Exploring the Influence of Stress on Adult Students' Academic Performance in Hong Kong: The Mediating Role of Depression

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ABSTRACT

The study explores the influence of stress on adult students' academic performance in Hong Kong. It focuses on the mediating role of depression in relation to stress (academic stress, family stress and job stress) and academic performance. The research involved 221 surveys, and the primary data used mixed methods with a quantitative and qualitative research methodology to collect 211 large-scale online surveys and face-to-face focus groups from these 10 adult students. The results showed that besides job stress having no relationship with academic performance, academic stress, family stress, and depression significantly positively impact academic performance among Hong Kong adult students. Additionally, all stress factors have a significantly positive impact on depression.

Conversely, depression has no mediating role between any stress factors and academic performance. This research was conducted in Hong Kong, and the target respondents were all Hong Kong adult students, which addresses flaws in prior research. The research suggests two crucial points. Firstly, colleges need to devote more resources to emotional therapy and counselling-related programs for students to decrease emotional illness crises. Secondly, the management of the education sector should aim to enhance the validity of knowledge in adult courses to replace traditional examinations with other more efficient practical assessments, which reduce the pressure on adult students to improve academic performance, which is especially important to contribute to education sector development in Hong Kong.

Keywords: Academic performance, academic stress, depression, job stress.

1. Introduction

The COVID-19 pandemic has severely impacted the Hong Kong economy, leading to decreased profitability for businesses (Barua & Barua, 2021). The government acquires international expertise to boost development (Yang *et al.*, 2022). Local workers are becoming more popular for study subsidies to improve competitiveness. However, employees working while studying face various stressors, including academic, family, and job stress (Abbas & Raja, 2015). These stressors can increase the likelihood of developing emotional issues, such as sadness and lack of compassion, which can significantly impact academic performance (Ribeiro *et al.*, 2018).

Nguyen *et al.* (2019) and Wang *et al.* (2023) found that depressive disorders impact academic performance, and students with different of stress are motivated to complete complex assignments and discontinue school careers (Nguyen *et al.*, 2019; Wang *et al.*, 2023). In contrast, Khan and Abbas (2022) argued that depression did not directly impact academic performance.

Hong Kong's education system is complete, and several universities are ranked among the top 100 in international rankings. They are influential. Major colleges have specific high-level requirements for students and course content, which will undoubtedly impact Hong Kong students differently. When adult students face stress in academics, jobs, and families, which may affect their academic

performance, this study will be conducted in Hong Kong. The aim is to explore and find practical suggestions for the Hong Kong education sector.

Prior research has primarily study on stress's impact on students' academic performance, focusing on particularly single-subject pupils (Deng *et al.*, 2022) and overseas employees (Wang *et al.*, 2023). Therefore, the target audience would be a Hong Kong adult student in this study. Secondly, there is a lack of research on adult students in Hong Kong. Thus, this research aims to fill this knowledge gap and improve the scholarly understanding of adult learners of Hong Kong, potentially aiding future course design and development in the Hong Kong education sector.

In this study, the primary data of reliability and validity will be collected and evaluated through mixed research methods, which use the qualitative method with focus group and quantitative method techniques for data collection. Literature serves as both secondary data and a conceptual foundation for study. The literature review is a quantifiable and crucial aspect of investigating the study reason, as shown by the studies conducted on a different kind of stress to affected academic performance by Sallehuddin *et al.* (2019), Deng *et al.* (2022), and Idaris *et al.* (2022). Mental health on depression influences academic performance (Wang *et al.*, 2023).

Alkhawaldeh *et al.* (2023) identified the stress of academic and family stress affected mental health (Deng *et al.*, 2022; Wang *et al.*, 2023) and working stress leading to different levels of mental health, especially in depression (Qiu *et al.*, 2021).

This study will examine the impact of academic stress, family stress, job stress, and academic performance via the mediation role of depression. The purpose can be to improve the Hong Kong education sector's understanding of adult students' academic performance and prevent some students from being unable to bear the pressure and emotional distress and causing unfortunate incidents.

2. LITERATURE REVIEW

The conceptual framework (as depicted in Fig. 1) measured the correlations among academic stress, family stress, job stress, depression, and academic performance among Hong Kong adult students in this research, evaluating and identifying the influence of the hypotheses' relationship, based on the works of Akanpaadgi *et al.* (2023), Deng *et al.* (2022), Iqbal *et al.* (2022), Qiu *et al.* (2021), and Wijesooriya (2023).

