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Exploring the Pathways between Mental Health and Academic Performance: A Structural Equation Modelling Perspective

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Abstract

This study investigates how college students' academic performance, as determined by their GPA, is impacted by stress, anxiety, depression, and economic circumstances. The study employed a non-experimental cross-sectional design with SEM and CFA to gather data from a stratified random sample of University of Gujarat students from various faculties. Lower GPAs were found to be substantially correlated with higher levels of stress, anxiety and depression. kids from low-income families also had inferior academic performance. Psychological and economic factors have both direct and indirect influence on academic results, as demonstrated by SEM. Stronger counseling services, financial aid, and supporting policies are needed to create a healthy learning environment. These findings also emphasize the crucial impact that financial and mental health circumstances have in predicting academic performance.

Keywords: Stress, Anxiety, Depression, Economic Conditions, Academic Performance

Introduction

Education has a crucial part in any nation, including Pakistan. It is fact that nation’s progress depends on youth’s achievements. Different socioeconomic backgrounds can introduce a range of risk factors for mental health when students enter universities. Numerous significant elements, such as the state of the economy, anxiety, melancholy, and academic stress, might affect a student's ability to study. Students are frequently under a lot of pressure to perform well because of the strong competition in today's educational setting. They may experience extreme stress and anxiety as a result of this pressure, which may negatively impact their mental health and make it challenging for them to concentrate and do well in class. Academic stress and family stress are the main reasons of student’s academic depression. Student’s performance also affected by some other factors like loss of interest, distracted mind, mental disorder, performance pressure, family issues, difficulty in understanding etc. Stress, anxiety, and depression are more common among university students than in the general population (Ibrahim et al., 2013). Students' perceptions of their academic performance are negatively impacted by stress, anxiety, and depression (Cunningham, 2021). Teenagers who experience high levels of stress, anxiety, or depression also have lower levels of life satisfaction. Higher-achieving academically talented students reported less stress, worry, and despair and were more satisfied with their lives. (Aziz & Tariq, 2019). Mental health disorder is one of the major factors that affects academic performance. Although stress is not commonly recognized as a mental health illness, it can lead to mental health issues. All the students

have to deal with depression, anxiety, and stress in their lives (Deng et al., 2022). Stress, anxiety, and depression are highly common among university students worldwide. A number of risk factors, including financial, social, psychological, academic, biological, and lifestyle influences (Mofatteh, 2021).

Academic Stress

Stress arises naturally when the body and mind react negatively to demands or challenges. Numerous things, referred to as stressors, can cause it to occur. These stressors can be environmental, psychological, or physical. It comes in two different forms: acute stress and chronic stress. It can be classified as either acute or chronic. Acute stress is triggered by specific challenges and passes quickly, whereas chronic stress is a long-lasting state that results from ongoing problems. One of the major reasons of stress is the unrealistic expectation of teachers and parents. Students claim that school-related concerns such as endless study sessions, paper writing assignments, test preparation, and tedious teachers are the most important issues they face on a daily basis. Academic pressure is caused by grade-level competition, exam and test preparation, and quick content learning. According to research, college students who experience stressful life events are more likely to perform poorly academically and have worse health. (Yasin & Dzulkifli, 2011).

Academic Anxiety

The restless, fearful, or worried feelings that can range from mild to severe are called anxiety. There are some anxieties and fears that are reasonable, such as worries about a family member or an upcoming test, quiz, or other assessment. (Khesht-Masjedi et al., 2019). Anxiety feels like headaches, mind won't turn off, feeling tense, no energy and sweaty. Children's and teenagers' academic performance is significantly impacted by anxiety because it limits their capacity to perform well. A few signs of academic anxiety include trouble recalling and remembering recently learned material, trouble following straightforward instructions, inability to make a decision, and trouble focusing during the test. It occurs prior to specific events, such as exams or presentations, and can make it difficult to focus, speak in class, or do well on tests. It has a short-term impact on students' mental health in that it causes anxiety for a set amount of time, such as until the end of a project or presentation, after which the students no longer experience the anxiety. Different students experience different things before, during, and after tests. For example, they may experience panic attacks, mental blocks, and misread simple questions or enter answers incorrectly, or feel uncertain when selecting their responses. Studying a foreign language was the most frequent source of anxiety among undergraduates, closely followed by concerns that they wouldn't be able to communicate in that language during presentations. (Mirawdali et al., 2018).

Academic Depression

The results show a connection between the demands of schooling and both apparent anxiety and depression disorder (Safdar et al., 2020). Depression symptoms might include feelings of melancholy, helplessness, disappointment, frustration, despair, and hopelessness (Sarason & Sarason, 1987). Academic depression is related with low grades. There are some causes of depression in students are lack of sleep, poor eating habits, financial worries, peer problems, long term bullying and academic workload. Students who are suffering from the mental disorders especially depression, they bunk more classes than others. When faced with challenges in their coursework, they tend to drop out of university more frequently than their peers who are not depressed. Broken families, poor family relationships, and marital status, particularly an unhappy marriage, are major risk factors for youth depression. Student-parent relationships have a big

impact on their academic achievement, and depression is largely caused by poor family relationships. In comparison to students from happy or whole families, those from broken families are less able to handle emotional breakdowns and have lower levels of confidence in all that they do. Compared to those born into families with at least a college degree, university students, especially mothers, who come from families with little to no educational background, are more likely to experience depression. Compared to children of moms with less education, children of mothers with more education or who have earned a college degree are often less likely to suffer from depression. (Deng et al., 2022).

