant partial mediation.

Table 5 *Independent Samples t-Test for Gender Differences in Study Variables (N = 360)*

Variable	Gender	*M*	*SD*	*t (358)*	*p*	*95% CI (LL, UL)*	Cohen's *d*
Growth Mindset	Male	4.91	0.72	2.41	.016*	[0.04, 0.33]	0.25
	Female	4.72	0.76				
Grit	Male	3.91	0.67	1.08	.280	[−0.04, 0.14]	-
	Female	3.86	0.69				
Academic Self-Efficacy	Male	5.18	0.83	1.34	.182	[−0.06, 0.31]	-
	Female	5.06	0.79				

Academic Flow	Male	4.05	0.66	0.84	.402	[−0.07, 0.17]	-
	Female	4.00	0.65				

Note. p < .05 indicates statistical significance. LL = Lower Limit, UL = Upper Limit of 95% Confidence Interval.

Table 5 revealed a significant gender difference in growth mindset, $t(358) = 2.41$, $p = .016$, with males ($M = 4.91$, $SD = 0.72$) scoring higher than females ($M = 4.72$, $SD = 0.76$). No significant gender differences were found in grit, self-efficacy, or academic flow ($p > .05$).

Discussion

In the current study, hypothesis 1 proposed that a growth mindset would be positively correlated with grit, academic self-efficacy, and academic flow. The findings supported this hypothesis, revealing significant positive correlations between growth mindset and all three variables. This is consistent with prior research indicating that individuals with a growth mindset are more likely to develop adaptive learning behaviors, persist through challenges (Duckworth et al., 2007), and experience enhanced motivation and engagement (Dweck, 2006; Csikszentmihalyi, 1990). The correlation between growth mindset and self-efficacy is also aligned with Bandura's (1997) theory that belief in one's capacity to develop abilities fosters stronger self-efficacy beliefs.

The second hypothesis predicted that growth mindset would significantly predict grit and academic flow, respectively. The hypothesis was supported by regression analyses, which showed that growth mindset accounted for a significant portion of the variance in grit ($R^2 = .21$) and academic flow ($R^2 = .17$). These findings are in line with Park et al. (2020) and Zhao et al. (2023), who demonstrated that growth mindset serves as a motivational foundation for persistent academic effort (grit) and engaging learning experiences (flow). Students who believe their intelligence and skills can be developed are more likely to adopt long-term academic goals and immerse themselves in learning tasks despite obstacles.

The third hypothesis narrated that academic self-efficacy would mediate the relationship between growth mindset and grit and proposed mediation between growth mindset and academic flow. The results supported this assumption, indicating significant partial mediation in both models. Specifically, academic self-efficacy partially explained how growth mindset influenced grit and flow, with indirect effects being significant and the confidence intervals not crossing zero. These results are theoretically grounded in social cognitive theory (Bandura, 1997), which emphasizes that individuals who believe in their capabilities are more likely to exert effort and persevere. A student with a growth mindset believes abilities can improve with effort, which enhances their self-efficacy. In turn, this increased self-efficacy fosters grit, the perseverance toward long-term goals (Usher et al., 2019) and enables deeper engagement in learning, producing flow experiences (Cho & Lee, 2017; Oliveira et al., 2021). Moreover, partial mediation suggests that while self-efficacy plays a significant role, growth mindset also exerts a direct influence on both grit and flow. This underscores the multifaceted nature of motivational constructs and suggests that interventions targeting both mindset and self-belief may yield stronger outcomes.

The last hypothesis examined whether significant gender differences exist in growth mindset, grit, academic self-efficacy, and academic flow. The results showed a significant gender difference only

in growth mindset, with male students scoring higher than females. This finding resonates with previous literature suggesting that males may report more confidence in their capacity for intellectual development, possibly due to gender-based academic socialization (Whitcomb et al., 2020). However, no significant gender differences were observed for grit, self-efficacy, or flow, indicating that once mindset beliefs are formed, the outcomes of effort, confidence, and engagement may not differ substantially between genders.

Study Implications

The findings have significant implications for educational theory and practice. First, they reinforce the importance of promoting growth mindset in higher education settings to develop grit and promote optimal engagement (flow). Second, the mediating role of self-efficacy highlights the need for programs that not only encourage adaptive beliefs but also build students' confidence in their academic abilities. Educators, counselors, and institutional leaders should incorporate strategies such as performance feedback, goal setting, and mentoring to strengthen both mindset and efficacy beliefs.

Additionally, understanding gender disparities in the growth mindset can help design more inclusive interventions. Tailoring programs to support mindset development in female students may help reduce subtle psychological barriers to learning and performance.

Limitations and Future Directions

The current study has a few limitations. The cross-sectional method restricts causal interpretations: future research should employ longitudinal or experimental designs to explore developmental and causal processes. Second, reliance on self-report measures may have introduced bias. Mixed methods approaches or behavioral assessments could provide deep understanding of the variables. Third, the sample was limited to Pakistani university students, which may affect generalizability. Future studies should examine cultural, institutional, or disciplinary variations in these relationships.

Moreover, future research could explore other mediators or moderators, such as goal orientation, intrinsic motivation, or academic stress. Investigating how these variables interact across academic domains could lead to more targeted interventions.

Conclusion

In summary, this study explained that a growth mindset significantly predicts both grit and academic flow among university students and that academic self-efficacy partially mediates these relationships. These findings emphasize the interconnected role of beliefs, confidence, and engagement in shaping student outcomes. By nurturing a growth mindset and boosting self-efficacy, educators can assist students in developing resilience and attaining more meaningful, enriching academic experiences.

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