2.1. Stress

Stress is based on a person being affected by different external factors in life, causing changes in mood and behaviour. Stress can have positive or negative effects (Reddy *et al.*, 2018). This study will focus on the three aspects of family stress, academic stress, and job stress in working adult students, which impact the derivation of stress on depression and academic performance.

2.1.1. Academic Stress

Academic stress refers to when the person experiences physical and psychological abnormalities due to different factors during the studying process, which is divided into internal problems and external issues (Reddy *et al.*, 2018); stress created by the student's status, such as the internal factor on personal
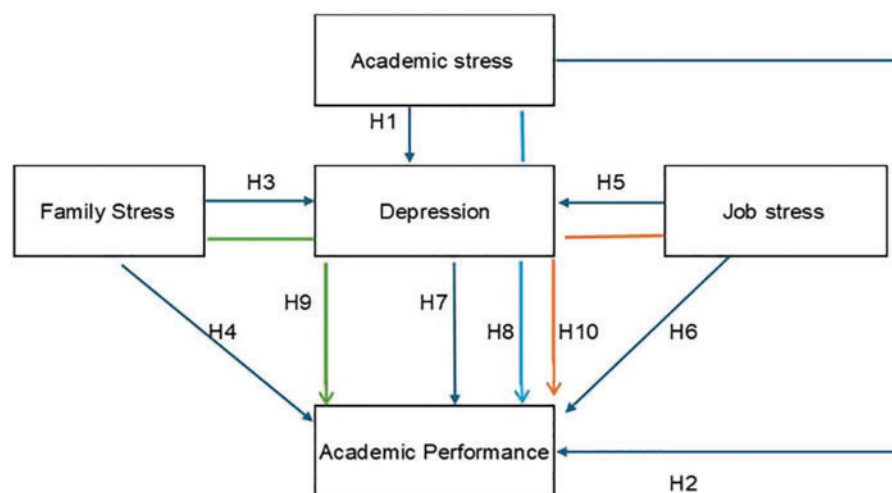
Fig. 1. The conceptual framework.

perfectionism, the feeling of failure and low self-esteem (Busari, 2012). For external factors such as homework and course density, the above factors impact adult students (Ang & Huan, 2006).

Academic stress is increasing the prevalence of mental health illnesses, particularly depression, due to the use of e-learning during the COVID-19 lockdown in Hong Kong (Lee *et al.*, 2021). The most prevalent psychiatric diseases, including depression, are experienced by individuals aged 18–25, attracting significant scrutiny and highlighting the need for improved educational practices.

Academic stress has a substantial positive link with depression levels, based on research published by Lörz *et al.* (2016) among university students in Canada (Lepine *et al.*, 2005). In contrast, Green *et al.* (2022) examined students' depression and academic stress as having a negative correlation.

H1: Academic stress has a significant positive influence on depression.

Besides, Akanpaadgi *et al.* (2023) point out that Academic stress has a negative impact on mental distress and a potential negative impact on academic performance since students do not know how to resolve stress. Even though stress can improve academic performance to a certain extent, it only accounts for occurs in rare cases.

Conversely, Issah (2018) believed that academic stress is unrelated to academic performance and explained that stress comes from personal emotional control and intelligence; academic performance depends on personal ability and knowledge. At the same time, research results point out that students with higher intelligence can successfully pass tasks with good coping skills; students only feel stressed since they have low ability and worry about not being able to complete tasks within the specified time.

H2: Academic stress has a significant negative influence on adult students' academic performance in Hong Kong.

2.1.2. Family Stress

According to Randall and Bodenmann (2013), Family stress is the tension that family members face as a result of problems, including schedule conflicts, financial problems, or conflicts between work and home life. Overtime working is deeply embedded in the ethos of most sectors in Hong Kong, often bearing an impact on employee and family dynamics; as the situation escalated, family members experienced varying degrees of emotional fluctuations, which correlates positively with levels of family stress and depression (Curby *et al.*, 2022). Abbas (2020) contradicted the notion that family problems, including economic stress, have an impact on different depression levels, which believes family stress is just a common issue and not related to mental disorders.

H3: Family stress has a significant positive influence on depression.

Iqbal *et al.* (2022) studied the negative impact of family problems on academic performance. They found that financial pressure and family conflicts simultaneously created different problems, which affected students' inability to focus on their studies and led to poor academic performance.

On the other hand, Rodgers and Rose (2001) believed that family pressure, such as financial status, was not the main factor that directly affected academic performance. They explained that family harmony and single-parent families are key factors affecting student performance and explored that even though the students come from wealthy families but grow up in a single-parent family, there was a greater chance that academic performance would be affected by personal abilities and emotions.

