

Effect of General Anxiety and Mathematics Anxiety in the Academic Performance of Prospective Teachers

Misbah Dilawer

misbahdilawer282@gmail.com

SSC, School Education Department, Punjab

Dr. Nargis Abbas

nargis.abbas@uos.edu.pk

Associate Professor, Institute of Education, University of Sargodha, Sargodha
ORCID:0000-0001-6973-3999

Afshan Jabeen Zahra

afshanbabar187@gmail.com

PhD Scholar, Institute of Education, University of Sargodha, Pakistan

Corresponding Author: Misbah Dilawer misbahdilawer282@gmail.com

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ABSTRACT

Students' mental health is developing a massive concern in Pakistan, as in many other countries, specifically due to its effect on academic performance. This research reveals that anxiety whether it is a fear of mathematics, or the feelings of discomfort and tension can significantly influence students' knowledge and achievement. This research is examined how math anxiety and general anxiety affect the academic performance of undergraduate students in the University of Sargodha, Pakistan. It intends to investigate how such anxieties are related to academic achievement, taking into consideration gender, socio-demographic aspects, and the academic background. This study applied quantitative approach and cross-sectional design. The structured questionnaire was used to conduct the study on a sample of 160 students enrolled in BS, B.Ed Hons Elementary and B.Ed 1.5 Years General programs. The result of t-test shows that the females have higher rates of math anxiety than males. Also, the rural pupils experienced higher levels of general and math anxiety than the urban pupils. Math anxiety is more correlated with current CGPA of students and the negative correlation of both forms of anxiety and current CGPA is significant. The study postulates that general anxiety and math anxiety weaken academic performance, and those students who have found their anxieties to be higher in one domain also reported that their anxieties were also higher in the other. The study emphasizes that cognitive-behavioral therapy (CBT), peer support, and mentoring programs, are important to treat anxiety and enhance academic performance. The study identifies the necessity of research and context-sensitive intervention, especially in developing states to improve the consequences of anxiety on the academic performance of students.

Keywords: Math Anxiety, General Anxiety, Academic Performance, Gender Differences, Socio-demographic Factors, Cognitive Behavioral Therapy, Pakistan.

INTRODUCTION

Academic performance is a pivotal factor in shaping the future educational and career. Anxiety is one of the most common mental health disorders that affect students at various universities, as academic performance tends to depend on a range of psychological and emotional issues affecting students across the globe. Math anxiety and general anxiety are among these and have been found to be major predictors of academic achievement, especially in undergraduate education. Such kinds of anxiousness do not only create

difficulties in the academic performance of students but also affects their well-being, academic motivation, and future educational results (Halim et al., 2025).

In Pakistan, as in most other nations, the mental health problems in students are receiving a growing attention, and an increasing number of studies identify the negative impact of anxiety on academic achievements. Anxiety may have different manifestations in students such as math anxiety that is defined as an extreme fear of mathematics and general anxiety, which is a wide scope of emotional disturbances such as excessive worry, nervousness, and fear (rani, 2025). This introduction provides the background of the research into the association between anxiety and academic performance in the case of undergraduate learners in the Institute of Education, University of Sargodha, branches: BS, B.Ed Hons Elementary, and B.Ed 1.5 Years General.

Math anxiety is a feeling of emotion about the topic of mathematics which is commonly translated into a feeling of fear and apprehension when it comes to mathematical tasks or even the thought of mathematics (Pahmi et al., 2025). This form of anxiety was revealed to have adverse influence on the performance of students in mathematics that results in lack of motivation, avoidance and low academic performance in the math subjects. General anxiety on the other hand is a more generalized form of anxiety that cuts across several areas of one's life such as social life, academic problems, as well as self-related duties (Yarkwah et al., 2024). The two forms of anxiety may have significant effects on the performance at school with some differences depending on the measures of their effects and situations where they occur.

Math anxiety is also especially important where a BS, B.Ed Hons Elementary, and B.Ed 1.5 Years General are concerned, because students must interact with mathematical content to a certain extent or another (Sammallahti et al., 2023). The B.Ed programs students, such as numeracy, statistics or educational psychology, may also include math-related content, which can cause mathematics anxiety in the less confident students. Instead, general anxiety can influence the general academic environment, and it is likely to lead to lack of concentration, avoidance of study, and poor performance in an assortment of subjects. In this respect, the relationship between math anxiety and general anxiety is a key to defining how these two variables interact to impact upon the overall performance of undergraduates (Daker et al., 2023). This understanding is crucial for developing targeted interventions and support systems to mitigate the detrimental effects of anxiety on academic success (Ali, 2023; Demedts et al., 2022). This study therefore aims to dissect these complex interrelationships, providing a nuanced perspective on how different forms of anxiety differentially impact academic outcomes in this specific student cohort.

