Journal of Palestine Ahliya University for research and studies
مجلـة جامعة فلسطين الأهلية للبحوث والدراسات
ISSN: 2959-4839
Vol. 04 Issue 01 (2025)

Academic Resilience and Psychological Flow Among University Students: Examining Gender and Residential Interaction Effects

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Received:19/01/2025 Accepted:23/02/2025 Published:01/04/2025

Abstract:

This study aimed to investigate the relationship between academic resilience and psychological flow among university students, examine the predictive capacity of academic resilience for psychological flow, and analyze the interactive effects of gender and residence on both variables. The sample was 879 students (24.1% female) from Al-Azhar University. The Academic Resilience Scale was developed and the Psychological Flow Scale was adapted to Arabic. Results showed significant correlational relationship (r = 0.424) between academic resilience and psychological flow. The findings suggested the possibility of predicting the psychological flow by the sub-dimensions of academic resilience, except the academic emotional regulation, and the total score. Moreover, results showed that females did better in academic emotional regulation, whereas males exceeded in all elements of psychological flow. Additionally, the gender and residency effects were found to be statistically significant in terms of the intrinsic reward dimension of psychological flow. Results highlight the need to promote academic resilience to enhance psychological flow experiences of both genders and their residential differences while designing educational interventions. The findings highlight novel interactive effects of gender and residence on academic resilience and psychological flow to inform the design of targeted educational interventions based on demographic differences.

Keywords: *Academic Resilience; Psychological Flow; Gender; Residence; University Students.*

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الصمود الأكاديمي والتدفق النفسي لدى طلاب الجامعة: دراسة أثر تفاعل النوع والإقامة

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تاريخ الاستلام:2025/01/19 تاريخ القبول:2025/03/23 تاريخ النشر:2025/04/01

ملخص:

هدفت الدراسة إلى الكشف عن العلاقة بين الصمود الأكاديمي والتدفق النفسي لدى طلاب الجامعة، وفحص القدرة التنبؤية للصمود الأكاديمي بالتدفق النفسي، وتحليل أثر تفاعل النوع والإقامة على كلا المتغيرين، وتكونت عينة البحث من (879) طالباً وطالبة (24.1% إناث) من جامعة الأزهر، تم بناء مقياس الصمود الأكاديمي وتعريب مقياس التدفق النفسي، وأظهرت النتائج وجود علاقة ارتباطية دالة إحصائيا (r = 0.424)، بين الصمود الأكاديمي والتدفق النفسي، كما أظهرت النتائج إمكانية التنبؤ بالتدفق النفسي من خلال الأبعاد الفرعية للصمود الأكاديمي والدرجة الكلية عدا بعد التنظيم الانفعالي الأكاديمي، وأظهرت النتائج تفوق الإناث في التنظيم الانفعالي الأكاديمي، بينما تفوق الذكور في جميع أبعاد التدفق النفسي. كما أظهرت النتائج وجود أثر تفاعل دال إحصائياً للنوع والإقامة على بُعد المكافأة الداخلية في التدفق النفسي. تؤكد النتائج أهمية تنمية الصمود الأكاديمي لتحسين خبرات التدفق النفسي، مع مراعاة الفروق المرتبطة بالنوع والإقامة عند تصميم التدخلات التربوية. تُقدّم الدراسة رؤى جديدة حول التأثيرات التفاعلية للنوع والإقامة على الصمود الأكاديمي والتدفق النفسي، مما يسهم في تطوير تدخلات تربوية مخصصة تراعي الفروق الديموغرافية.

الكلمات المفتاحية: *الصمود الأكاديمي؛ التدفق النفسي؛ النوع؛ الإقامة؛ طلاب الجامعة.*

1. Introduction

In educational psychology, academic resilience has come to emerge as an essential construct; students' ability to thrive despite adversities and maintain academic success (Rudd et al., 2021). This is a multifarious concept that is realised through adaptive Cognition affective and response patterns (Cassidy, 2016); social emotional learning and academic buoyancy to handle everyday challenges (Beri & Kumar, 2018; Martin & Marsh, 2008). Studies in recent years have shed light on its negative relationship with academic stress as well as the variation among cultural contexts (Mulati & Purwandari, 2022; Ye et al., 2021), highlighting factors such as confidence, home resources and school belonging (Wang et al., 2024).

In today's educational context, academic resilience has been gaining in importance, especially in light of the COVID 19 pandemic (Reyes et al., 2022). Research emerging highlights its important involvement in supporting students' ability to independently achieve both good performance and good well-being (Brewer et al., 2019; García-Martínez et al., 2022). Studies have shown that resilience not only lowers stress but also raises academic ability through a better self concept (Beri & Kumar, 2018; Durso et al., 2021). Particular interest is given to the complex relationship between resilience and demographic factors that differ in predictive patterns among gender groups (Ayala & Manzano, 2018).