H4: Family stress has a significant negative influence on adult students' academic performance in Hong Kong.

2.1.3. Job Stress

Job stress is a psychological response experienced by individuals when they need to face problems outside their knowledge and skills (Shi *et al.*, 2022). The economic downturn and inflation caused by COVID-19 have resulted in layoffs, pay cuts, and overtime, which was common in the healthcare industry (Sun *et al.*, 2022). Working stress positively impacts workers' mental problems (Qiu *et al.*, 2021).

Benach *et al.* (2014) outlined that unstable employment negatively impacts health and quality of life, leading to mental health issues and depression levels. Conversely, Lepine *et al.* (2005) hypothesized that job stress may enhance performance and positively influence job conduct without affecting depression.

H5: Job stress has a significant positive influence on depression.

Previous research reflected that Job stress has a negative impact on academic performance (Wijesooriya, 2023). Ahmad *et al.* (2019) stated that employed students who encounter highly demanding problems at work and feel highly stressed have mood swings and poor cognitive functions, affecting their academic performance.

Conversely, Li *et al.* (2015) argued that stress can increase motivation and positively affect performance. At the same time, people's attention to tasks and their ability to unleash their potential have also increased relatively.

H6: Job stress has a significant negative influence on adult students' academic performance in Hong Kong.

2.2. Depression

In psychology, "depression" is a widely used term that usually refers to somatic, psychological, and bodily alterations in addition to shifts in mood and attitude towards life (Mellal *et al.*, 2014), which manifest in many degrees or intensities (Idaris *et al.*, 2022). Over the years, suicide cases related to depression have increased dramatically, including in Hong Kong. Most primary and secondary school students with heavy academic workloads, and suicide resulting from scholastic stress is very high (Wang *et al.*, 2023).

However, the magnitude of adult suicide resulting from academic stress is not too significant. Awadalla *et al.* (2020) expressed that depression impairs academic performance, which indicates why pupils with varied degrees of depressive disorder drop out of college or the topic. Wang *et al.* (2023) found that depression levels had a considerable detrimental impact on academic performance. Conversely, some scholars refuted that depression and mental health have no effect on academic scores and instead verified that pupils were able to get good scores even when experiencing seriously depressive mental health problems (Ngasa *et al.*, 2017).

H7: Depression has a significant negative influence on adult students' academic performance in Hong Kong.

2.3. Academic Performance

Academic performance includes learning attitudes and behaviours that pupils acquire throughout the learning process, evidenced by assessments or behavioural performance (Crede *et al.*, 2015). Most educational institutions use GPA ratings to assess students' academic performance (Alkis & Temizel, 2018).

Hong Kong is a fast-paced metropolis. Adult students frequently experience emotional and stress-related issues stemming from various aspects of their lives, such as work and family. When students willingly decide to pursue further studies, they are subjected to significant academic stress, which can have diverse effects on their academic performance (Yang *et al.*, 2022). Enkema *et al.* (2020) revealed that academic performance is severely affected by mental health. On the contrary, some research findings support that depression does not affect academic performance and discovered that people with good GPAs suffer from moderate levels of depression (Owens *et al.*, 2012).

H8: Depression mediates the effect between academic stress and adult students' academic performance in Hong Kong.
H9: Depression mediates the effect between family stress and adult students' academic performance in Hong Kong.
H10: Depression mediates the effect between job stress and adult students' academic performance in Hong Kong.

3. Method

3.1. Data Collection

Primary and secondary data are the two main data sources used in this research, and a mixed methods approach combining quantitative and qualitative methods is used. Simultaneous data collection from online questionnaires using the quantitative method is accomplished through a cross-sectional study. The qualitative method for in-person focus group interviews with actual questionnaires is expected. The secondary data is analyzed to ascertain the impact of stress on students' Academic performance in Hong Kong and the mediating role of depression.

3.2. Questionnaire Design

The 31-question questionnaire has three components: Personal information, general information, and academic area. Screening questions are used to choose suitable adult students (Choi *et al.*, 2014). The questionnaire includes males and females ages 18 to 65. Table I presents an overview of the questionnaire.

A simple multiple-choice method was used to gather the general and personal data (Kamper, 2020). Using a "five-point Likert scale" from 1 (Strongly Disagree)" to "5 (Strongly agree)", the academic area section followed the methods adapted by Deng *et al.* (2022) and Hwang and Lee (2023). The focus group utilized respondents' surveys with altered questions. Throughout the questions, respondents were free to offer their distinctive answers.