Economic Condition

An important factor influencing students' academic performance is their economic situation. Of course, not all students are from the upper class; the majority are from the middle and lower middle classes. These students are struggling financially. When they are unable to pay for their education, they experience anxiety about their financial situation. They find it difficult to afford the required study materials due to financial difficulties. Students with lower grades and higher levels of anxiety and depression were those who said they had less support from parents, siblings, teachers, and peers. (Rehman et al., 2023). According to studies, a parent's marital status, income level, and family size all have a significant impact on the academic success of their children in school. The results imply that in order to address parental socioeconomic factors and improve students' academic achievement, government intervention may be required, especially in rural areas. (Ogunshola & Adewale, 2012).

Academic Performance

Test scores, coursework completion, and undergraduate examination results are often used to characterize a student's academic performance. Students' academic performance at the university is evaluated in a number of ways, including their test scores, CGPA, and GPA. Universities use a student's GPA to assess their performance for a given semester. In Pakistan, academic achievement (GPA) is measured on a scale of 0 to 4, according to Ministry of Education regulations (Dahir, 2019). The educational backgrounds of the mother and father, the type of family structure (joint, nuclear, or single parent), and the location (rural, urban) are some of the variables influencing a student's academic performance. In order to build their character and provide a comfortable environment for their child to grow, parents' education is important. Parent-child interaction is also important because when parents and children bond well, they can feel good, and when people feel good, they will perform at their best in all activities. Lack of bonding prevents the child from sharing their troubles with them, which makes them feel anxious and depressed at all times. Academic and family stress negatively affects academic achievement and exacerbates depression. Controlling these stressors in the classroom is essential to improving students' health and wellbeing (Deng et al., 2022). In order to improve students' academic performance, a focused intervention is required to lessen and manage stress and anxiety among students, especially among female students (Nadeem et al., 2012). Because academic success is negatively correlated with anxiety and despair. Counseling, life skills programs, psychotherapy, and mental health care are essential in the classroom to help students do better academically (Khesht-Masjedi et al., 2019).

Material and Methods

The design of the study is cross-sectional. The intended audience is undergraduate students from the University of Gujarat's faculties of architecture, design and fine arts, engineering and technology, management and administrative sciences, computing and information technology, and the arts, sciences, and social sciences. Stratified random sampling ensures that a representative

sample is drawn from each faculty and subject area. According to the Cochran's Formula (1977) for unknown population the sample size is given below. Here is the main Condition is that the Population is Unknown where we want to draw the sample size.

$$n = \frac{z^2\ p(1-p)}{e^2}$$

Whereas; e is margin of error, P is the proportion (if not known use 0.5), Z is Confidence value from Z score table. $n = \frac{1.96^2\ 0.5(1-0.5)}{0.05^2}$ = 384.16. So, by the formula of Cochran the sample size is 384. The sample size of 400 were taken to minimize the chance of error. There was total 8 faculties and the sample of 50 students were randomly chosen from each faculty.

Academic Anxiety

The purpose of this study is to determine whether a student has mild or severe academic anxiety using a brief questionnaire devised by Nist and Diehl (1990). It consists of 10 multiple choice questions that measures the anxiety score. Scores will range from 10 – 50. Standardized questionnaire scores are defined as follows: Low anxiety (10 – 19), Moderate anxiety (20 – 35), High anxiety (more than 35).

Academic Depression

To measure the academic depression the questionnaire, consist of 14 multiple types questions. The scores will range from 0 – 70. Scores on questionnaires are defined as follows: Normal (0 – 15), Mild depression (16 – 30), Moderate depression (31 – 46), Severe depression (47 – 63).

Academic Stress

To measure the academic stress the questionnaire, consist of 10 multiple type questions. The scores will range from 0 – 50. Scores on questionnaires are defined as follows: Low stress (0 – 13), Moderate stress (14 – 26), High stress (27 – 50). SPSS version 21.0 was used to process and clean data initially. AMOS version 24 was used for structural equation modelling and advanced statistical analysis. The consistency and accuracy of the measurement was assessed using the Cronbach alpha criteria. Descriptive statistics, are used to provide an overview of the available data.

Confirmatory Factor Analysis (CFA)

CFA is a statistical method for determining whether or not the correlations between the variables themselves and the factors that explain the observed variables match predictions. To find the theoretical model that best fits the data, CFA can compare multiple models in addition to testing additional parameters. The assistance it provides in locating and correcting measurement errors improves the accuracy of measurement instruments. Structural equation modeling (SEM), which looks at intricate interactions between variables and uses diagrams to make the model easier to understand, commonly uses CFA.