Psychological flow frames into complementing the academic resilient domain that encapsulates an optimal mental state wherein total absorption and concentration are present in the academic activity (Beard, 2014; Nemt-allah, 2022; Pronenko et al., 2023). This state has been extensively studied in university settings, and has been found to correlate strongly with improved academic achievement and psychological well-being (Mao et al., 2024; Wang, 2014). Recent research suggests that flow experiences act as powerful mediators of the relationship between academic psychological capital and student performance (where positive psychology interventions may help promote these beneficial flow states) (Adil et al., 2019, 2020). Furthermore, the flow experiences across demographic factors and academic disciplines are documented (Aboodi, 2018; Hobbs et al., 2022; Won et al., 2023).

Gender and residential factors provide a compelling opportunity to study academic resilience and psychological flow together. Recent systematic reviews recommend that the combination of positive psychology principles, including the flow concepts, should maximize the extent with which students' well-being can be promoted (Hobbs et al., 2022). Additionally, while gender variations in flow experiences persist (Cha, 2014), flow conducive environments have also shown promise in promoting sustainable behaviour (Pronenko et al., 2023). The findings highlight the importance of standardised measurement of gender residence effects on psychological flow outcomes in academic contexts (García-Ramírez, 2023, Rudd et al., 2021, Ye et al., 2021).

Though the literature in these areas has advanced significantly with respect to both academic resilience and psychological flow, there remain considerable gaps in the literature at present. While academic resilience (Almulla, 2024; López-Aguilar et al., 2023) and psychological flow (Burke et al., 2024; Mao et al., 2024) have been studied separately, their relationship has not been fully investigated. Gender differences on both domains have been reported, but the interaction between gender and residential status on these psychological constructs has been poorly studied. This gap is noteworthy given the increasing diversity in student populations and living arrangements in higher education settings.

In accordance with these research gaps, the study seeks to examine the interaction between academic resilience and psychological flow among university students, predicting capacity, and examining interactive effects of gender and residence on academic resilience and psychological flow patterns. To achieve these objectives, the following research questions guide this investigation:

[1] Is there a statistically significant relationship between academic resilience and psychological flow among university students?
[2] Can psychological flow be predicted through academic resilience?
[3] What is the effect of gender and residence interaction on academic resilience?
[4] What is the effect of gender and residence interaction on psychological flow?

2. Theoretical Framework

This research is grounded in the theoretical foundation of several complementary frameworks that clarify the relationship between academic resilience and psychological flow. In educational settings, these phenomena are examined using Ecological Systems Theory, a primary lens, of examining the interrelation of environmental systems and student outcomes. According to this theory, resilience as an adaptive system is operating at multiple ecological levels (Loh et al., 2020; Mayar et al., 2021; Stokols et al., 2013). Academic motivators and barriers exist at various developmental levels, that interact between the personal and environmental factors (Allen et al., 2019; Li et al., 2020). Yet, the application of this multi-level perspective has effectively analysed how professional and academic resilience arises in more socially embedded contexts (Meerow & Newell, 2015; Newell, 2019).

Self Determination Theory (SDT) supplement the ecological perspective contribution on psychological mechanisms of the academic resilience. Liu and Huang (2021) suggested that SDT emphasises that students with a high level of their basic psychological needs such as autonomy, competence, and relatedness would have a better performance in academic performance. Pitzer and Skinner (2017) underline the importance of teacher support and environmental factors in the case of the formation of student's motivational resilience and academic achievement. Synthesized with ecological systems thinking, SDT provides a full framework for dissection of academic resilience that encompasses both individual psychological manifold and the extensive environmental systems of students success (Li et al., 2020; Stokols et al., 2013).

Flow Theory offers the construct that optimal psychological experience occurs in academic settings. The Flow Engine Framework further demystifies these complex interactions, elucidating how flow materializes through intricate interplays among inputs, cognitive processes, and outputs (Šimleša et al., 2018). Empirical studies underscore that flow experiences amplify counseling self-efficacy, augment emotional awareness, and bolster academic performance through the cultivation of psychological capital (Carmona-Halty et al., 2019; Mateo & Salanga, 2018).

The Broaden-and-Build Theory, as a component of Flow Theory, that pleasant emotions expand cognitive and behavioral repertoires, promoting personal growth and resilience (Fredrickson, 2001, 2004). However, this theory is becoming less robust by recent research that questions its role in positive emotions causing therapeutic progress and increases in psychological empowerment at organizational levels (Fitzpatrick & Stalikas, 2008; Roth et al., 2024; Zhai et al., 2022).

Recent empirical research has found important interconnections between academic resilience and psychological flow in education settings. The psychological resilience mechanisms that flow experiences give rise to (Mao et al., 2024) and the role of academic resilience (Bukhari et al., 2023) as a crucial buffer against stress levels that may otherwise thwart their academic progress are demonstrated by studies. Psychological capital and flow experiences have furthermore been found to positively predict academic achievement by reducing self handicapping behaviors (Adil et al., 2019), and in particular flow experiences lead to reduction in anxiety by increasing self esteem and academic self efficacy (Mao et al., 2020).