3.3. Sample Size and Sampling Method

This study used online questionnaires to collect 20 target participants for pilot testing, with a 100% return rate from all participants who did not dispute the question. The questionnaires were collected using a voluntary sampling method, and the minimum sample size was calculated using the following formula of Tabachnick and Fidell (2019):

$$N = \left(\frac{z}{e}\right)^2 pq \tag{1}$$

TABLE I: Questionnaire Design

Variables	Factors	Questionnaire	No	Adapted From
Independent	Academic stress	AS1: During my studies, I believed that academic stress led to life stress.	4	Deng *et al.* (2022); Hwang and Lee (2023)
		AS2: During my studies, the depth of the course made it challenging for me to grasp the fundamental concepts.		
		AS3: I needed repeated revisions from the lecturer to gain a complete understanding during my studies.		
		AS4: When I was studying, the stress of exams or assignments during studying negatively impacted my sleep quality.		
	Family stress	FS1: I believe that family stress significantly impacts students' lives.	4	Deng *et al.* (2022); Hwang and Lee (2023)
		FS2: I believe family issues may hinder students' ability to concentrate on their studies.		
		FS3: I believe family issues (such as time management, financial pressure, family conflicts), can significantly contribute to sleep disorders.		
		FS4: I am satisfied with my current life since I have a good income.		
	Job stress	JS1: I have a fear of going to work.	5	Hwang and Lee (2023)
		JS2: The nature of my job is that I work alone.		
		JS3: When facing a boss or colleague who has betrayed me, my pressure will increase accordingly.		
		JS4: I consistently experience often anger at work.		
		JS5: I am satisfied with my current workload and work environment.		
	Depression	DL1: I have lost interest in academic aspects that used to be important for me.	4	Deng *et al.* (2022); Hwang and Lee (2023)
		DL2: Unfair treatment by teachers will cause students to be academic depressed.		
		DL3: During my studies, sometimes I don't see value in my life. I feel depressed in the class.		
		DL4: I believe the continuous decline in sleep quality is a potential precursor to depression.		
Dependent	Academic performance	AP1: I believe various levels of depression (e.g., insomnia, loss of appetite) negatively affects student's motivation to learn.	4	Deng *et al.* (2022)
		AP2: I believe various levels of depression (e.g., memory issues) negatively affects student's learning capabilities.		
		AP3: I believe various levels of depression (e.g., insomnia, sadness) negatively affects student's academic grades.		
		AP4: Mental health has a valuable impact on students' academic learning.		

TABLE II: SUMMARY OF RESPONDENTS' PROFILE (N = 221; 211 ONLINE, 10 FACE-TO-FACE)

Variables	Category	Frequency	Percentage
Methods	Face to Face	10	4.6
	Online	211	95.4
Gender	Male	108	48.8
	Female	113	51.2
Age group	18–29 years old	44	19.9%
	30–39 years old	68	30.8%
	40–49 years old	83	37.6%
	50–65 years old	26	11.7%
Education level	Primary school or below	0	0.0%
	Secondary School	30	13.6%
	Post secondary/Associate/Diploma	48	21.7%
	Bachelor's degree	74	33.5%
	Master's degree or above	69	31.2%
Monthly income (HKD)	$10,000 or below	34	15.4%
	$10,001 to 20,000	29	13.1%
	$20,001 to 40,000	94	42.5%
	$40,001 to 60,000	37	16.8%
	$60,001 or above	27	12.2%
	Total	221	100

Note. 221 valid data with 100% return rate.

The researcher collected a total sample size of 221, divided into 211 questionnaires collected from online surveys using a Quantitative method and 10 actual surveys collected from in-person focus group interviews using a qualitative method, with 100% of the target participants completing the survey. The data from the online survey was analyzed and accepted by SPSS, providing a solid basis for the research findings in this study.

4. RESULTS

4.1. Descriptive Analysis

This study employed a mixed methodology that included a qualitative approach using face-to-face focus groups to gather data from 10 respondents, followed by a quantitative approach using an online questionnaire and pilot test distributed to 211 respondents, yielded 211 surveys and a 100% response rate. Descriptive analysis was employed in this research (Choi *et al.*, 2014).

1) Qualitative Method: Face-to-Face Focus Group Interviews

The focus group consisted of 10 participants, whose characteristics all of whom were adult students with secondary school above the qualification level. All participants completed all questions, ensuring the quality and validity of the data collected from the actual survey. Table II summarizes the profile characteristics of the respondents.