Structural Equation Model (SEM)

SEM is a technique for determining how different factors are related to one another. It aids in understanding how various factors, such as stress or economic conditions, influence one another and affect things like academic achievement. SEM provides a comprehensive view by combining the accuracy with which these factors are measured and their interactions. It also accounts for data errors and inconsistencies, which improves the reliability of the results. In simple terms, SEM aids in the exploration and validation of complex relationships between various factors in research (Kline, 2023)

Results and Discussion

Reliability Analysis

The 40-item scale's reliability is 0.841. The items are consistent and function well together, as indicated by the Cronbach's Alpha value of 0.841. A value greater than .8 is regarded as good. The items' strong reliability indicates that they measure the same concept accurately and are closely related. About 29% of the participants are males and 71 % are females. Out of 389 students, a small proportion of students (20 or 5.1%) have a GPA below 2.5 indicating lower academic performance. A significant proportion of students (107 or 27.5%) have a GPA of 2.5 to 3.0, indicating moderate academic performance. The majority of students (160 or 41.1%) have a GPA of 3.0 to 3.5, indicating good academic performance. A significant proportion of students (102 or 26.2%) have a GPA of 3.5 or higher, indicating superior academic performance. According to the data, 39.3% of students are from rural areas and the majority 60.7%, are from urban areas. This implies that educational opportunities may be greater in urban areas. However, having a large number of rural students adds diversity to the student body, allowing for a variety of perspectives and experiences. The educational distribution of fathers within a sample of 389 respondents. The largest group is made up of 32.4% of those who are intermediate and approximately 30.6% of those with less education13.1% of people have a master's degree, while 21.1% of people have a bachelor's degree. Only 2.8% of people are PhD holders. In general, most people have completed at least their high school education; fewer hold advanced degrees, such as master's or doctoral degrees. This trend indicates that fewer individuals reach each higher level as education levels rise. Regarding the educational distribution of mothers within a sample of 389 respondents. The largest group is made up of 38.3% of those with less education and approximately 32.6% of those who are intermediate. Six out of seven people have a master's degree, while about 20.6% of people have a bachelor's degree. Only 1.8% of people are PhD holders. In general, most people have completed at least their high school education; fewer hold advanced degrees, such as master's or doctoral degrees. This trend indicates that fewer individuals reach each higher level as education levels rise.

Confirmatory Factor Analysis (CFA)

Figure 1 shows a visual representation of which variables correspond to each factor. Anxiety, the state of the economy, stress, and depression are the four main components of the model highlighted in the figure. There are multiple specific questions or indicators used to measure each factor. Measurement errors for these indicators are shown by circles with labels that start with the letter "e." Each question's relationship to its factor is indicated by an arrow, and the relationships between the factors are indicated by curved arrows. This model clarifies the relationships and measurements between these factors.

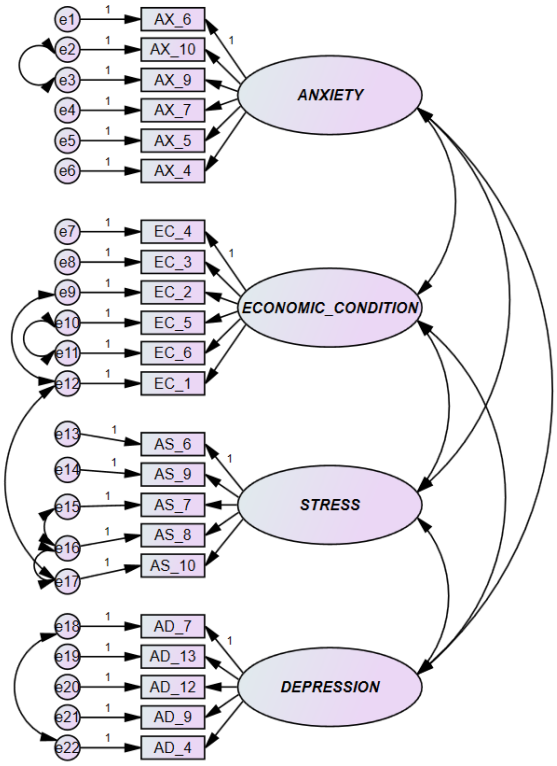

Figure 1: Confirmatory Factor Analysis

Table 1. Model Fit Measures

Measure	Estimate	Threshold	Interpretation
CMIN	319.518	--	--
DF	196	--	--
CMIN/DF	1.630	Between 1 and 3	Excellent
CFI	0.946	>0.95	Acceptable
SRMR	0.061	<0.08	Excellent
RMSEA	0.040	<0.06	Excellent
P Close	0.980	>0.05	Excellent

Table 1 shows that there is a good fit between the data and the model. 1.630 is the outstanding chi-square to degrees of freedom ratio. The Comparative Fit Index (CFI) of 0.946 is suitable. The Root Mean Square Error of Approximation (RMSEA) of 0.040 and the Standardized Root Mean Square Residual (SRMR) of 0.061 both show excellent fit. The p-value of 0.980 for the test of close fit is another positive outcome. All things considered, the model fits the data quite well.

Table 2. Regression weights

			Estimate	S.E.	C.R.	P
AX_6	<---	1	1.000			
AX_10	<---	1	.718	.079	9.134	***
AX_9	<---	1	.672	.077	8.718	***
AX_7	<---	1	.640	.083	7.718	***
AX_5	<---	1	.802	.089	9.043	***
AX_4	<---	1	.760	.084	9.095	***
EC_4	<---	2	1.000			

			Estimate	S.E.	C.R.	P
EC_3	<---	2	.880	.060	14.612	***
EC_2	<---	2	.883	.063	13.910	***
EC_5	<---	2	.769	.064	12.095	***
EC_6	<---	2	.780	.065	11.963	***
EC_1	<---	2	.640	.066	9.657	***
AS_6	<---	3	1.000			
AS_9	<---	3	1.329	.165	8.054	***
AS_7	<---	3	.338	.059	5.727	***
AS_8	<---	3	.211	.054	3.878	***
AS_10	<---	3	.281	.055	5.064	***
AD_7	<---	4	1.000			
AD_13	<---	4	1.772	.468	3.784	***
AD_12	<---	4	1.954	.514	3.799	***
AD_9	<---	4	1.841	.486	3.790	***
AD_4	<---	4	.734	.292	2.513	.012

Table 2 shows the regression weights for each indicated relationship between elements. It shows us regression weights and their significance in model, indicating that there are three factors. The direction and intensity of the association between observable variables and their latent factors are indicated by regression weights. To compare the strength of the remaining variables, one of the loadings of the observed variables for each factor is set to 1. Every variable that has three stars next to it indicates that it is playing a very important role in measuring its corresponding latent factor.