In particular, research in specialized educational contexts has been most productive. Consistently, studies have shown resilience to be important in the reduction of academic burnout and to the psychological well being (García-Izquierdo et al., 2018; Ríos-Risquez et al., 2018; Ríos-Risquez et al., 2016). Academic psychological capital has been shown to positively influence both flow experiences and study engagement (Adil et al., 2020), while the combination of academic resilience and motivational intensity contributes significantly to academic achievement (Yang & Wang, 2022). Research focusing on medical students has additionally verified that psychological well-being maintains a positive correlation with resilience while showing a negative correlation with academic burnout (Yu & Chae, 2020).

Gender differences in academic resilience present a complex picture in the literature. Some studies have found no significant gender differences among diverse student populations, including high school students in Jakarta (Faturrohmah & Sagita, 2023), Ghanaian senior high school students (Amoadu et al., 2024), and medical undergraduate students (Popa-Velea et al., 2021). However, other

research has identified notable variations, with international students showing higher academic resilience among females (Bala, 2019), and secondary school students in Jammu and Kashmir demonstrating significant advantages for girls in motivation and goal achievement (Dar et al., 2019). The complexity of these relationships is further illustrated by research showing that Chinese female college students experienced higher psychological distress rates, despite varying roles of resilience and social support (Zhang et al., 2018).

Residential factors and their interaction with academic outcomes have also emerged as significant areas of study. Research among Ghanaian youth has identified substantial regional differences in academic outcomes, highlighting the importance of protective factors such as school mentors and parental educational values (Abukari & Laser, 2013). Studies have demonstrated that resilience and engagement dimensions positively predict academic performance in first-year university students, with variations in importance between genders (Ayala & Manzano, 2018).

The intersection of gender, residence, and psychological flow reveals additional complexities. Some studies have stressed pronounced gender differences in mental health outcomes, i.e. showing women to be more obsessed and neurotic depressed than men (Mishra & Jha, 2015). Nonetheless, alternative research has contradicted these findings, indicating no substantial gender-related variances in psychological well-being among college students (Chauhan, 2019). Additionally, the latest investigations involving Fine Arts students observed no gender distinctions concerning the influence of psychological flow on quality of life (Ghazi et al., 2024).

The emergence of contemporary academic resilience measurement approaches attended to the multidimensional nature of the construct. Recent research on gender-residence effects in academic settings has generated interest in developing standardized measurement approaches that take gender residence effects into account and the impact they have on psychological flow (García-Ramírez, 2023; Rudd et al., 2021; Ye et al., 2021). As measurement methodologies have evolved to further understand the relationship of both academic resilience and psychological flow with demographic characteristics, these outcomes have been more precise and useful in designing more fine-tuned educational interventions.

The results of this study will help to produce a growing literature in educational psychology that has practical implications for educational institutions involved in building student success through targeting interventions. This research will investigate these relationships as they relate to gender and residential status in order to provide a nuanced and comprehensive approach to developing more productive support strategies for disparate student populations.

3. Method

3.1 Participants

Two samples from Al-Azhar University, Egypt were recruited as participants. For the initial psychometric sample (N = 478; 33.9% female), subjects were 18-23 years old (M = 19.62, SD = 1.43) and undergraduate students (M = 19.62, SD = 1.43). The participants were distributed across academic years (first year: 39.1%, second year: 12.6%, third year: 35.1%, fourth year: 13.2%) and represented various academic majors including English (15.1%), Special Education (24.3%), Psychology (17.6%), and Arabic Studies (11.7%). The residential distribution showed 41% from urban areas and 59% from rural areas, with most students living with family (66.7%), followed by independent housing (28.0%) and university housing (5.2%).

The main study sample comprised 879 students (24.1% female) within the same age range (M = 19.85, SD = 1.40). This sample represented five colleges, predominantly from the College of Education and Humanities, with similar residential patterns (35.7% urban, 64.3% rural) and living arrangements as the psychometric sample. Table 1 presents the detailed demographic characteristics of the participants.

Table1: Demographic Characteristics of the participants

Variable	Category	Psychometric sample		Main sample	
		N	%	N	%
Gender	Male	316	66.1	667	75.9
	Female	162	33.9	212	24.9
Residence	Urban	196	41.0	314	35.7
	Rural	282	59.0	565	64.3
Living Arrangement	With Family	319	66.7	603	68.6
	Independent Housing	134	28.0	229	26.1
	University Housing	25	5.2	47	5.3
College	Faculty of Education (Males) - Tafhna Al-Ashraf	236	49.4	54	6.1
	Faculty of Education (Females) – Cairo	77	16.1	168	19.1
	Faculty of Education (Males) – Cairo	80	16.7	438	49.8
	Faculty of Humanities (Females)- Tafhna Al-Ashraf	85	17.8	219	24.8
Academic Year	First year	187	39.1	248	28.2
	Second year	60	12.6	98	11.1
	Third year	168	35.1	417	47.4
	Fourth year	63	13.2	116	13.2

3.2 Measures

The Academic Resilience Scale (ARS) was developed through a systematic multi-stage process. The initial pool consisted of 30 items generated based on comprehensive literature review and existing measures of academic resilience. These items were designed to capture various aspects of academic resilience including perseverance, emotional regulation, and self-efficacy in academic contexts. The initial item pool was evaluated by seven expert judges specializing in educational psychology and psychometrics, who assessed the items' content validity, clarity, and relevance to the construct of academic resilience.

