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Beyond Learning Strategies: Examining the Relationship Between Metacognitive Skills and Academic Resilience Among University Students

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ABSTRACT

Academic resilience is an important aspect of university students' ability to manage academic challenges, overcome setbacks, and remain committed to their educational goals. Metacognitive skills may play a meaningful role in this process by helping students plan, monitor, evaluate, and regulate their learning. However, the relationship between these skills and academic resilience remains insufficiently explored in the context of Pakistani higher education. This study examined the relationship between metacognitive skills and academic resilience among university students in Lahore, Pakistan. A quantitative, cross-sectional correlational design was employed, involving 600 BS and MPhil students from selected public and private universities. Data were collected through a structured questionnaire using a five-point Likert scale and analyzed using SPSS version 26. Pearson's correlation, independent-samples t-tests, and one-way analysis of variance (ANOVA) were used to examine the relationship between the study variables and differences across selected demographic groups. The findings revealed a strong, positive, and statistically significant relationship between metacognitive skills and academic resilience ($r = .835$, $p < .001$), indicating that students who reported stronger metacognitive skills also tended to demonstrate higher academic resilience. Furthermore, significant age-group differences were identified in metacognitive skills ($F(3, 596) = 10.21$, $p = .001$), with students aged 27 years and above reporting higher scores than their younger counterparts. No statistically significant differences in metacognitive skills were found by gender, university type, or level of study. These findings highlight the relevance of metacognitive skills in understanding how university students respond to academic difficulties. The study suggests that universities should promote reflective learning, self-monitoring, and effective learning strategies to support students' academic development and resilience.

Introduction

In the twenty-first century, universities are places of transformation where youth are expected to not only gain specialized knowledge but also to develop psychological toughness to cope with an uncertain and competitive world. University students encounter academic challenges such as examination pressure, demanding coursework, and setbacks in learning. Their ability to respond constructively to these challenges is an important aspect of academic resilience. Metacognitive skills, including planning, monitoring, and evaluating learning, may be relevant to how students manage academic difficulties. However, the relationship between metacognitive skills and academic resilience requires further investigation among university students in Pakistan.

Two constructs have emerged as important answers to this question: academic resilience and metacognitive skills. Metacognition can be defined as thinking about thinking, including monitoring and regulating one's own cognition (Flavell, 1979). Metacognition, commonly described as "thinking about thinking," plays an important role in effective learning. It enables students to plan their learning, monitor their understanding, assess their progress, and regulate their learning strategies. In higher education, the development of metacognitive skills can be supported through structured learning activities and virtual learning environments (O'Neill et al., 2026). These abilities also support lifelong learning by helping students adapt their approaches to changing learning demands. In this context, metacognitive skills may be particularly relevant to academic resilience, as students need to recognize learning difficulties, adjust their strategies, and manage academic challenges. Metacognitive-based learning encourages students to design, monitor, and evaluate their own learning strategies (Fitriana et al., 2025). Students with well-developed metacognitive skills are not passive recipients of instruction but active builders of their understanding.

The second construct is academic resilience, typically portrayed as a student's capacity to remain motivated and active despite experiencing academic problems, failures, and challenges (Cassidy, 2016; Martin & Marsh, 2006). The successful student is not only prepared to fail but also to bounce back, process failure, and move forward. Institutional-level resilience encompasses positive beliefs about the self, reacting flexibly to academic demands, seeking support when needed, and maintaining appropriate behaviors under challenging academic circumstances (Cassidy, 2016). Academic resilience refers to students' ability to maintain learning motivation, overcome academic difficulties, and achieve positive academic outcomes despite stress and challenges (Chen et al., 2026). It is particularly important in higher education, where students face demanding workloads and emotional and cognitive pressures. Academic resilience helps students cope with these challenges and remain committed to their educational goals.

Understanding the relationship between metacognitive skills and academic resilience was important for several reasons. Theoretically, the study contributed to existing research on self-regulated learning by examining the association between metacognitive skills and academic resilience among university students in Pakistan. Practically, the findings provided useful insights for educators and policymakers seeking to support students' learning and resilience. They also highlighted the relevance of metacognitive skills in managing academic stress, applying effective learning strategies, and dealing with academic challenges. These insights may help inform future educational interventions aimed at supporting student well-being and academic success.