Moderation Analysis

Figure 2 displays the analysis of moderation. In this analysis, several models were developed, but one produced significant result. Although depression is typically an independent variable in this research, it is treated as the dependent variable in the moderation analysis. Here, stress and anxiety are the independent variables. An interaction term is added to the model to assess the combined effect of anxiety and stress, which effectively illustrates moderation. This method aids in comprehending how different anxiety levels impact the connection between stress and sadness.

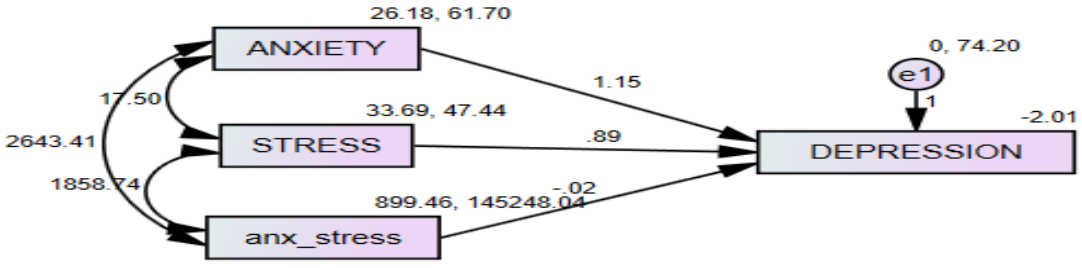

Figure 2: Moderation analysis between stress and anxiety

Table A-1 show the maximum likelihood estimates. Depression is strongly correlated with anxiety, increasing depression by 1.146 units for every unit increase in anxiety. Depression is also

significantly increased by stress; for every unit increase in stress, the corresponding increase in depression is.895 units. The term "anx_stress" interacts with depression to see if the combined impact of stress and anxiety is different from each of their individual effects. For every unit increase in the interaction between Anxiety and Stress, Depression is marginally reduced by.017 units. Every one of these effects has statistical significance.

Table A-1: MLE of depression, anxiety and stress

			Estimate	S.E.	C.R.	P
DEPRESSION	<---	ANXIETY	1.146	.287	3.988	***
DEPRESSION	<---	STRESS	.895	.218	4.106	***
DEPRESSION	<---	anx_stress	-.017	.008	-2.176	.030

In **Figure 3,** the model clarifies the ways in which depression is influenced by the interaction of anxiety and family environment. A coefficient of 1.20 indicates a slight increase in depression due to anxiety. A coefficient of 6.01 indicates that family structure has a greater effect on depression. The model also looks at whether anxiety and family structure together change this effect, as indicated by a minor interaction effect coefficient of -0.24.

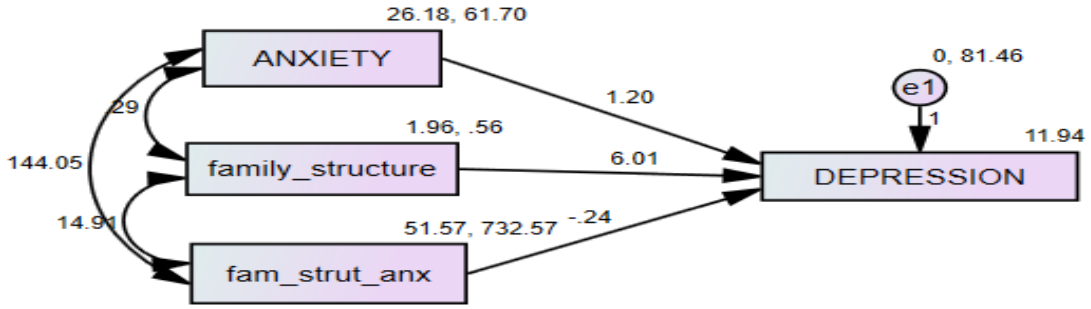

Figure 3: Moderation analysis between anxiety and family structure

Table A-2 describes how depression is impacted by anxiety, family structure, and their interaction (fam_strut_anx). Anxiety significantly increases depression, according to a path coefficient of 1.203 and a strong significance p-value. With a p-value of.005 and a coefficient of 6.013, family structure also has a significant impact on depression. It appears that family structure and anxiety interact to somewhat lessen the impact on depression, as indicated by the interaction term's negative effect on depression (-.245), which is still significant.

Table A-2: MLE of depression, anxiety and family structures

			Estimate	S.E.	C.R.	P
DEPRESSION	<---	ANXIETY	1.203	.186	6.462	***
DEPRESSION	<---	family_structure	6.013	2.129	2.824	.005
DEPRESSION	<---	fam_strut_anx	-.245	.080	-3.067	.002

Figure 4 shows the relationship between depression, anxiety, and the state of the economy. A coefficient of 1.05. indicates that anxiety has a moderate and direct effect on depression. With a

coefficient of 0.80, economic conditions have less of a direct impact on depression. Anx_eco_condition, the interaction between anxiety and economic conditions, is associated with a negative coefficient of -0.02, which indicates a slight reduction in depression.