The preliminary psychometric evaluation began with examining the scale's factorial structure. The Kaiser-Meyer-Olkin measure of sampling adequacy was .954, and Bartlett's test of sphericity was significant ($\chi^2 = 6134.216$, $df = 435$, $p < .001$), indicating the data's suitability for factor analysis. Total Variance Explained," the exploratory factor analysis revealed three distinct factors explaining 47.856% of the total variance, with the first factor accounting for 37.237%, the second for 6.327%, and the third for 4.291% of the variance.

Through principal component analysis with Varimax rotation, six items were eliminated due to low factor loadings (below .50) or cross-loading issues, resulting in a 24-item scale. As presented in Table 2, "Factor Structure of the Academic Resilience Scale," the final structure comprised three dimensions: Academic Perseverance (10 items), Academic Emotional Regulation (10 items), and Academic Self-Efficacy (4 items). Items were rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Table 2 Factor loading of 24-ARS

Items	Academic Perseverance	Academic Emotional Regulation	Academic Self-Efficacy
1.I maintain dedication to my studies, even when facing difficulties.	0.600		
2.I persevere in my academic work until I achieve my goals.	0.591		
3. I redouble my efforts when encountering obstacles in my studies.	0.550		
5. I focus on long-term academic goals, despite short-term setbacks.	0.526		
6. I am prepared to invest additional time and effort to overcome academic challenges.	0.660		
7. I remain committed to my studies, even when other activities tempt me.	0.626		
8. I fulfill my academic commitments, regardless of my feelings.	0.511		
9. I work consistently toward achieving my academic goals, even when progress is slow.	0.648		
10. I stay engaged in my studies, even when they become difficult or boring.	0.641		
23. I stay engaged in my studies, even when they become difficult or boring.	0.512		
11. I maintain composure when facing unexpected academic challenges.		0.684	
12. I control my emotions during stressful academic situations, such as exams or presentations.		0.756	
13. I think clearly and rationally when dealing with academic setbacks.		0.562	
14. I effectively regulate my emotions when facing academic pressure.		0.648	
16. I control my anxiety when dealing with difficult study materials.		0.625	
17. I maintain focus and calm when working under academic deadlines.		0.645	
18. I maintain balance and perspective when facing academic challenges.		0.611	
19. I effectively manage my stress levels during intensive study periods.		0.747	
20. I remain calm when faced with unexpected questions in class or during presentations.		0.608	
28. I remain balanced when receiving critical feedback on my academic work.		0.631	
21. I believe in my ability to influence my academic outcomes through my actions and decisions.			0.628

Items	Academic Perseverance	Academic Emotional Regulation	Academic Self-Efficacy
24. I believe my efforts have a direct impact on my academic success.			0.673
25. I can modify my study approach when current methods aren't working.			0.528
27. I control my reactions to academic setbacks and disappointments.			0.675

The scale demonstrated robust reliability across multiple indices, as detailed in Table 3, "Reliability Coefficients for ARS Dimensions." The total scale showed excellent internal consistency (McDonald's ω = .92, Cronbach's α = .92, Guttman's λ2 = .93), with strong reliability coefficients for individual subscales: Academic Perseverance (ω = .86, α = .86), Academic Emotional Regulation (ω = .87, α = .87), and Academic Self-Efficacy (ω = .70, α = .70). Average inter-item correlations ranged from .37 to .41 across subscales, indicating good item homogeneity.

Table 3 Reliability Coefficients for ARS Dimensions

Scale/Dimension	McDonald's ω	Cronbach's α	Guttman's λ2	Average Inter-item Correlation
Academic Perseverance	0.86	0.86	0.86	0.38
Academic Emotional Regulation	0.87	0.87	0.87	0.41
Academic Self-Efficacy	0.70	0.70	0.70	0.37
Total Academic Resilience	0.92	0.92	0.93	0.33

Confirmatory factor analysis supported the three-factor structure with satisfactory fit indices (RMSEA = .047, CFI = .935, TLI = .928, GFI = .917). Factor loadings ranged from .474 to .712, demonstrating good construct validity (Figure 1). The scale's criterion validity was established through correlation with Cassidy's (2016) Academic Resilience Scale (r = .82), indicating strong concurrent validity.