Anxiety in universities has been not only established but also observed to be common in various nations (Mofatteh, 2020). This pervasive issue affects students across all age groups, genders, and educational levels, presenting a significant challenge to academic achievement worldwide (Kartika & Roesdiana, 2020).

Regarding Pakistan, the research has been limited in examining how math anxiety and the general anxiety affect the academic achievement of the undergraduate students. A study conducted by Bukhari et al. (2022) indicated that there are increasing concerns about mental health problems among Pakistani students, especially when it comes to the effects of exam stress and academic related anxiety. Nonetheless, the research on math anxiety and general anxiety as far as academic performance is concerned is rather low, especially in the Institute of Education at the University of Sargodha (Rauf & Iqbal, 2024).

Depending on the level of support and resources provided to the students, the academic environment would either contribute to the negative effects of anxiety or mitigate the same. In this respect, the association between math anxiety, general anxiety and the academic outcomes is complicated and multi-dimensional. (Wang et al., 2025) Math anxiety may also be a major impediment to the way students process mathematical tasks thus performing poorly in examination, classroom activities and homework. Hembree (1990) affirms

that math anxiety is closely linked with poor test performance, math shyness, and low self-esteem about mathematical performance. This anxiety can be especially harmful among students doing such courses as BS, B.Ed Hons Elementary, and B.Ed 1.5 Years General, because math is usually part of the practice (Yarkwah et al., 2024).

On the same note, general anxiety may also disrupt more general academic performance such as reading comprehension, problem solving, and critical thinking. Adolescents with generalized anxiety frequently indicate that they have problems with time management, study habits, and academic engagement, which also negatively lead to poor performance. Math anxiety and general anxiety together and their impact on the mental health of students and their performance require further investigation, especially with respect to Pakistani universities such as University of Sargodha.

There are a number of socio-demographic factors that cause math anxiety and general anxiety as well as their severity. It has been shown that gender differences exist in the studies of anxiety, as female students tend to report more instances of math anxiety and general anxiety than their male peers (Yang & Jamaludin, 2024). This observation has been blamed on gender roles, self-concept and stereotypes of education in societies where the gendered attitudes towards mathematics and intellectual ability continue to exist.

Besides gender, another aspect of socioeconomic factors that affect the levels of anxiety among students is socioeconomic status. The learners of the Institute of Education of the University of Sargodha might belong to various socio-economic levels, and it is necessary to explore the role of SES on anxiety levels and, therefore, academic achievements (Rehman, 2025).

The academic history of students is also very important in defining the levels of anxiety among them. Students pursuing BS, B.Ed Hons Elementary and B.Ed 1.5 Years General courses may have different backgrounds of exposure to mathematics in previous studies, which may result in different degrees of math anxiety. Individual learners who were not exposed to math in high school might experience more difficulty in adjusting to math-related material in their university courses, and the effect of math anxiety becomes more pronounced, which causes academic failure (Pizzie & Kraemer, 2023).

Although the problem of mental health is increasingly becoming recognized within the educational environment, the literature regarding math anxiety and overall anxiety within the context of Pakistani educational system and in the Institute of Education of the University of Sargodha is scarce. The literature gap highlights this deficiency in the literature, and everyone agrees that further localized studies are required to explore the effects of anxiety in the academic performance of students, specifically in the BS, B.Ed Hons Elementary, and B.Ed 1.5 Years General curricula. Through these programs it is a unique chance to analyze the role of math anxiety and general anxiety among different groups of students and mainly their different academic backgrounds, different levels of exposure to math and the socio-economic statuses (Mainali & Spalding, 2025).

According to the research, the study aimed at offering a thorough insight into the presence of the effect of anxiety, the effect of math anxiety and general anxiety on the academic success of undergraduates at the Institute of Education, University of Sargodha. Within the scope of analyzing the effect of gender, socioeconomic status, and academic background on anxiety levels, the study will be useful to make certain contributions that can be used in academic interventions and mental health approaches (Imran et al., 2025). Finally, the results used to come up with specific remedies that can enhance the mental health and academic performance of learners in institutions of higher learning, especially in minimizing the adverse impact of anxiety on the performance of students in institutions of higher learning.