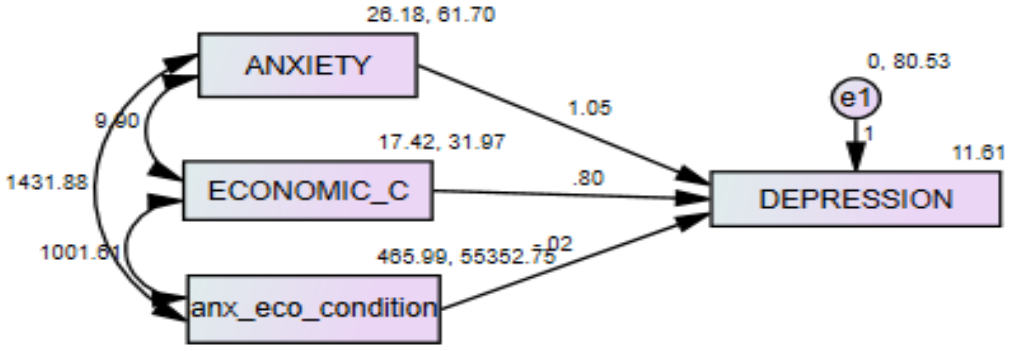

Figure 4: Moderation analysis between anxiety and economic condition

Table A-3 shows how anxiety, the state of the economy, and their combination affect depression. With a coefficient of 1.046 and strong statistical significance, anxiety substantially raises depression. A statistically significant correlation of 0.799 indicates that economic conditions also increase depression levels. A small but statistically significant negative coefficient of -0.022 indicates that the interaction between anxiety and economic conditions somewhat reduces depression.

Table A-3: MLE of depression, anxiety and economic condition

			Estimate	S.E.	C.R.	P
DEPRESSION	<---	ANXIETY	1.046	.184	5.688	***
DEPRESSION	<---	ECONOMIC_C	.799	.245	3.258	.001
DEPRESSION	<---	anx_eco_condition	-.022	.009	-2.436	.015

Figure 5 that represent SEM showing relationship between multiple variables and their influence on GPA where depression is acting as mediator. All the independent variables and the interaction terms are added at first to check their significance. **Table 3** shows the estimates of these relationships. We will choose only those variables, which have significant relationship with GPA through depression because we are checking mediation trough depression.