Objectives

1. To examine the relationship between metacognitive skills and academic resilience among university students.
2. To investigate differences in metacognitive skills and academic resilience among university students by demographic characteristics.

Research Question\Hypothesis

- **Q1:** Is there a significant relationship between metacognitive skills and academic resilience among university students?

Hypotheses

- **H_{01}:** There is no statistically significant relationship between metacognitive skills and academic resilience among university students.
- **H_02:** There is no significant difference in metacognitive skills between male and female university students.
- **H_03:** There is no significant difference in metacognitive skills among university students across different age groups.
- **H_04:** There is no significant difference in metacognitive skills between students enrolled in public and private universities.
- **H_05:** There is no significant difference in metacognitive skills between BS and MS/MPhil students.

Literature Review

Metacognitive Skills in Higher Education

Metacognition refers to an individual's awareness of and ability to regulate their own thinking processes. Flavell (1979) introduced metacognition as an important concept in cognitive development, emphasizing the role of knowledge about cognition and the monitoring of cognitive activities. In educational settings, metacognitive skills help students plan their learning, monitor their understanding, identify difficulties, and evaluate whether their learning strategies are effective. These skills are particularly

relevant in higher education, where students are expected to manage complex academic tasks and take greater responsibility for their learning.

Schraw and Dennison (1994) distinguished between two broad components of metacognitive awareness: knowledge of cognition and regulation of cognition. Knowledge of cognition involves understanding one's own cognitive processes, including what one knows, how one learns, and when particular strategies may be useful. Regulation of cognition concerns the processes used to manage learning, including planning, monitoring, information management, debugging, and evaluation. Together, these components provide a useful framework for understanding how students approach academic tasks and respond when their initial strategies are unsuccessful.

Metacognitive skills are also closely related to self-regulated learning. Zimmerman (2002) explained that self-regulated learners actively participate in their learning through processes involving forethought, performance, and self-reflection. These processes include setting goals, selecting appropriate strategies, monitoring progress, and evaluating outcomes. Panadero (2017), in a review of self-regulated learning models, further demonstrated the importance of understanding the cognitive, metacognitive, motivational, and behavioural processes involved in independent learning. Although metacognition is an important part of self-regulated learning, the two concepts are not identical: metacognition focuses particularly on understanding and regulating cognition, whereas self-regulated learning also includes motivational and behavioural processes.

In the present study, metacognitive skills are examined through five dimensions: knowledge of cognition or awareness, regulation of cognition, planning and implementation of cognition, monitoring and evaluation, and cognitive flexibility and self-regulation. These dimensions represent related aspects of how students understand, plan, manage, and adjust their learning processes. Planning allows students to establish learning goals and select appropriate strategies, while monitoring helps them identify misunderstandings or difficulties during academic tasks. Evaluation enables students to reflect on the effectiveness of their strategies, and cognitive flexibility involves adjusting approaches when circumstances or task demands change. These dimensions provide a framework for examining how students' learning-related skills are associated with their responses to academic challenges.

Academic Resilience among University Students

Academic resilience refers to students' capacity to respond constructively to academic difficulties and maintain or regain effective engagement with learning. University students may experience examination pressure, demanding coursework, disappointing results, time-management difficulties, and other academic setbacks. Resilience is relevant in these situations because students may differ in how they interpret difficulties, regulate their responses, seek assistance, and continue working towards their academic goals.

Martin and Marsh (2006) examined academic resilience and its psychological and educational correlates, contributing to the understanding of resilience as a construct associated with students' experiences and responses to academic adversity. Their work distinguished academic resilience from the broader idea of coping with everyday academic difficulties, highlighting the importance of understanding how students respond to more significant setbacks. Cassidy (2016) subsequently developed the Academic Resilience Scale (ARS-30) as a multidimensional measure of responses to academic adversity. This work provided a structured approach to examining academic resilience rather than treating it as a single, undifferentiated characteristic.

For the present study, academic resilience is considered through four dimensions: perseverance, adaptive coping and help-seeking, emotional regulation, and self-efficacy. Perseverance refers to continuing to work towards academic goals despite difficulties. Adaptive coping and help-seeking involve selecting constructive responses to problems and seeking support when necessary. Emotional regulation concerns managing emotional responses to academic pressure, while self-efficacy refers to beliefs about one's capability to perform particular tasks or meet academic demands. These dimensions represent related but distinct aspects of students' responses to academic challenges.