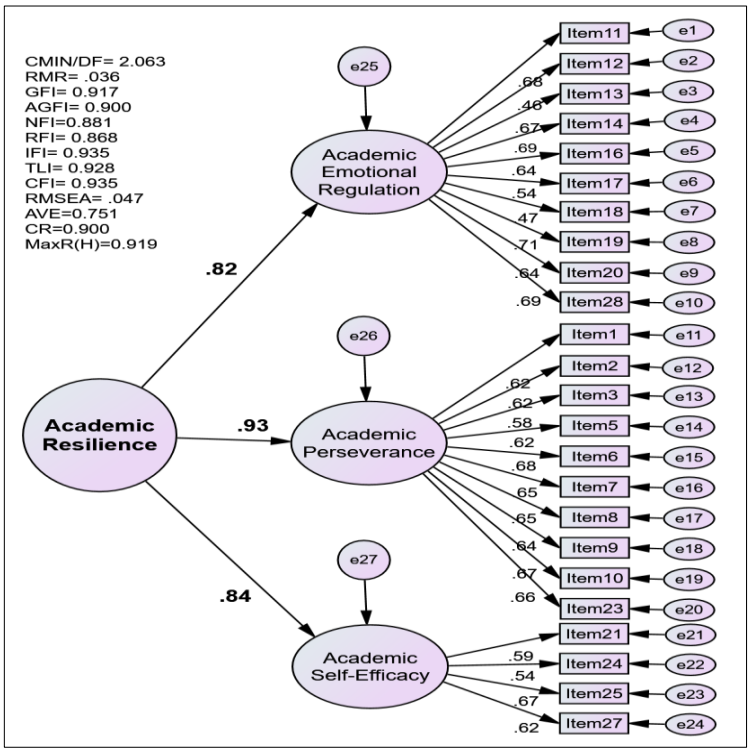

Figure 1 Standardized CFA for the three-factor 24-ARS

Composite reliability (CR) analysis yielded a value of .900, exceeding the recommended threshold of .70, while the average variance extracted (AVE) was .751, well above the .50 criterion, supporting the scale's construct validity. These psychometric properties, combined with the comprehensive development process and expert validation, suggest that the ARS is a reliable and valid instrument for measuring academic resilience in university students.

The Psychological Flow Scale (PFS), an Arabic adaptation of Norsworthy et al.'s (2023) scale, was developed through a comprehensive validation process. The scale consists of 9 items measuring three core dimensions of psychological flow: Absorption, Effortless Control, and Intrinsic Reward, with each dimension represented by three items. Responses were recorded on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree).

The Arabic adaptation process began with a rigorous translation and back-translation procedure to ensure conceptual equivalence. The initial scale underwent expert review by seven specialists in educational psychology and psychometrics who evaluated the items' content validity, linguistic clarity, and cultural appropriateness. The scale's construct validity was examined through confirmatory factor analysis (CFA), which supported the three-factor structure with satisfactory fit indices (RMSEA = .061, CFI = .972, TLI = .958, GFI = .969). The model demonstrated good parsimony with CMIN/DF = 2.748, further supporting its structural validity (Figure 2).

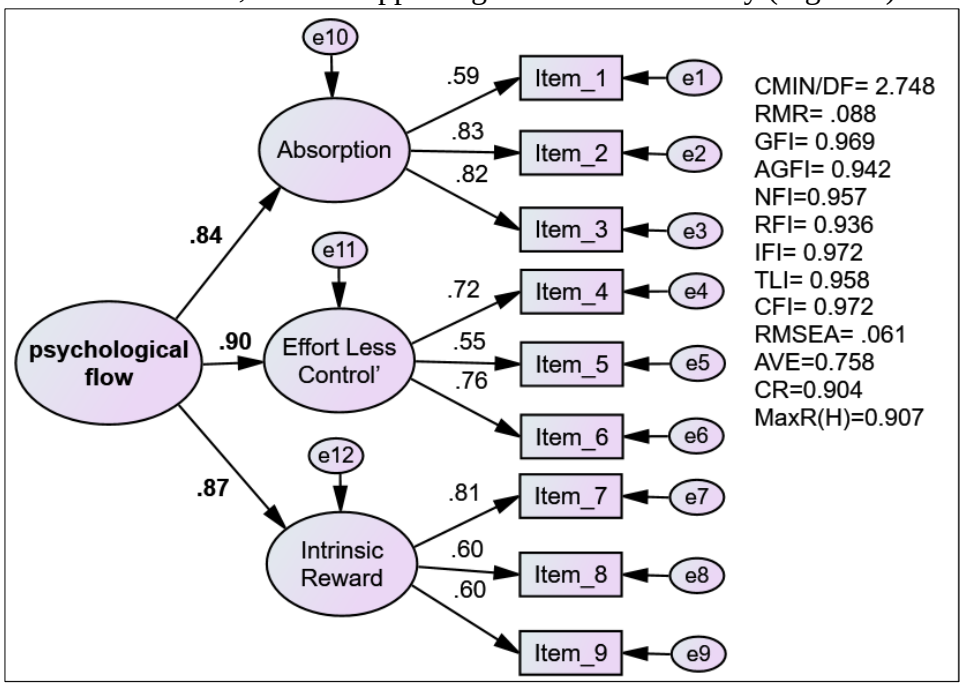

Figure 2 Standardized CFA for PFS

Factor loadings from the CFA showed strong item-factor relationships, with standardized regression weights ranging from .552 to .831 for individual items, and factor loadings of .840 to .901 for the three dimensions on the overall flow construct. The model fit indices demonstrated strong convergent and discriminant validity, with all modification indices falling within acceptable ranges. These comprehensive psychometric properties indicate that the Arabic version of the PFS is a reliable and valid instrument for measuring psychological flow in university students.