2) Quantitative Method: Online Survey

The total sample size of the online questionnaire was 211, and there was a 100% response rate; all participants completed all questions, including screening questions, which were valid. The questionnaire included academic questions, personal information questions, and general questions.

4.2. Reliability Analysis

The reliability test evaluates the internal consistency and dependability of measuring items using Cronbach's Alpha values. A coefficient above 0.7 indicates a robust correlation and excellent quality, while a lower number indicates a weak correlation and close to 1 has more dependability (Zhang *et al.*, 2020).

For Cronbach's alpha of reliability test, the family stress (0.695), job stress (0.427) and depression (0.677) were low correlation and the Cronbach alpha value below 0.7, which deleted the question FS4, JS2, JS3, JS5, DL2 and DL4. This research modified the number of questionnaire designs to 21 to 15 questions for reliability analysis in the academic section (see Table IV). All variable values were above 0.7 when the questions were adjusted, and the internal coefficient values of the reliability test were shown to be significant and satisfactory in this study (see Table III).

TABLE III: Research Instrument and Cronbach's Alpha (N = 211)

Variables	Cronbach's Alpha	Number of items	
Academic stress	0.839	4	AS1: During my studies, I believed that academic stress led to life stress.
			AS2: During my studies, the depth of the course made it challenging for me to grasp the fundamental concepts.
			AS3: I needed repeated revisions from the lecturer to gain a complete understanding during my studies.
			AS4: When I was studying, the stress of exams or assignments during studying negatively impacted my sleep quality.
Family stress	0.865	3	FS1: I believe that family stress significantly impacts students' lives.
			FS2: I believe family issues may hinder students' ability to concentrate on their studies.
			FS3: I believe family issues (such as time management, financial pressure, family conflicts), can significantly contribute to sleep disorders.
Job stress	0.709	2	JS1: I have a fear of going to work.
			JS4: I consistently experience often anger at work.
Depression	0.715	2	DL1: I have lost interest in academic aspects that used to be important for me
			DL3: During my studies, sometimes I don't see value in my life. I feel depressed in the class.
Academic performance	0.93	4	AP1: I believe various levels of depression (e.g., insomnia, loss of appetite) negatively affects student's motivation to learn.
			AP2: I believe various levels of depression (e.g., memory issues) negatively affects student's learning capabilities.
			AP3: I believe various levels of depression (e.g., insomnia, sadness) negatively affects student's academic grades.
			AP4: Mental health has a valuable impact on students' academic learning

TABLE IV: Reliability Test Result of Questionnaires Instrument (N = 211)

Variables	Before adjusted:21 Questions		After adjusted:15 Questions		
	Cronbach's alpha	Number of items	Cronbach's alpha	Number of items	Reduced question
Academic stress	0.839	4	0.839	4	NIL
Family stress	0.695	4	0.865	3	FS4
Job stress	0.427	5	0.709	2	JS2, JS3, JS5
Depression	0.677	4	0.715	2	DL2, DL4
Academic performance	0.930	4	0.930	4	NIL

4.3. Multiple Regression Model

4.3.1. Model of Regression Test

Table V shows the R-squared value of the three models analyzed from linear regression.

Model 1: The R^2 value of 0.249 indicates that academic stress, family stress, job stress, and depression collectively account for 24.9% of academic performance at a 99% confidence level. The βs for academic stress and family stress were 0.17 (p = 0.033) and 0.409 (p < 0.01), indicating a robust positive relationship with academic performance at a 95% confidence level of correlation. However, the correlation coefficients for job stress and depression were −0.003 (p > 0.1) and −0.016 (p > 0.1), indicating a lack of statistically significant relationship with academic performance.

Model 2: R^2 value was 0.383, which three variables of academic stress, family stress, and job stress achieved 38.3% of depression at a 99% confidence level. The βs for academic and job stress were 0.438 and 0.258, respectively (p < 0.01), indicating that the above two variables have a significant positive relationship with depression at a 99% confidence level. Conversely, the correlation coefficient of family stress is 0.072 (P > 0.1) with depression, which had no statistically significant relationship.

Model 3: R^2 value was 0.042, depression achieved 4.2% of academic performance at a 99% confidence level. The βs for depression was 0.205 (p = 0.003), indicating that the variables have a positive relationship with Academic performance, in which the confidence level reaches 99%. The regression outcome of the above three models demonstrated a strong confidence level of 99%.