Conceptual Framework

The article is based on an integrated conceptual framework of the control-value theory of achievement emotions and the theoretical frameworks of transactional model of stress and coping and social learning theory to examine the complex interaction between the variables of mathematical anxiety (MA), general anxiety, gender, socio-demographic factors, and academic performance. The control-value theory implies that, in situations with low competence and control in math and high value of academic achievement, emotional distress caused by control-value theory results in poor performance (Li et al., 2025). The transactional model assumes that academic anxiety can be the result of dynamic interplay between people and their environment, in which the stressors such as academic demands and perceived inadequacy of coping resources increase anxiety and influence performance (Höhne et al., 2022). Moreover, the social learning theory puts special emphasis on the influence of gender and other socio-demographic variables on the development of self-image and vulnerability to anxiety among students, particularly in the form of stereotypes about society (Garba et al., 2019). This combined model implies that there is a reciprocal interaction between MA and general anxiety so that one might worsen the other, especially with gender and socio-demographic attributes (Peng et al., 2024). As an illustration, cultural and societal demands can trigger the development of anxiety in female students, particularly in such countries as Pakistan (Pasha, 2023). The framework guides the hypothesis of the study stating that the higher the MA and anxiety are, the worse the academic performance can be, and female pupils should have more MA, yet cultural differences could be possible. It highlights the need to conduct research that is specific to the contexts in developing countries to design specific interventions that would help students to become more resilient and academic.

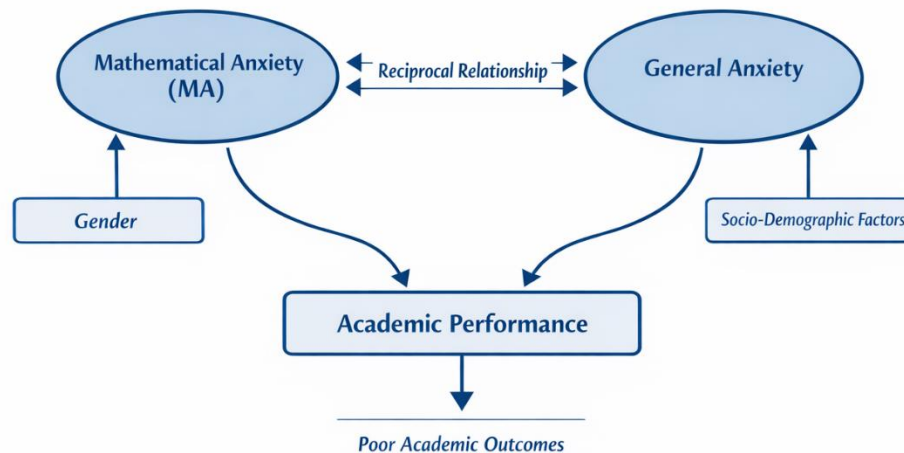


Figure 1 Conceptual framework of Study

LITERATURE REVIEW

The relationship between math anxiety, general anxiety, and academic performance has been the growing interest of educational psychology. Math-related or other forms of anxiety may have a profound impact on the academic performance of a student, especially on those subjects that require cognitive processing and attention (Perek-Białas et al., 2024). The Institute of Education of the University of Sargodha that provides undergraduate courses, including BS, B.Ed Hons Elementary, and B.Ed 1.5 Years General, can be considered a unique environment to study the interaction of math anxiety and general anxiety and their influence on the academic performance of the students. The current literature on the study investigated the

connection between anxiety and academic performance, the socio-demographic aspect that contributes to the anxiety levels, and the treatment strategies that have been applied to reduce anxiety in a learning institution (Rastogi et al., 2025).

Math anxiety is a term that is used to express the emergence of fear, tension, as well as nervousness in students whenever there are mathematical tasks being presented to them. It is a type of academic anxiety that is among the most researched and has been found to have a strong influence on performance of students in mathematics and other courses, which involve mathematical reasoning (Yarkwah et al., 2024). Math anxiety is not confined to the performance of students in math; they are also influenced by math anxiety in their motivation and attitude to academics. What is even more worrying is the adverse effect of math anxiety as it creates a vicious cycle of avoidance behavior, which in turn strengthens the anxiety condition and further impairs the learning process (Diponegoro et al., 2024).

Math anxiety has been established to influence students of different levels of education in Pakistan, starting at the level of primary school to the university level, and disproportionately the female students. Mousoulidou et al. (2025) also argue that high math anxiety students perform poorly in math related subjects resulting in a wider range of academic underachievement. To illustrate, learners who are pursuing courses that demand high levels of mathematics use, like BS and B.Ed courses, are particularly exposed to the adverse effects of math anxiety (Perek-Białas et al., 2024). Specifically, students accepted to the B.Ed Hons Elementary and B.Ed 1.5 Years General programs might experience more pressure and difficulties in their academic performance when touching upon such subjects as educational statistics and numeracy, which are the inherent parts of the study programs.