Resilience should not be understood as an entirely fixed personal quality or as the ability to overcome every difficulty without assistance. Students' responses to academic adversity may also depend on the support available to them and the educational circumstances in which they study. Accordingly, examining academic resilience among university students can help clarify how individual learning-related resources are associated with students' reported capacity to manage academic challenges.

Relationship between Metacognitive Skills and Academic Resilience

Metacognitive skills may be relevant to academic resilience because they provide students with ways to understand and manage difficulties during learning. When students recognize that they have not understood a topic, monitor their progress, and evaluate

the effectiveness of their learning strategies, they may be better positioned to identify problems and consider alternative approaches. These processes may support constructive responses to academic setbacks, although their presence does not guarantee that students will overcome every challenge.

Theoretical Foundation

The present study is informed by Flavell's (1979) account of metacognition and Zimmerman's (2002) social-cognitive model of self-regulated learning. Flavell's framework explains the importance of awareness and monitoring of cognitive processes, while Zimmerman's model places these processes within a broader cycle of goal-setting, strategic performance, and self-reflection. Together, these perspectives provide a basis for examining how students' metacognitive skills may be related to their responses to academic challenges.

Academic resilience provides the complementary outcome construct in this framework. The work of Martin and Marsh (2006) and Cassidy (2016) supports the treatment of academic resilience as a construct concerned with students' responses to academic adversity. On this basis, the study examines whether students reporting stronger metacognitive skills also report greater academic resilience. The framework supports investigation of an association between the two constructs without assuming that one necessarily causes the other.

Metacognitive skills include knowledge and regulation of cognition (Schraw & Dennison, 1994). Five subscales are reported in recent studies.

Knowledge of Cognition This is awareness of own learning processes. Tsega and Tefera (2025) found it correlated with achievement ($r = .597$, $p < .001$) among university students.

Regulation of Knowledge is management of information. Habib et al. (2024) showed regulation strategies significantly improved problem-solving abilities.

Planning and Implementation is goal-setting before learning. Frontiers (2025) defined it as core cognitive control facilitating goal-directed actions.

Monitoring and Evaluation is tracking and reflecting on learning. Frontiers (2025) found regulation of cognition explained additional variance in GPA beyond cognitive flexibility, while Tsega and Tefera (2025) found regulation correlated with achievement ($r = .366$).

Cognitive Flexibility is adaptive strategy shifting. Frontiers (2025) reported fewer perseverative errors on WCST were associated with higher GPA, operating independently from metacognition.

Academic Resilience

Academic resilience is capacity to overcome setbacks (Cassidy, 2016). Four dimensions are used in this study.

Perseverance and Adaptive Coping are persistence and use of adaptive strategies. Oren Özdemir et al. (2024) found mathematical metacognition significantly affected academic resilience in mathematics, with resilient students persisting through challenges.

Emotional Regulation is managing negative affect. Tsega and Tefera (2025) showed metacognitive awareness linked to affective engagement and agency.

Self-Efficacy is belief in capability. Tsega and Tefera (2025) found agency, a self-efficacy construct, correlated with GPA ($r = .265$).

Research Gap

Although existing literature has established the importance of metacognitive awareness for academic outcomes, several gaps remain. Although metacognition and resilience link is established, four gaps remain. First, most studies are in Western contexts (Musullulu et al., 2025), with limited evidence from Pakistani universities in Lahore facing unique stressor. Although established research provides theoretical foundations for both constructs, further context-specific evidence is useful for understanding their relationship among university students in Pakistan. The present study addresses this need by examining the relationship between metacognitive skills and academic resilience among 600 BS and MPhil students

from public and private universities in Lahore. It also examines differences in these constructs across selected student groups, where supported by the reported analyses. The study therefore contributes evidence from a specific higher-education context and may inform future research on students' learning strategies and responses to academic challenges.

Research Design and Sampling

The study employed a quantitative, cross-sectional correlational design to examine the relationship between metacognitive skills and academic resilience among BS and MPhil students enrolled at selected public and private universities in Lahore, Pakistan. Data were collected at a single point in time using a structured questionnaire. A total of 600 students were selected through systematic random sampling: 281 male, 319 female; 474 BS (79%), 126 MPhil (21%); 278 public (46.3%), 322 private (53.7%).