TABLE V: Regression Results of All Models (N = 211)

Dependent variable	Academic performance (Model 1)				Depression (Model 2)				Academic performance 2 (Model 3)			
Multiple R	0.499				0.619				0.205			
R^2	0.249				0.383				0.042			
Adj R^2	0.234				0.374				0.038			
F (sig)	17.046 (<0.001)				42.88 (<0.001)				9.2 (0.003)			
Independent variable	β	t	sig	VIF	β	t	sig	VIF	β	t	sig	VIF
AS	0.17	2.149	0.033	1.707	0.438	6.791	<0.001	1.396				
FS	0.409	6.071	<0.001	1.243	0.072	1.185	0.237	1.235				
JS	−0.003	−0.042	0.966	1.277	0.258	4.369	<0.001	1.169				
DL	−0.016	−0.207	0.836	1.621					0.205	3.033	0.003	1

Note. All variables measured on 5-point Likert scale, 1 = strongly disagree to 5 = strongly agreed. Regression is significant at $p < 0.01$. AS: Academic Stress; FS: Family Stress; JS: Job Stress; DL: Depression; AP: Academic Performance.

TABLE VI: Direct Relationship of Hypothesis (N = 211)

Hypotheses	Relationship	R^2	β	P value	Result
H1	Academic stress has a significantly positive impact on depression	0.322	0.567	<0.001	Supported
H2	Academic stress has a significantly positive impact on academic performance	0.114	0.338	<0.001	Supported
H3	Family stress has a significantly positive impact on depression	0.096	0.309	<0.001	Supported
H4	Family stress has a significantly positive impact on academic performance	0.228	0.477	<0.001	Supported
H5	Job stress has significantly positive impact on depression	0.191	0.437	<0.001	Supported
H6	Job stress has no impact on academic performance	_	_	_	Not Supported
H7	Depression has a positive impact on academic performance	0.042	0.205	<0.003	Supported

4.3.2. Analysis of Variance (ANOVA)

The analysis of variance (ANOVA) results can predict the P value and F value, the significant difference between the values of P and F, which confidence is more significant (Fahrmeir *et al.*, 2013). The results show that the dependent variable was substantially predicted with an F-value (df: Regression, Residual) and P value.

Model 1 shows that academic performance of F value (4.206) at 17.046 (p < 0.001). Model 2 shows the depression of the F-value (3.207) at 42.880 (p < 0.001). Model 3 shows the academic performance of F value (1.209) at 9.2 (p = 0.003). The findings were significant at a 99% confidence level, suggesting a substantial association between the independent components (Table V).

4.3.3. Hypothesis Testing by Regression Analysis

This section illustrates the connection between variables, followed by the outcomes of regression analysis. The evaluation examines both the direct correlation and the mediation effect to assess the hypotheses (see Tables VI and VII).

4.3.4. Regression Analysis Summary

A total of 211 questionnaires were valid and legitimate for using SPSS v25 for data analysis. This study revealed that depression has no mediation relationship between any stress factors and academic performance, and job stress has no direct relationship with academic performance. Instead, academic stress, family stress and job stress were explored to have a strong positive impact on depression, and academic stress, family stress, and depression had a significant positive impact on adult students' academic performance in Hong Kong at a confidence level of 99% respectively, which reflected the results was highly reliability and validity in this research (see Fig. 2 and Tables VI and VII).

5. Discussion

This section examines the relationship between positive and negative stress via the results from the regression test, revealing that academic stress, family stress, job stress, and depression were the first factors influencing adult students' academic performance in Hong Kong.

This research revealed that academic stress (H2) has a positive significant impact on academic performance. The findings are contrary to previous research. The most likely reason is that the

TABLE VII: MEDIATION ANALYSIS RESULTS (N = 211)

Hypothesis 8	Variable	Relationship								Result
		AS → DL		DL → AP		AS → AP		AS→DL→AP		
		β	VIF	β	VIF	β	VIF	β	VIF	
Coefficient	AS	0.567	1.000	/	/	0.338	1.000	0.338	1	No Mediation
	DL	/	/	0.205	1.000	/	/	0		
Model summary	R	0.567		0.205		0.338		0.338		
	R^2	0.322		0.042		0.114		0.114		
ANOVA	F	99.098		9.200		26.875		26.875		
	sig F value	<0.001		0.003		<0.001		<0.001		