Studies have always indicated that female students are prone to high math anxiety levels when compared to male students (Martinot et al., 2025). The specified gender difference specifically applies in Pakistan, as the societal gender-related norms and stereotypes tend to affect the view on mathematical ability. It is possible, however, that female students in the Institute of Education, University of Sargodha have a higher level of math anxiety, which adversely impacts their results in math and non-math courses. This is a gendered effect of math anxiety that explains the need to explore the role of gender in the formation of anxiety in academic environments where the biases related to gender in the educational process are still present (Yang & Jamaludin, 2024).

Besides math anxiety, there is general anxiety which is also a sensitive factor that determines performance at school. General anxiety is a more general emotional state which is being excessive worry and fear about a number of things in life such as academic requirements, social life, and personal problems. In the case of university students, this type of anxiety is usually displayed through lack of concentration, procrastination, as well as a sense of nervousness that is always present during exams and classroom sessions (Pérez-Jorge et al., 2025).

Research has established that general anxiety is highly associated with low academic achievement because it affects the way one thinks such as memory, attention and problem-solving (rani, 2025). Specifically, students with high general anxiety scores do not perform well in examinations, they avoid academic challenges and may struggle to cope with academic workloads. Within the frame of University of Sargodha, the participants of the degree programs of BS, B.Ed Hons Elementary and B.Ed 1.5 Years General are likely to experience academic stresses, which increase their anxiety levels, particularly during final exams and projects.

There are several socio-demographic factors that affect the relationship between general anxiety and academic performance; these are gender, socioeconomic status (rani, 2025). Although some studies consider math anxiety and general anxiety as two distinct anxiety types, other studies confirm that the two

types of anxiety can interact with each other in complex ways which increase their impact on academic performances of students. Math anxiety is identified to bring along general anxiety and hence more stress and academic avoidance behaviors (Williams et al., 2024). Students who have the two types of anxieties may have compounded problems within the academic sphere, especially when they are assigned tasks involving mathematics together with other demanding circumstances.

In Pakistan, Math anxiety mixed with general anxiety is particularly acute among the undergraduate students of BS and B.Ed programs where the academic requirements are high and students are likely to be called upon to excel in various subjects (Bhutta et al., 2025). As an illustration, the BS students in specialties like education or social sciences might need to deal with statistical information or simple mathematical concepts that can cause math anxiety, but at the same time, might be unable to handle the overarching emotional and anxiety-related stress of general anxiety. These two pressures can greatly impair performance of the students particularly in terms of their performance in school where they do not have adequate mental health support or coping strategies (Dzonlic et al., 2025). Since it has been established that math anxiety and general anxiety are very influential on academic performance, educational institutions need to put in place effective interventions that can assist students to deal with the aforementioned anxiety. Different studies have suggested various measures aimed at minimizing the adverse impact of anxiety such as stress management training, peer support group, and cognitive-behavioral therapies (Shaikh et al., 2024).

Cognitive behavioral therapy (CBT) has been shown to be quite effective in the treatment of math anxiety and general anxiety. CBT assists students to recognize and dispute their negative thought patterns and substitute them with more positive and reasonable thinking patterns. This method has been demonstrated to decrease anxiety in math and overall anxiety and consequently positively affects academic performance (Li et al., 2025). CBT-based program implementation may turn out to be useful at the Institute of Education, University of Sargodha, as it helps lower anxiety levels among the students and positively influence their academic performance.

Moreover, interventions such as peer support systems and mentor programs can also be used to treat anxiety in universities. According to a study by Krishna (2024), peer support is an important factor in alleviating academic stress and improving mental health. Universities can create safe places where students can share their experiences and help one another to make them feel a part of communities to reduce the feeling of isolation and anxiety (Versfeld et al., 2025). Moreover, time management, relaxation skills, and positive coping skills workshops on stress management can build the student against academic stresses. These workshops are to be customized to the requirements of students in courses such as B.Ed Hons Elementary where the academic pressure might have been added to the strain of future teaching duties.