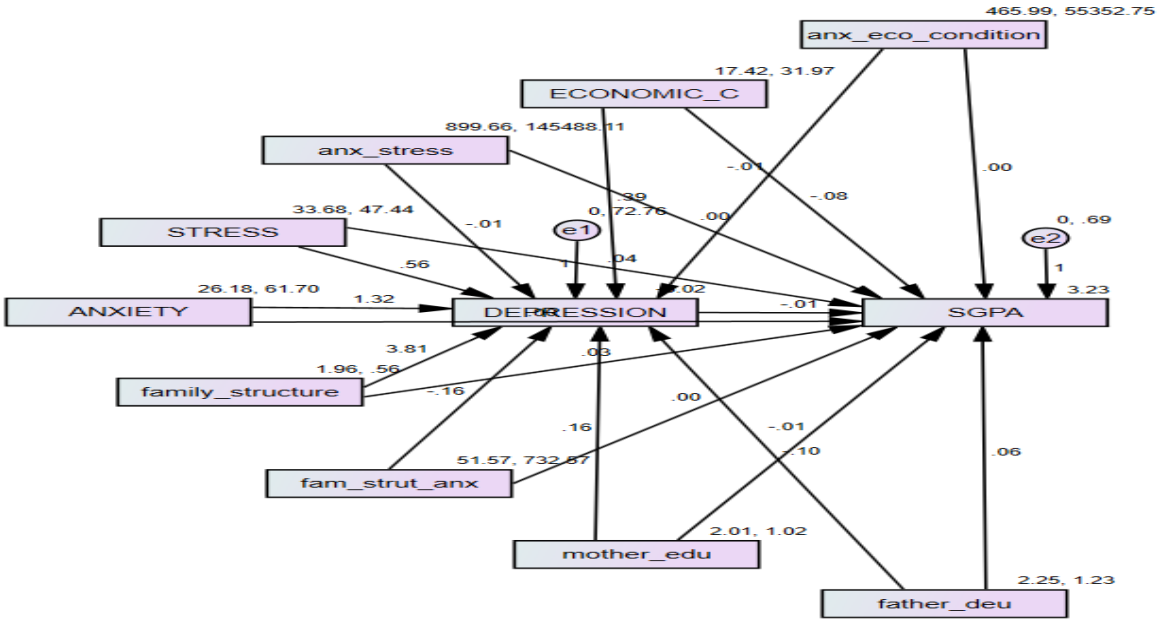

Figure 5: complete CFA model

Table 3. Regression weights

			Estimate	S.E.	C.R.	P
DEPRESSION	<---	anx_stress	-.006	.001	-4.895	***
DEPRESSION	<---	ECONOMIC_C	.391	.077	5.104	***
DEPRESSION	<---	anx_eco_condition	-.012	.002	-6.427	***
DEPRESSION	<---	family_structure	3.813	.579	6.580	***
DEPRESSION	<---	fam_strut_anx	-.164	.016	-10.246	***
DEPRESSION	<---	mother_edu	.161	.429	.376	.707
DEPRESSION	<---	father_deu	-.097	.390	-.249	.803
DEPRESSION	<---	ANXIETY	1.317	.055	23.888	***
DEPRESSION	<---	STRESS	.556	.063	8.833	***
SGPA	<---	anx_eco_condition	.003	.000	14.871	***
SGPA	<---	mother_edu	-.011	.042	-.273	.785
SGPA	<---	STRESS	.040	.007	5.906	***
SGPA	<---	ECONOMIC_C	-.081	.008	-10.527	***
SGPA	<---	father_deu	.065	.038	1.702	.089
SGPA	<---	anx_stress	-.001	.000	-13.138	***
SGPA	<---	DEPRESSION	-.010	.005	-1.988	.047
SGPA	<---	fam_strut_anx	.001	.002	.359	.720
SGPA	<---	family_structure	.033	.059	.555	.579
SGPA	<---	ANXIETY	-.001	.008	-.122	.903

Structural Equation Modeling (SEM)

Figure 6 shows the model of SEM. We get the above model after eliminating every variable that had insignificant relationship to either depression or GPA. Now all variables now have a strong correlation with GPA and depression. The model demonstrates how family structure, stress, and anxiety all contribute to depression. Depression can be somewhat reduced by interactions between anxiety and stress and anxiety and family, but economic conditions also play a role in its rise. Depression has a detrimental effect on SGPA, while stress has a modest favorable effect. The SGPA is negatively impacted by economic condition, which means that students who are in worse financial situations typically perform worse academically.

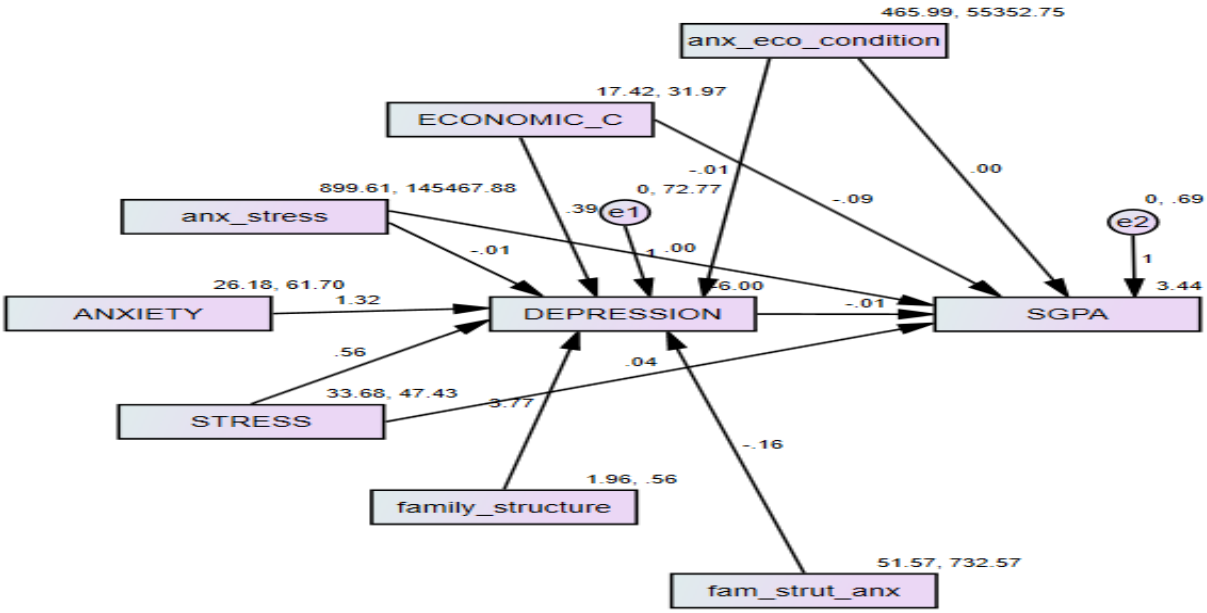

Figure 6: Semifinal model of SEM

Table 4. Regression weights

			Estimate	S.E.	C.R.	P
DEPRESSION	<---	ECONOMIC_C	.389	.077	5.076	***
DEPRESSION	<---	anx_eco_condition	-.012	.002	-6.379	***
DEPRESSION	<---	fam_strut_anx	-.163	.016	-10.173	***
DEPRESSION	<---	family_structure	3.770	.580	6.506	***
DEPRESSION	<---	ANXIETY	1.322	.055	23.965	***
DEPRESSION	<---	STRESS	.562	.063	8.922	***
DEPRESSION	<---	anx_stress	-.006	.001	-5.097	***
SGPA	<---	anx_eco_condition	.003	.000	15.735	***
SGPA	<---	ECONOMIC_C	-.086	.008	-11.336	***
SGPA	<---	anx_stress	-.002	.000	-13.775	***
SGPA	<---	DEPRESSION	-.010	.003	-3.466	***
SGPA	<---	STRESS	.042	.006	6.627	***

Mediation Analysis

To understand the mechanism or process by which one variable influence another through a third variable called a mediator, a statistical technique known as mediation analysis is employed. The mediator transfers the effect of an independent variable on a dependent variable, and it helps identify and quantify this effect. **Table B-1** shows the results of a mediation model in which depression acts as a mediator between economic condition and SGPA**.** Economic condition doesn't directly impact SGPA, but it influences SGPA indirectly through its effect on depression.