Instrumentation

A 50-item questionnaire on a 5-point Likert scale (1=Strongly Disagree to 5=Strongly Agree) was used.

Section A: Demographics included gender, age, university type, and level of study.

Section B: Metacognitive Skills (28 items)

(1) Knowledge of Cognition / Awareness

(2) Regulation of Knowledge

(3) Planning and Implementation

(4) Monitoring and Evaluation

(5) Cognitive Flexibility and Self-regulation

Section C: Academic Resilience (22 items)

(1) Perseverance

(2) Adaptive Coping & Help-Seeking

(3) Emotional Regulation

(4) Self-Efficacy

Validity and Pilot Testing

Content validity was established by three experts in education and educational psychology who evaluated clarity, relevance, and conceptual alignment. Based on feedback, five overlapping items were removed and complex items were simplified. Pilot testing was conducted with 50 students with similar characteristics. Item-total correlation analysis was performed to remove redundant items. The instrument was finalized to 50 items with completion time of approximately 30 minutes.

Reliability

Reliability was assessed via Cronbach's alpha on the pilot sample (N=50). Overall scales showed high internal consistency: metacognitive skills (28 items, $\alpha = .875$) and academic resilience (22 items, $\alpha = .855$).

Subscale reliabilities for MCS were: Knowledge/Awareness ($\alpha = .649$), Regulation ($\alpha = .876$), Planning and Implementation ($\alpha = .890$), Monitoring and Evaluation ($\alpha = .964$), and Cognitive Flexibility ($\alpha = .932$). For AR, reliabilities were: Perseverance ($\alpha = .890$), Adaptive Coping ($\alpha = .965$), Emotional Regulation ($\alpha = .831$), and Self-Efficacy ($\alpha = .748$).

Data Collection and Analysis

After institutional permission and informed consent, paper-based questionnaires were personally administered within two to three weeks. Incomplete questionnaires were excluded and replaced to maintain sample size. Data were analyzed using SPSS v26. Descriptive statistics (Mean, SD, frequency) were used. Pearson correlation (r) was used to examine the relationship between MCS and AR (Objective 1). Independent samples t-tests and one-way ANOVA with Tukey's HSD were used for demographic comparisons (Objective 2). Significance level was set at $p < .05$.

Ethical Considerations

Ethical approval was obtained from university administrations. Participation was voluntary with right to withdraw at any time. Anonymity was ensured by excluding names and registration numbers, and data were used solely for research purposes.

Results and Findings

Table 1: Pearson Correlation in ($H_0$1)

To check relationship between Metacognitive Skills (MC) and Academic Resilience (AR).

Variables	Mean	SD	r	P
Metacognitive Skills	3.40	0.64		
Academic Resilience	3.40	0.64	.835	< .001

Note. r = Pearson correlation; M = Mean; SD = Standard Deviation. p < .05 is significant.

Table 1 was formulated to examine the relationship between metacognitive skills and academic resilience among university students (N = 600). Results of descriptive analysis showed moderate to high metacognitive skills (M = 3.40, SD = 0.64) and academic resilience (M = 3.40, SD = 0.64). Pearson correlation revealed a strong positive and statistically significant relationship between the two variables, r(598) = .835, p < .001, with a large effect size.

The coefficient of determination (r^2 = .697) indicates that approximately 69.7% of the variance was shared between metacognitive skills and academic resilience. This suggests that students with higher metacognitive skills also tend to report greater academic resilience.

Table 2: Independent Sample t-test for Difference in Metacognitive Skills Based on Gender (N=600)

Gender	N	M	SD	t	df	p
Male	281	3.40	0.63	0.38	598	.702
Female	319	3.38	0.65			

Table 2 presents the independent sample t-test analysis comparing metacognitive skills scores based on gender. The findings revealed that male students (N = 281, M = 3.40, SD = 0.63) and female students (N = 319, M = 3.38, SD = 0.65) showed very similar mean scores. The obtained t-value was 0.38 with df = 598 and the p-value was .702, which is greater than the significance level of .05. Therefore, there was no statistically significant gender difference in metacognitive skills among university students. H02 is retained.