The literature review shows that the effects of math and general anxiety can have significant consequences on the performance of the students, especially in the Institute of Education, University of Sargodha. According to the research, math anxiety and general anxiety are both relevant causes of academic failure and depend on other socio-demographic characteristics, such as gender and socioeconomic status. It also highlights that specific interventions including CBT, peer support and stress management programs should be used to assist reduce anxiety and the academic results of students (Rastogi et al., 2025). Since such anxieties are predominant among students in undergraduate programs, research grounded on the students in various disciplines should be conducted to determine the needs of students and come up with effective intervention measures that can improve their mental health and performance (Rastogi et al., 2025). Furthermore, understanding the nuanced interplay between anxiety, academic stress, and various learning methodologies, particularly in the context of online versus in-person instruction, is critical for developing comprehensive support systems (Lee et al., 2022; Yang & Jamaludin, 2024).

Theoretical Framework

The research is based on the synthesis of three complementary psychological approaches, the Control-Value Theory of Achievement Emotions (Pekrun et al., 2007), the Transactional Model of Stress and Coping (Ben-Zur, 2019), and the Social Learning Theory (Kytile and Bandura, 1978). These theories offer a solid perspective through which to analyze the complex interactions between math anxiety and general anxiety, socio-demographic variables and academic achievement.

The Control-Value Theory states that the achievement emotions such as math anxiety are caused by the internal appraisals of control and value by a student (Pekrun et al., 2007). In particular, they develop debilitating anxiety when students acquire a sense of inability to cope with mathematical tasks and at the same time set a high valuation on performance and performance tends to drop (Linnenbrink-Garcia et al., 2016, p. 232). In addition to it, the Transactional Model assumes general anxiety due to the dynamic interaction between people and their surroundings (Ben-Zur, 2019). According to this model, students conduct the primary appraisal of academic tasks as stressors and secondary appraisal of their personal coping resources; the perceived imbalance results in stress that negatively affects memory and attention (Ben-Zur, 2019).

Lastly, the Social Learning Theory indicates that these anxiety levels do not exist in born form but are influenced by social situations and observational learning (Kytile and Bandura, 1978). Gender roles and regional backgrounds are some of the environmental factors that act as models to behaviors of the students to academic pressure (Kytile and Bandura, 1978). Collectively, these models help in the understanding of the interplay between psychological appraisals and social factors in the determination of anxiety severity and the final effects of anxiety on academic achievement.

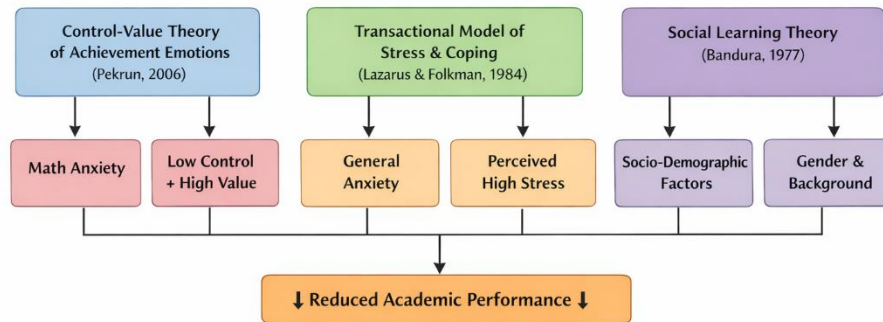


Figure 2 Theoretical framework of the research

METHODOLOGY

Study design and population

The research design used is cross-sectional and is aimed at determining the test anxiety of undergraduate students in the Institute of Education, University of Sargodha, Pakistan. The study will be carried out by the use of a structured questionnaire, which will be used in order to obtain the information concerning the levels of test anxiety. The questionnaire will be administered face to face unlike online surveys. The research is aimed at the BS, B.Ed. Elementary, and B.Ed. general (1.5 years) students. Such students represent a heterogeneous group in terms of their educational backgrounds, with science, business, and education being some of the examples that include the population of undergraduate students at large. This study will attempt to determine the levels and nature of test anxiety among these particular categories of students with great emphasis on the academic fields and types of programs.

This study was done on 160 undergraduate students studying BS, B.Ed. Elementary, and B.Ed. General (1.5 years) at the Institute of Education, University of Sargodha, Pakistan. The sample size was chosen in such a way that the sample size is representative enough to give sufficient data which can be analyzed reliably to give results on test anxiety level in these particular academic programs. This study utilized a purposive (judgmental) sampling method in which the sampling was carried out using certain characteristics that were pertinent to the study. Undergraduate students pursuing BS, B.Ed. Elementary and B.Ed. General (1.5 years) programs in the Institute of Education, University of Sargodha were being included in the sample. The criteria used to select the participants was voluntary participation with students being selected to take part in the study by answering the structured questionnaire. To achieve diversity, the study has covered students of different academic fields in order to have a wide variety of experiences on the subject of test anxiety. This method goes in line with the aim of the study of collecting data that are directly related to the research subject and at the same time the participants are voluntarily involved in the research.