Table B-1: Mediation (economic condition as independent)

Model Summary

R	R-sq	MSE	F	df1	df2	p
.3001	.0901	81.6237	38.3112	1.0000	387.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	33.3721	1.4838	22.4903	.0000	30.4547	36.2896
ECONOMIC	.5014	.0810	6.1896	.0000	.3422	.6607

****

Outcome: SGPA

Model Summary

R	R-sq	MSE	F	df1	df2	p
.1862	.0347	.7097	6.9310	2.0000	386.0000	.0011

Model

	coeff	se	t	p	LLCI	ULCI
constant	3.6462	.2102	17.3493	.0000	3.2330	4.0594
DEPRESSI	-.0147	.0047	-3.0979	.0021	-.0240	-.0054
ECONOMIC	-.0082	.0079	-1.0402	.2989	-.0238	.0073

********** DIRECT AND INDIRECT EFFECTS **********

Direct effect of X on Y

Effect	SE	t	p	LLCI	ULCI
-.0082	.0079	-1.0402	.2989	-.0238	.0073

Indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
DEPRESSI	-.0074	.0029	-.0138	-.0025

Table B-2 demonstrates the findings of a mediation model in which SGPA and anxiety are mediated by depression. Although anxiety does not directly affect SGPA, it does have an indirect effect on academic performance because anxiety increases depression, which lowers SGPA.

Table B-2: Mediation (Anxiety as independent)

Model Summary

R	R-sq	MSE	F	df1	df2	p
.5706	.3255	60.5015	186.7950	1.0000	387.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	22.8648	1.4622	15.6377	.0000	19.9901	25.7396
ANXIETY	.7387	.0540	13.6673	.0000	.6324	.8449

****

Outcome: SGPA

Model Summary

R	R-sq	MSE	F	df1	df2	p
.1788	.0320	.7117	6.3722	2.0000	386.0000	.0019

Model

	coeff	se	t	p	LLCI	ULCI
constant	3.5657	.2026	17.6008	.0000	3.1674	3.9640
DEPRESSI	-.0161	.0055	-2.9239	.0037	-.0270	-.0053
ANXIETY	-.0001	.0071	-.0138	.9890	-.0141	.0139

********** DIRECT AND INDIRECT EFFECTS **********

Direct effect of X on Y

Effect	SE	t	p	LLCI	ULCI
-.0001	.0071	-.0138	.9890	-.0141	.0139

Indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
DEPRESSI	-.0119	.0040	-.0199	-.0044

Table B-3 shows the results of a mediation model in which depression acts as a mediator between stress and SGPA. Stress has a negative indirect effect on SGPA through depression, but it does not directly affect it. An increase in stress causes depression, which lowers academic performance.

Table B-3: Mediation (Stress as independent)

Model Summary

R	R-sq	MSE	F	df1	df2	p
.5207	.2711	65.4908	143.5498	1.0000	386.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI

```
constant    16.9332     2.1397     7.9137      .0000    12.7262    21.1402
STRESS       .7487      .0625    11.9812      .0000     .6258      .8715

**************************************************************************
Outcome: SGPA
Model Summary
       R       R-sq        MSE          F        df1        df2          p
    .1786      .0319      .7116     6.3437     2.0000   385.0000      .0019
Model
           coeff         se          t          p       LLCI       ULCI
constant   3.5043      .2405    14.5733      .0000     3.0316     3.9771
DEPRESSI    -.0172     .0053    -3.2329      .0013     -.0276     -.0067
STRESS       .0031      .0076      .4067      .6844     -.0119      .0181
******************** DIRECT AND INDIRECT EFFECTS *************************
Direct effect of X on Y
    Effect         SE          t          p       LLCI       ULCI
     .0031      .0076      .4067      .6844     -.0119      .0181
Indirect effect of X on Y
          Effect    Boot SE   BootLLCI   BootULCI
DEPRESSI    -.0128      .0044     -.0224     -.0051
```

Table B-4 shows the results of a mediation model in which depression acts as a mediator between family structure and SGPA. Academic performance is not significantly impacted by family structure or its indirect effects through depression. Depression on its own, however, has a negative impact on SGPA, suggesting that even though family structure is not a major predictor of academic success, depression is still a significant factor.

Table B-4: Mediation (family structure as independent)

```
Model Summary
       R       R-sq        MSE          F        df1        df2          p
    .0017      .0000    89.7038      .0011     1.0000   387.0000      .9730

Model
           coeff         se          t          p       LLCI       ULCI
constant   42.0654     1.3470    31.2297      .0000    39.4171    44.7136
family_s     .0218      .6424      .0339      .9730    -1.2414     1.2849
**************************************************************************
Outcome: SGPA
Model Summary
       R       R-sq        MSE          F        df1        df2          p
    .1854      .0344      .7099     6.8724     2.0000   386.0000      .0012

Model
           coeff         se          t          p       LLCI       ULCI
constant   3.4551      .2248    15.3680      .0000     3.0131     3.8971
DEPRESSI    -.0162     .0045    -3.5761      .0004     -.0251     -.0073
family_s     .0563      .0572      .9842      .3256     -.0561      .1686
```

********** DIRECT AND INDIRECT EFFECTS **********
Direct effect of X on Y

Effect	SE	t	p	LLCI	ULCI
.0563	.0572	.9842	.3256	-.0561	.1686

Indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
DEPRESSI	-.0004	.0108	-.0227	.0212

Table B-5 demonstrates the findings of a mediation model in which SGPA, anxiety, and family structure are all mediated by depression. Family structure has no direct effect on academic performance (SGPA), although depression levels do have an indirect effect. Family structure influences depression, which in turn affects SGPA, which in turn affects academic performance.