Reliability analyses revealed robust internal consistency across all dimensions. The total scale demonstrated excellent reliability with McDonald's $\omega = .86$, Cronbach's $\alpha = .85$, and Guttman's $\lambda 2 = .86$. The individual subscales also showed good reliability: Absorption ($\omega = .79$, $\alpha = .78$), Effortless Control ($\omega = .72$, $\alpha = .72$), and Intrinsic Reward ($\omega = .70$, $\alpha = .70$). The average inter-item correlations ranged from .44 to .55 across subscales, indicating good item homogeneity. The CR analysis yielded a value of .904, while the AVE was .758, both exceeding recommended thresholds and supporting the scale's construct validity.

3.3 Procedure

The scales were administered to participants during regular academic sessions after obtaining informed consent. Data collection occurred between September 22nd, 2024 to November 19th, 2024. Data collection occurred during regular academic sessions, with questionnaires administered in both paper and electronic formats depending on accessibility. Average completion time was 20-25 minutes. All participants provided informed consent, and the study received approval from the institutional ethics committee. Participation was voluntary and anonymous, with participants informed of their right to withdraw at any time.

3.4 Data Analysis

Statistical analyses were conducted using SPSS 27.0, and AMOS 26.0. The analytical approach included confirmatory factor analysis to validate scale structures, reliability analyses using multiple indices (McDonald's ω, Cronbach's α, Guttman's λ2), and main analyses addressing the research questions through Pearson correlations, multiple regression, and two-way ANOVA.

4. Results

The results of this study are presented in four main sections aligned with the research questions: (1) the relationship between academic resilience and psychological flow, (2) the predictive capacity of academic resilience for psychological flow, (3) the effects of gender and residence on academic resilience, and (4) the effects of gender and residence on psychological flow.

4.1 Relationship Between Academic Resilience and Psychological Flow

Pearson correlation analyses revealed significant positive relationships between academic resilience and psychological flow dimensions (Table 4). The overall academic resilience showed a moderate positive correlation with total psychological flow ($r = .424$, $p < .001$). Among the academic resilience dimensions, perseverance demonstrated the strongest correlation with overall psychological flow ($r = .409$, $p < .001$), followed by self-efficacy ($r = .369$, $p < .001$) and emotional regulation ($r = .367$, $p < .001$).

Table 4. Correlations Between Academic Resilience and Psychological Flow Dimensions

Variable	1	2	3	4	5	6	7
1.Academic Perseverance							
2.Academic Emotional Regulation	.748**						
3.Academic Self-Efficacy	.650**	.704**					
4.Total ARS	.920**	.934**	.809**				
5.Absorption	.361**	.340**	.385**	.344**			
6.Effortless Control	.338**	.314**	.349**	.270**	.565**		
7.Intrinsic Reward	.308**	.241**	.307**	.300**	.471**	.490**	
8.Total PFS	.409**	.367**	.424**	.369**	.831**	.858**	.768**

Note. N = 879; **p < .001

4.2 Predictive Capacity of Academic Resilience

Multiple regression analyses were conducted to examine the predictive relationship between academic resilience and psychological flow. The results indicated that total academic resilience significantly predicted psychological flow ($F(1, 877) = 192.397$, $p < .001$), explaining 18% of the variance ($R^2 = .180$). The regression equation was:

Psychological Flow = 18.965 + 0.264(Academic Resilience)

Further analysis examining the predictive capacity of individual resilience dimensions revealed that the three components collectively explained 18.7% of the variance in psychological flow ($F(3, 875) = 67.202$, $p < .001$). As shown in Table 5, perseverance ($\beta = .263$, $p < .001$) and self-efficacy ($\beta = .155$, $p = .001$) were significant predictors, while emotional regulation did not contribute significantly to the model ($\beta = .060$, $p = .237$).

Table 5. Multiple Regression Analysis: Academic Resilience Dimensions Predicting Psychological Flow

Predictor	B	SE	β	t	p
Constant	18.231	1.867	-	9.766	.001
Academic Perseverance	0.365	0.066	.263	5.532	.001
Academic Emotional Regulation	0.081	0.068	.060	1.185	.237
Academic Self-Efficacy	0.508	0.146	.155	3.493	.001

Note. $R^2 = .187$, Adjusted $R^2 = .184$, $F(3, 875) = 67.202$, $p < .001$

4.3 Effects of Gender and Residence on Academic Resilience

Two-way ANOVA analyses were conducted to examine the effects of gender and residence on academic resilience dimensions. For total academic resilience, no significant main effects were found for gender ($F(1, 875) = 0.723$, $p = .395$) or residence ($F(1, 875) = 1.444$, $p = .230$), and no significant interaction effect was observed ($F(1, 875) = 0.016$, $p = .900$).