Inclusion Criteria: The study sample was comprised of full-time undergraduate students that were enrolled in the BS, B.Ed. Elementary or B.Ed. General (1.5 years) programs at the Institute of Education, University of Sargodha and voluntarily agreed to take part in the study.

Exclusion criteria: The study excluded non-undergraduate students, those who are not enrolled in the given programs, as well as part-time students. The analysis was done only on the students who had voluntarily participated and gave incomplete answers to the questionnaire.

ANALYSIS

Table 1

Demographic Characteristics of Respondents (N = 160)

Variable	Category	Frequency (f)	Percentage (%)
Gender	MALE	84	52.5
	FEMALE	76	47.5
Age	20 and less	35	21.9

	21-25	87	54.4
	26 and above	38	23.8
Programme	B.ED HONS ELEMENTARY	40	25.0
	B.ED(1.5) GENERAL	20	12.5
	BS	100	62.5
Semester	2	13	8.1
	3	7	4.4
	4	47	29.4
	5	52	32.5
	6	11	6.9
	7	30	18.8
	Intermediate stream	I.COM	32
ICS		52	32.5
F.SC		15	9.4
F.A		61	38.1
Studied Mathematics in HSSC	YES	104	65.0
	NO	56	35.0
Residence	RURAL	87	54.4
	URBAN	73	45.6

Table 1 presents the demographic profile of the respondents. A total of 160 students were sampled. The sample population was slightly larger when male respondents (52.5%) were compared to female respondents (47.5%) in terms of gender. The age group 21-25 years had the highest percentage (54.4%) of respondents, with 23.8% of the respondents being above 25 years and 21.9% being 20 years and lower.

As far as academic program is concerned, most of the respondents were studying BS program (62.5%), followed by B.Ed. Hons Elementary (25.0%) and B.Ed. 1.5 General (12.5%). The maximum number of students are studying in 5th semester (32.5%) and 4th semester (29.4%). The largest percentage of students had studied F in relation to intermediate stream. A (38.1%), followed by ICS (32.5%), I.Com (20.0%), and F.Sc (9.4%). Additionally, 65.0% of the respondents had studied Mathematics at the HSSC level but 35.0% had not studied it at this level. Regarding place of residence, a little more students come from rural areas

(54.4%) than urban areas (45.6%). The overall sample is of a fairly well-balanced gender distribution and most of the respondents belonged to BS programs and rural areas.

Table 2

Academic Performance and Scale Scores

Variable	N	Minimum	Maximum	Mean	SD
SSC marks (recorded)	160	87.00	120.00	101.59	10.10
HSSC marks (all recorded values)	160	0.00	160.00	77.29	63.69
HSSC marks (excluding zero entries; check missing-code)	98	100.00	160.00	126.18	20.36
CGPA (recoded from value labels)	160	2.50	3.96	3.19	0.40
Generalized Anxiety Disorder (GAD_Total)	160	7.00	28.00	3.09	3.05
Mathematics Anxiety (MARS_Total)	160	53.00	139.00	3.702	17.25

Table 2 shows the descriptive statistics for academic performance and anxiety-related variables. The average score for SSC marks was 101.59 with a standard deviation of 10.10, which meant there was moderate variation of students' performance in SSC. If all values were included in the calculation of the mean for HSSC, it was 77.29 and the standard deviation was high, 63.69. If the zeros are omitted, however, the mean rose to 126.18 and the standard deviation to 20.36. This means that the zero scores significantly influenced the overall mean and should be checked to ensure they are not due to missing data but actually scores. The mean CGPA of students was 3.19 and the standard deviation was 0.40, indicating that the students on average performed well in their academic studies. The mean scores of the Generalized Anxiety Disorder (GAD_Total) and Mathematics Anxiety (MARS_Total) were 3.09 and 3.702, respectively. The results of the present study suggest that the respondents experienced significant general anxiety and mathematics anxiety. The computed mean score for MARS was higher than the mean score for other scales, indicating that mathematics anxiety was a dominant concern of the participants.