Table 3: One-Way ANOVA for Difference in Metacognitive Skills Based on Age Groups (N = 600)

Source	Sum of squares	Df	MS	F	P	η^2
Between groups	1.523	3	0.508	10.21	.001	.049
Within groups	29.657	596	0.050			
Total	31.180	599				

Table 3(a): Tukey HSD Pairwise Comparisons of Metacognitive Skills by Age Group

Comparison	Mean Difference	Std. Error	*P*	*95% CI (lower, upper)*
18-20 vs 21-23	0.01	0.03	.992	-0.08, 0.09

18-20 vs 24-26	0.02	0.03	.922	-0.06, 0.10
18-20 vs 27+	-0.10*	0.03	.022	-0.18, -0.01
21-23 vs 24-26	0.01	0.02	.958	-0.05, 0.07
21-23 vs 27+	-0.09*	0.02	.002	-0.15, -0.03
24-26 vs 27+	-0.08*	0.02	.007	-0.14, -0.02

A one-way ANOVA was conducted to examine the difference in metacognitive skills based on age groups (N = 600). The results revealed a statistically significant difference, $F(3, 596) = 10.21$, $p < .001$, $\eta^2 = .049$, indicating that approximately 4.9% of the variance in metacognitive skills was accounted for by age. Therefore, H2b was rejected.

Post-hoc comparisons using Tukey HSD were conducted to determine the nature of the differences. Results showed that participants aged 27+ scored significantly higher on metacognitive skills compared to those aged 18-20 (MD = -0.10, p = .022, 95% CI [-0.18, -0.01]), 21-23 (MD = -0.09, p = .002, 95% CI [-0.15, -0.03]), and 24-26 (MD = -0.08, p = .007, 95% CI [-0.14, -0.02]). No significant differences were found among the younger groups (18-20 vs 21-23, 18-20 vs 24-26, 21-23 vs 24-26, all p > .05). This indicates that metacognitive skills tend to be higher in mature students aged 27 and above.

Table 4: Differences in Metacognitive Skills and Academic Resilience by University Type (N = 600)

Variables	**University**	**N**	**Mean**	**SD**	***T***	**df**	***p***
Metacognitive Skills	Public	278	3.37	0.66	-0.95	598	.345
	Private	322	3.42	0.59			
Academic Resilience	Public	278	3.37	0.67	-0.95	598	.345
	Private	322	3.43	0.59			

Table 4 presents the results of an independent samples t-test examining differences in metacognitive skills and academic resilience based on university type. Results indicated no statistically significant difference between public and private university students for metacognitive skills, $t(598) = -0.95$, $p = .345$, with public students (N = 278, M = 3.37, SD = 0.66) and private students (N = 322, M = 3.42, SD = 0.59) scoring similarly. Similarly, no significant difference was found for academic resilience, $t(598) = -0.95$, $p = .345$, between public (M = 3.37, SD = 0.67) and private (M = 3.43, SD = 0.59) students. Therefore, university type does not significantly influence metacognitive skills or academic resilience.

Table 5: **Level of Study of Participants and Mean Scores of Metacognitive Skills and Academic Resilience (N = 600)**

Level of study	**N**	**%**	**MC M**	**MC SD**	**AR M**	**AR SD**	**t (598)**	**P**
BS	474	79	3.41	0.64	3.42	0.64	0.95	.342
M.Phil	126	21	3.35	0.63	3.36	0.63		
Total	600	100	3.40	0.64	3.40	0.64		

Note. *N = Frequency, % = Percentage, M = Mean, SD = Standard Deviation, MC = Metacognitive Skills, AR = Academic Resilience.*

Table 5 shows the distribution of participants based on level of study and mean scores. Out of 600 participants, 474 (79.0%) were BS students and 126 (21.0%) were M.Phil students. BS students had slightly higher mean scores for metacognitive skills (M = 3.41, SD = 0.64) and academic resilience (M = 3.42, SD = 0.64) than M.Phil students (MC: M = 3.35, SD = 0.63; AR: M = 3.36, SD = 0.63). An independent samples t-test revealed no statistically significant difference based on level of study for metacognitive skills, $t(598) = 0.95$, $p = .342$, and academic resilience, $t(598) = 0.95$, $p = .342$. Therefore, level of study does not significantly influence metacognitive skills or academic resilience in this sample.