However, analysis of individual resilience dimensions revealed significant effects for emotional regulation. A significant main effect of gender was found ($F(1, 875) = 7.731$, $p = .006$), with female students ($M = 40.095$, $SE = 0.235$) showing higher emotional regulation scores than male students ($M = 38.831$, $SE = 0.389$). No significant main effect of residence ($F(1, 875) = 2.440$, $p = .119$) or interaction effect ($F(1, 875) = 0.250$, $p = .617$) was found for emotional regulation.

For perseverance and self-efficacy dimensions, no significant main effects of gender (perseverance: $F(1, 875) = 0.606$, $p = .436$; self-efficacy: $F(1, 875) = 0.188$, $p = .664$) or residence (perseverance: $F(1, 875) = 0.491$, $p = .484$; self-efficacy: $F(1, 875) = 0.760$, $p = .383$) were found, and no significant interaction effects were observed. The complete results of these analyses are presented in Table 6.

Table 6. Two-Way ANOVA Results for Academic Resilience Dimensions

Variable	Effect	Mean Square	F	p
	Gender	18.406	.606	.436
Academic Perseverance	**Residence**	14.895	.491	.484
	Gender × Residence	1.442	.047	.828
	Gender	247.474	7.731	.006
Academic Emotional Regulation	**Residence**	78.098	2.440	.119
	Gender × Residence	8.013	.250	.617
	Gender	1.027	.188	.664
Academic Self-Efficacy	**Residence**	4.149	.760	.383
	Gender × Residence	.008	.002	.969
	Gender	108.735	.723	.395
Total ARS	**Residence**	217.078	1.444	.230
	Gender × Residence	2.369	.016	.900

4.4 Effects of Gender and Residence on Psychological Flow

Analysis of psychological flow revealed significant gender differences across multiple dimensions. For total psychological flow, a significant main effect of gender was found ($F(1, 875) = 34.392$, $p < .001$), with male students ($M = 47.083$, $SE = 0.514$) reporting higher flow experiences than female students ($M = 43.558$, $SE = 0.311$). No significant main effect of residence ($F(1, 875) = 2.526$, $p = .112$) or interaction effect ($F(1, 875) = 2.226$, $p = .136$) was observed for total flow.

Examining individual flow dimensions, significant gender differences were found in absorption ($F(1, 875) = 12.959$, $p < .001$), effortless control ($F(1, 875) = 4.914$, $p = .027$), and intrinsic reward ($F(1, 875) = 97.011$, $p < .001$). Male students consistently reported higher scores across all dimensions. Additionally, a significant gender × residence interaction effect was found for intrinsic reward ($F(1, 875) = 5.938$, $p = .015$), indicating that the gender difference in intrinsic reward was more pronounced among urban residents. These findings are detailed in Table 7.

Table 7. Two-Way ANOVA Results for Psychological Flow Dimensions

Variable	Effect	Mean Square	F	p
	Gender	124.171	12.959	.001
Absorption	**Residence**	5.947	.621	.431
	Gender × Residence	.420	.044	.834
	Gender	58.915	4.914	.027
Effortless Control	**Residence**	25.525	2.129	.145
	Gender × Residence	18.616	1.553	.213
	Gender	628.485	97.011	.001
Intrinsic Reward	**Residence**	19.383	2.992	.084
	Gender × Residence	38.471	5.938	.015
	Gender	1926.194	34.392	.001
Total PFS	**Residence**	141.456	2.526	.112
	Gender × Residence	124.660	2.226	.136

These findings highlight the complex interplay between demographic factors and psychological constructs in academic settings, with gender emerging as a particularly significant factor in both emotional regulation and psychological flow experiences.

5. Discussion

The present study investigated the complex relationships between academic resilience and psychological flow among university students, with particular attention to the moderating effects of gender and residential status. The findings reveal several noteworthy patterns that both align with and extend current understanding in educational psychology, while also highlighting important areas for future research and practical intervention.

The significant positive correlation between academic resilience and psychological flow ($r = .424$) demonstrates a substantial interconnection between these two psychological constructs, supporting the theoretical framework that links adaptive psychological resources with optimal learning experiences. The strongest correlation was from this dimension of academic perseverance towards overall psychological flow ($r = .409$). The results are in line with previous studies that reported similar relationships between resilience mechanisms and positive psychological states in academic settings (Bukhari et al., 2023; Mao et al., 2024). A strong association between these constructs points to the possibility that while students who have higher levels of academic reservoir will also experience psychological flow during their academic activities, we may be setting up what may be a virtuous cycle of increased engagement and performance.