Table 3

Independent Samples t-tests for Gender and Residence Differences in Anxiety

Variable	Group	N	Mean	SD	T	p	Decision
GAD by Gender	Male	84	21.13	3.45	-2.21	.029	Significant
	Female	76	22.18	2.44			
MARS by Gender	Male	84	109.58	19.02	-1.14	.256	Not significant
	Female	76	112.70	15.02			
GAD by Residence	Rural	87	21.71	2.71	0.37	.714	Not significant
	Urban	73	21.53	3.44			
MARS by Residence	Rural	87	111.08	16.37	0.01	.989	Not significant
	Urban	73	111.04	18.37			

Table 3 presents the results of independent samples t-tests used to examine differences in anxiety scores based on gender and residence. The results demonstrated a significant difference between the gender and Generalized Anxiety Disorder (GAD); $t(158) = -2.21, p = .029$. Female students also reported higher mean GAD score ($M = 22.18$) compared to male students ($M = 21.13$) which suggests that female students had significantly higher scores of generalized anxiety than male students.

The gender difference on Mathematics Anxiety was not found to be statistically significant, however, $p = .256$. The mean MARS rating of the female students was slightly higher than that of the male students but this difference was not seen to be statistically significant.

No differences were found between rural and urban students in terms of residence for GAD_Total or MARS_Total. The results show that the respondents' residence did not provide significant support in explaining the differences of generalized anxiety and mathematics anxiety. Overall, there was only one

Table 4

Correlation Matrix among Study Variables (N = 160)

Variable	N	Mean	SD	GAD_Total	MARS_Total	CGPA
Generalized Anxiety Disorder (GAD_Total)	160	3.09	3.05	—	.727**	.277**

Variable		N	Mean	SD	GAD_Total	MARS_Total	CGPA
Mathematics (MARS_Total)	Anxiety	160	3.702	17.25	.727**	—	.376**
CGPA		160	3.19	0.40	.277**	.376**	—

Table 4 shows the correlations among generalized anxiety disorder, mathematics anxiety, and CGPA. The mean scores for GAD and Math anxiety were 3.09 (SD = 3.05) and 3.702 (SD = 17.25) respectively. The scores of the respondents ranged from 2.90 to 3.30 with an average of 3.19 (SD = 0.40).

Results of the correlation analysis showed that generalized anxiety disorder was strongly and positively correlated with mathematics anxiety ($r = .727, p < .01$), which means that the students who had higher generalized anxiety had higher mathematics anxiety. Moreover, there was a positive and significant relationship between generalized anxiety disorder and CGPA ($r = .277, p < .01$). Likewise, CGPA had positive and significant relationship with mathematics anxiety ($r = .376, p < .01$). The results of this study indicated that all the study variables were significant factors to each other.

Table 5

Multiple Regression Predicting Recoded CGPA from Anxiety Variables

Predictor	B	SE B	B	t	p
Constant	2.216	0.219	—	10.13	< .001
GAD_Total	0.001	0.014	.008	0.07	.943
MARS_Total	0.009	0.002	.370	3.43	< .001

Model Summary

R	R ²	Adjusted R ²	F	df	p
.376	.141	.130	12.90	2, 157	< .001

Multiple regression analysis was performed to investigate the predictive power of two anxiety measures (GAD_Total and MARS_Total) on students' CGPA. The mathematics anxiety was a significant positive predictor of academic performance, $B = 0.009, \beta = .370, t = 3.43, p < .001$. I.e., after controlling for generalized anxiety, students with higher mathematics anxiety scores tended to have higher CGPA scores. However, the effect of generalized anxiety (GAD_Total) was not independent of mathematics anxiety as it did not significantly predict CGPA, $B = 0.001, \beta = .008, t = 0.07, p = .943$. We did not find a significant effect of GAD_Total on CGPA in the regression model, but the correlation analysis showed that it was a positive correlation with mathematics anxiety, which may explain the lack of significance in the regression model. The overall regression model was thus statistically significant, $F(2, 157) = 12.90, p < .001$, meaning that the overall regression model accounted for a significant portion of the variance in CGPA. The model yielded an $R = .376$, suggesting a moderate relationship between the predictors and CGPA. The sum of the

R² values of .141 indicates that generalized anxiety and mathematics anxiety accounted for about 14.1% of the variance in academic performance; the adjusted R² value is .130, which is slightly lower because the number of predictors was included. Overall, the results suggest that mathematics anxiety has more unique variance in predicting academic performance than generalized anxiety in this sample. Although anxiety is a factor in CGPA, the small amount of variance that could be explained by the anxiety dimension indicated that other factors, such as academic, social and personal, have significant roles in determining students' academic outcomes.