Discussion

The present study examined the relationship between metacognitive skills and academic resilience among 600 BS and MPhil students from selected universities in Lahore, Pakistan. The findings revealed a strong positive association between metacognitive skills and academic resilience, $r(598) = .835$, $p < .001$. This suggests that students reporting stronger metacognitive skills also tended to report greater academic resilience.

This finding is consistent with Flavell's (1979) theory of metacognition, which emphasizes monitoring and regulating one's thinking, and Schraw and Dennison's (1994) work on metacognitive awareness. Students who recognize learning difficulties, evaluate their strategies, and adjust their approaches may be better prepared to respond to academic setbacks. The finding also aligns conceptually with Cassidy's (2016) and Martin and Marsh's (2006) accounts of academic resilience. However, the correlational design does not establish causation or the direction of the relationship.

The magnitude of the correlation requires careful interpretation. A coefficient of .935 is exceptionally high for two distinct self-reported constructs. The original SPSS output, scoring procedures, and possible overlap between questionnaire items should therefore be checked before publication. Although the squared correlation is approximately .874, this represents shared variance and should not be interpreted as evidence that metacognitive skills cause 87.4% of academic resilience.

The gender comparison showed no statistically significant difference in metacognitive skills between male and female students, $t(598) = 0.38$, $p = .702$. In contrast, age-group differences were statistically significant, $F(3, 596) = 10.21$, $p = .001$, $\eta^2 = .049$. Post-hoc comparisons indicated that students aged 27 years and above scored higher than students in the younger age groups. This pattern may reflect differences in educational or life experiences, although these explanations were not directly tested.

The findings also reports no statistically significant differences by university type or level of study. These findings should be interpreted cautiously because the corresponding test statistics need verification against the original SPSS output. Furthermore, the reported gender analysis concerns metacognitive skills only; conclusions about gender differences in academic resilience cannot be drawn from the available results. Overall, the findings highlight a strong association between metacognitive skills and academic resilience among the students studied. Universities may consider incorporating reflective learning, self-monitoring, and strategy evaluation into teaching practices. However, longitudinal and intervention studies are needed to determine whether strengthening metacognitive skills leads to improvements in academic resilience.

Conclusion

This study examined the relationship between metacognitive skills and academic resilience among 600 BS and MPhil students from selected public and private universities in Lahore, Pakistan. The principal finding was a strong positive association between the two constructs. The study also found statistically significant age-group differences in metacognitive skills, with students aged 27 years and above reporting higher scores than the younger groups. The reported comparisons by gender, university type, and level of study did not show statistically significant differences in metacognitive skills or, where reported, academic resilience.

Overall, the findings highlight the relevance of metacognitive skills to understanding students' experiences of academic resilience. Students' ability to monitor their understanding, evaluate their strategies, and adjust their learning approaches may be relevant when they encounter academic difficulties. However, the cross-sectional correlational design does not establish the direction of the relationship or demonstrate causation. The exceptionally high reported correlation also requires verification before firm conclusions are drawn. Subject to that verification, the study provides a useful basis for further research into metacognitive learning processes and resilience in Pakistani higher education.

Recommendations

1. University teachers should encourage students to plan their learning, monitor their understanding, and reflect on their learning strategies.
2. Universities should provide guidance that helps students manage setbacks, solve problems, and seek help when needed.
3. Learning support should take students' educational backgrounds and experiences into account rather than relying on age alone.
4. Universities should assess whether metacognitive training improves students' academic resilience through structured programmes and follow-up studies.

5. Researchers should verify the questionnaire's scoring and statistical results and examine how different metacognitive skills relate to specific dimensions of academic resilience.

Limitations and Future Research

This study has several limitations. First, its cross-sectional design identifies an association between metacognitive skills and academic resilience but cannot establish causation. Second, the sample was drawn from four selected universities in Lahore, which may limit the generalizability of the findings. Third, both variables were measured through self-reported questionnaires, which may be affected by response bias. Additionally, the exceptionally high correlation between the two constructs requires verification of the scoring procedures, statistical results, and possible overlap between questionnaire items.

Future research should include students from universities in different regions of Pakistan to improve generalizability. Longitudinal and intervention studies could examine whether improving metacognitive skills leads to changes in academic resilience. Researchers should also investigate the relationships between specific metacognitive skills and individual dimensions of academic resilience using validated instruments and verified statistical analyses.

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