Academic resilience explains 18% of psychological flow variance, indicating the importance of the developmental relationship between these constructs. There was a particularly noteworthy finding that academic perseverance ($\beta = .263$) and self efficacy ($\beta = .155$) significantly predicted the model but emotional regulation did not. This pattern suggests it is persistence through academic challenges, rather than emotional regulation skills themselves, more important to achieving flow states. These results build upon previous work by Adil et al. (2019, 2020), and specifically highlight which resilience components are the most critical to leading to flow state experiences.

The study of separate gender effects on academic resilience followed an interesting pattern, wherein the scores of female students compared with their male peers in the dimension of emotional regulation were significantly higher. This finding raises an interesting contrast to some previous studies which found no significant gender differences in academic resilience (Amoadu et al., 2024; Faturrohmah & Sagita, 2023). It corresponds to the research of Bala (2019) and Dar et al., (2019), who found some advantages for female students in academic resilience components. The female students scored higher on emotional regulation, which they may have done under socialization patterns or due to coping strategies with respect to academic overload, with the need for gender sensitive approaches in resilience building interventions.

Unexpectedly, there are no significant residential effects on academic resilience dimensions,

in contrast to Abukari and Laser (2013) who found large regional differences in academic outcomes. The implication of this result could be that the urban rural divide does not greatly affect Egyptian university settings' influence on psychological resilience as predicted, or that other environmental factors that might drive resilience patterns were at play. This lack of interaction effect between gender and residence also suggests that the demographic factors represented by gender and by residence elicit individual effects on resilience.

The results involving psychological flow present a strikingly more dissimilar pattern of demographic effects. The large gender differences on all flow dimensions with male students reporting consistently higher levels is consistent with earlier research by Cha (2014) but is contrary to more recent findings by Ghazi et al. (2024). It may reflect domain specific differences in flow based experiences or cultural factors affecting how differently gender affects patterns of academic engagement. Particularly strong gender effect on intrinsic reward ($F = 97.011$) indicated that male and female students may have different level of inherent satisfaction from academy activities that could affect their overall ability to be engaged academically.

A novel finding concerning the significant interaction between gender and residence for intrinsic reward in the context of psychological flow is reported here. If urban environments amplify gender based differences in how students experience academic engagement, the more pronounced gender difference found among urban residents suggests this. Adding a new dimension to our understanding of how environmental and demographic factors interact to influence psychological flow experiences in the academic context, beyond the simpler main effects evidenced in previous research (García Ramírez, 2023; Rudd et al., 2021).

Theoretical implications of these results suggest for understanding the connection between resilience and flow in academic contexts. Results are consistent with patterned integration of Flow Theory with Self Determination Theory by indicating that resilience may function as a psychological resource that enables the fulfillment of basic psychological needs necessary to facilitate flow experiences. The results suggest that demographic considerations need to be taken into account more carefully in theoretical models of academic psychological processes in which gender differences occur.

From a practical perspective, these results highlight a number of interventions that might increase student engagement and performance. By showing a strong predictive relationship between academic perseverance and psychological flow, this indicates that interventions aimed at fostering persistence and goal directed behavior are likely to be particularly efficacious for developing optimal learning experiences. Resilience and flow pattern differences have the potential of benefitting from tailored support strategies differentially tailored to men versus women in terms of patterns of academic engagement and coping.

The findings have implications for educational policy and practice in higher education settings. The higher emotional regulation scores among female students, coupled with their lower flow experiences, suggest a complex relationship between coping mechanisms and engagement that might require nuanced approaches to student support. The interaction between gender and residence in flow experiences indicates the need for context-sensitive interventions that consider both demographic and environmental factors in promoting student engagement.

Several limitations of the current study should be noted. The cross-sectional nature of the data limits causal interpretations of the relationships between resilience and flow. The sample's composition, drawn from a single university in Egypt, may limit the generalizability of findings to other cultural and institutional contexts. Additionally, the reliance on self-report measures might not capture the full complexity of students' psychological experiences in academic settings.

Future research should address these limitations through longitudinal designs that can better establish the temporal relationship between resilience development and flow experiences. This study would be enhanced by universality studies on the gender and residential effects observed via cross culture studies. Additional demographic and environmental factors that could better explain the context of the academic psychological processes, namely socioeconomic status and specific academic

disciplines, could be investigated.

This study makes significant methodological contributions by developing and validating the Academic Resilience Scale (ARS) and the Arabic adaptation of the Psychological Flow Scale (PFS). The psychometric robustness of these instruments is a significant contribution to Arabic speaking educational contexts research, and the three-factor structure of the ARS provides a nuanced framework for understanding the construct of academic resilience.

6. Conclusion

This study provides important insights into the relationship between academic resilience and psychological flow and their complex role of demographic factors. The findings point to academic resilience, which includes self efficacy and perseverance, as a target for promoting higher levels of academic engagement and success by enhancing students' flow experiences. Results of this study highlight the importance of demographic factors when both research and practice around academic psychological processes take place. These results add to the body of literature on educational psychology and add practical implications for educational institutions that want to increase student success with targeted interventions.

Acknowledgments

The authors thank the candidates who participated in this work.

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