DISCUSSION

This finding of a strong positive correlation between generalized anxiety and mathematics anxiety indicates that, although these constructs are different, they have a closely related emotional and cognitive basis. This consistency can be seen in the literature that people who tend to worry generally are more prone to specific types of worry within certain academic areas, like math (Hill et al., 2016). Generalized anxiety has been shown to be a developmental risk factor or "aetiological" risk factor for the development of specialized academic anxieties (Caviola et al., 2021; Hill et al., 2016). They are independent latent factors, but because of their high variance they are likely to overlap, meaning that general trait anxiety is likely to affect the perception and response of students to specific mathematical stimuli (Demedts et al., 2022; Paechter et al., 2017).

A novel aspect of this study is the positive relationship among all anxiety types and academic achievement. This indicates the existence of "facilitating anxiety", which is the emotional arousal that is found to be a stimulus to exert effort but not to hinder performance (Taibu & Ferrari-Bridgers, 2020). There is some evidence that high achieving students may have greater anxiety due to their greater emotional involvement in their academic results and their self worth (D' Agostino et al., 2021). In addition, high achieving university students have been found to have medium to high situational anxiety that could be a factor in their performance in the university rather than a hindrance to them as it has been found that such anxiety helps them remain alert to meet the high demands in the university (Majali, 2020). The regression model indicated that mathematics anxiety was the only significant independent predictor of CGPA while generalized anxiety was correlated with performance. This aligns with the "anxiety specificity" hypothesis that suggests domain-specific worries are directly and uniquely associated with academic outcomes, compared to general concerns of anxiety (Demedts et al., 2022; Hill et al., 2016). The fact that mathematics anxiety has been shown to predict academic performance uniquely beyond general anxiety in previous research (Demedts et al., 2022) confirms that mathematics anxiety has a unique predictive power for academic performance, especially in a mathematical context. This indicates that psychological distress specifically related to math-related tasks is a stronger predictor of academic performance than overall psychological distress (Devine et al., 2012; Dowker et al., 2016).

The results support the Yerkes-Dodson law, which states that there is not a linear positive relationship between anxiety and performance, but that there may be a moderate amount of anxiety in order to achieve a high level of performance. Within this model, moderate stress or mental activation increases alertness and concentration, thus enhancing complex cognition and learning effectiveness (Cooper, et al. 2018; Wang, et al. 2015). On the one hand, an excessive level of anxiety can be a severe disability, while on the other, a "moderate amount" of anxiety can be a motivator to enhance concentration and academic performance as a way to cope with the perceived challenge (Castej et al., 2021; Cooper et al., 2018). This "optimal arousal" is probably responsible for the increased anxiety reported by students: It was acting as a motivator to the improvement of students' performance by boosting their engagement with the learning process (Casty et al., 2021; Majali, 2020).

Thus, the present study reveals that math anxiety and generalized anxiety are closely related and share a salient emotional component which is a part of the undergraduate experience. General anxiety was correlated with the overall emotional state of the student, whereas mathematics anxiety emerged as the main unique predictor of academic performance, suggesting that domain-specific anxieties are more related to performance achievement than overall anxiety. The most important finding is the positive correlation between anxiety and CGPA, indicating that emotional arousal is a facilitator for this group. The results of this study suggest that the right amount of anxiety, like an optimal amount of arousal, can increase motivation and academic concentration, which in turn can result in better grades. The study ultimately implies that the success of higher education depends on the student's capacity to make use of a constructive degree of stress, by which specific educational issues lead to greater concentration and effort, but not to a drop in performance.

CONCLUSION AND RECOMMENDATIONS

This study found that generalized and mathematics anxiety are very closely related and mathematics anxiety is a positive predictor of undergraduate academic achievement. Moderate anxiety seems to motivate this sample by helping them to concentrate harder and to work more efficiently, rather than being a hindrance. These findings indicate that, under certain conditions, as the anxiety is focused on specific academic domains, it can be adaptive and contribute to the process of optimal arousal, which is a level of stress that stimulates the engagement of learners and their persistence in academic tasks without leading to cognitive paralysis.

From these results, it is advised that educators and university counsellors should move from the complete removal of academic stress to managing academic stress. Interventions can be tailored to enable a student to keep his or her level of arousal "motivationally appropriate" rather than so high or so low as to become overwhelming and incapacitating. Given the finding that mathematics anxiety was a stronger predictor for success than general worry, tailored academic coaching should focus on redirecting students' concerns toward the development of a focus on mathematics into structured study patterns and focused preparation. Lastly, further studies should examine what point is too high or too low for this facilitative anxiety, with the goal of maintaining student well-being alongside goals for academic success.

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