H8: Depression has not mediation with Academic Stress and Academic Performance

Hypothesis 9	Variable	Relationship								
		FS → DL		DL → AP		FS → AP		FS→DL→AP		
		β	VIF	β	VIF	β	VIF	β	VIF	
Coefficient	FS	0.309	1.000	/	/	0.477	1.000	0.477	1.000	No Mediation
	DL	/	/	0.205	1.000	/	/	0		
Model summary	R	0.309		0.205		0.477		0.477		
	R^2	0.096		0.042		0.228		0.228		
ANOVA	F	22.083		9.200		61.633		61.633		
	sig F value	<0.001		0.003		<0.001		<0.001		

H9: Depression has not mediation with Family Stress and Academic Performance

Hypothesis 10	Variable	Relationship								
		JS → DL		DL → AP		JS → AP		JS→DL→AP		
		β	VIF	β	VIF	β	VIF	β	VIF	
Coefficient	JS	0.437	1.000	/	/	0		0		No Mediation
	DL	/	/	0.205	1.000	/	/	0.205	1	
Model summary	R	0.437		0.205		0		0.205		
	R^2	0.191		0.042		0		0.042		
ANOVA	F	49.337		9.200		0		9.2		
	sig F value	<0.001		0.003		0		0.003		

H10: Depression has not mediation with Job Stress and Academic Performance
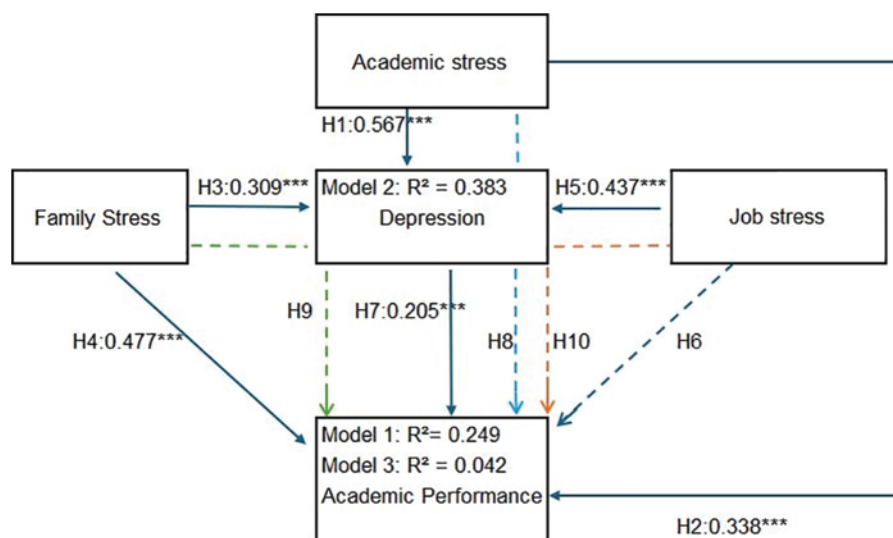
Fig. 2. Research model with analysis results. Only the lines marked with *** were found significant at the level of p < 0.01.

subjects of previous overseas studies focused on undergraduate students, while the target respondents of this study were adult students. When an adult student faces academic stress, they can solve the problem more maturely and are less restricted, increasing motivation and positively impacting academic performance (Li *et al.*, 2015).

Conversely, Issah (2018) predicted that stress and academic performance have no positive or negative relationship and explained that academic scores depend on personal ability only.

Previous studies found that undergraduate students are more passive in the face of family stress. Conversely, the present research result confirmed that adult students can proactively seek solutions and then continue their studies to improve and affect academic performance positively. Being a parent of an adult student helps set a positive role image for children and, therefore, has a positive relationship with academic performance (H4). On the other hand, some scholars have different opinions on family stress. Iqbal *et al.* (2022) believed the financial problem of family stress would affect the student, leading to poor academic performance. Rodgers and Rose (2001) alluded that financial status was a significant factor in impacting academic performance. Who believed the critical problem of family harmony and single-parent families, in this case by personal behaviour, not related to mental health problems.

Referring to the regression test of this study, depression has a positively significant impact on academic stress (H7), which reflected that adult students have better emotional management abilities. However, Wang *et al.* (2023) found that depression has a significant negative impact on academic performance.

Secondly, academic stress (H1), family stress (H3) and job stress (H5) were positively associated with depression, and H1 was the most vital positive coefficient correlation value in this study. These were similar to previous research by scholars (Deng *et al.*, 2022; Qiu *et al.*, 2021), proving that various emotional problems derived from stress are not restricted by geography or age group. Emotional diseases often arise from different types of stress. Recently years, the case of suicide related to mental health issues have increased dramatically (Wang *et al.*, 2023).

Finally, this study shows that job stress has no relationship with academic performance (H6). Oppositely, Ahmad *et al.* (2019) believed that employed students with a heavy workload would cause high stress and affect academic performance. Depression also has no mediating role between all stress variables and academic performance (H8–10). Previous research found that most students had depressive mental health issues but still got excellent academic scores, which showed that mental health was not related to academic performance (Ngasa *et al.*, 2017).

6. Conclusion

In conclusion, this study explored the influence of academic stress, family stress, and job stress on the academic performance of adult students in Hong Kong, including the mediating role of depression. The mixed research method, incorporating quantitative and qualitative approaches, revealed some significant findings. Depression was identified without mediating between any stress factors and academic performance, and job stress was not found to be related to academic performance. However, the finding identified that all stress factors have a strong positive impact on depression, and academic stress and family stress emerged as critical factors, which were found to have a significant positive impact on the academic performance of adult students in Hong Kong. Family stress is particularly influential (Table VI).

Prior research has studied several stresses that have negatively affected academic performance, particularly among single-subject students and overseas employed students, and research seldom focuses on Hong Kong's education sector. In this research result, academic stress and family stress were discovered to have a highly significant positive impact on the academic performance of Hong Kong-employed adult students. Simultaneously, all stress factors also have an enormously significant positive impact on depression. This research result shows the most realistic situation of employed adult students in Hong Kong. It fills the gap in previous studies and is seldom the target audience of employed adult students in Hong Kong.

This study has explored essential results regarding the impact of several stressors on academic performance and mental health problems among Hong Kong adult students. Family stress was an important factor affecting academic performance; academic stress also had a high impact on depression, which was a relationship that cannot be ignored. The most substantial coefficient correlation value in this study was. The findings contribute to the development of the education sector and help all sectors of society pay attention to mental health issues.

7. Implications

7.1. Theoretical Implications

Prior research on academic performance rarely focused on Hong Kong adult students and was limited to certain class subjects of the student's group. Thus, this study filled a research gap to explore the influence of stress factors and mental health factors, such as academic stress, family stress, job stress

and depression, on adult students' academic performance in Hong Kong. Deng *et al.* (2022) and Wang *et al.* (2023) found that depression and job stress have a negative impact on academic performance, respectively. Conversely, this research was conducted in Hong Kong and identified that depression has a significant positive relationship with academic performance. Job stress is not related to academic performance in Hong Kong adult students but is impacted by different characteristics, such as student background and country. This study expanded the sample size to all adult students at Hong Kong College to address a research gap.

7.2.   Practical Implications

7.2.1.   Academic Stress

Adult students should try to complete the homework before the submission deadline and pay attention to time management to avoid increasing stress due to failure at the deadline. Simultaneously, preparing lessons before the start of class can help make the class more attractive (Akanpaadgi *et al.*, 2023).

7.2.2.   Family Stress

The government should expand the amount of education funds and scholarships to help and encourage students and reduce family conflicts and pressure caused by student financial pressure. The college can expand the student counselling department and hire more experienced social workers and psychological experts to provide counselling for students in need.

7.2.3.   Job Stress

Under appropriate circumstances, the college allows students to attend class online, allowing students to be more flexible in time management between studying and working, which can reduce stress due to work absences that affect study progress and help to improve academic performance.

7.2.4.   Depression

The colleges need to devote more resources to emotional therapy and counselling-related programs for students to decrease emotional illness crises. Suicide cases caused by mental depression problems have become more frequent in Hong Kong in recent years, which also happens to students and teachers. This research recommended that the government pay more attention to the problem and make in-depth improvement plans and solutions.

7.2.5.   Academic Performance

Education institutions should try to enhance the validity of knowledge in adult courses, replacing traditional examinations with more efficient practical assessments and reducing the pressure on adult students to improve academic performance.

Implementing the above strategies to reduce adult students' various stress issues will improve academic performance and decrease emotional illness crises, which is especially important in contributing to the education sector development in Hong Kong.

8.   Limitations and Further Research

Since this study was hastily completed within half a year with a sample size as low as 300, it could not be considered a large-scale sampling. Furthermore, the face-to-face focus group sampling needed to be more in-depth. The temporal dimension was a limitation in this study. In order to make up for the study's shortcomings, the sample collection time should be extended to a year, and the amount of quantitative and qualitative research should be increased to improve future studies' comprehensiveness.

Conflict of Interest

The authors declare that they do not have any conflict of interest.

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