Table B-5: Mediation (family structure and anxiety as independent)

Model Summary

R	R-sq	MSE	F	df1	df2	p
.3262	.1064	80.1572	46.0925	1.0000	387.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	36.2356	.9768	37.0948	.0000	34.3151	38.1562
fam_stru	.1139	.0168	6.7891	.0000	.0809	.1468

****
Outcome: SGPA
Model Summary

R	R-sq	MSE	F	df1	df2	p
.1879	.0353	.7093	7.0623	2.0000	386.0000	.0010

Model

	coeff	se	t	p	LLCI	ULCI
constant	3.5414	.1961	18.0569	.0000	3.1558	3.9270
DEPRESSI	-.0180	.0048	-3.7576	.0002	-.0274	-.0086
fam_stru	.0019	.0017	1.1560	.2484	-.0014	.0052

********** DIRECT AND INDIRECT EFFECTS **********
Direct effect of X on Y

Effect	SE	t	p	LLCI	ULCI
.0019	.0017	1.1560	.2484	-.0014	.0052

Indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
DEPRESSI	-.0020	.0006	-.0034	-.0010

Once mediation analysis has been performed, eliminate all variables from the model that have neither direct nor indirect impact on SGPA.

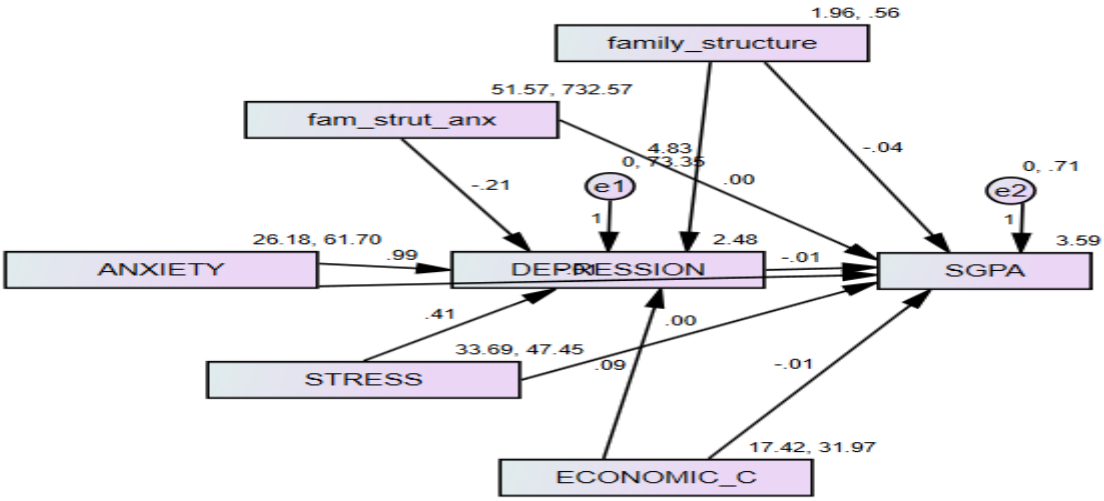

Figure 7: Final model of SEM

Figure 7 is a path diagram from a structural equation model (SEM), which shows the relationships between different variables related to academic performance (SGPA), mental health, and family/economic conditions. Positive coefficient (1.96) of family structure and depression, indicates that changes in family structure (divorce or single parent households) are associated with increased levels of depression. Economic condition has a very slight positive impact on depression (coefficient of 0.09). While economic challenges are generally known to cause stress and anxiety, in this model, economic factor don't have major impact on depression levelA substantial positive correlation of 0.99 indicates that anxiety has a significant impact on depression. This suggests that pupils who have higher levels of anxiety also have higher levels of depression. With a value of 0.41, stress also has a favorable effect on depression. This implies that pupils who are under more stress are more likely to suffer from depression. The path coefficient of -0.21 means that the combined effect of family structure and anxiety actually reduces depression levels. In other words, certain family structures, when combined with anxiety, might provide unique support that lower depression. This highlights the importance of looking at how different factors work together rather than in isolation.

Conclusion

This study demonstrated a strong correlation between academic success, mental health, and socioeconomic circumstances. Higher levels of stress, anxiety, and depression were associated with worse performance, and each of these characteristics had a substantial detrimental impact on GPA. Depression was exacerbated by economic difficulties, which further reduced GPA. Additionally, as students with more educated parents typically performed better, parental education had a favorable impact on academic attainment.

Recommendations

Schools and universities should prioritize mental health services since anxiety and sadness significantly affect academic achievement. These difficulties can be lessened by offering timely interventions, early screening, and routine counseling. Increased financial aid, grants, scholarships, and financial literacy programs would help students from low-income families reduce financial stress, which frequently leads to mental health issues. Institutions should provide counseling and support to students from challenging home environments because family dynamics and structure can have an impact on well-being. Additionally, by being receptive to students' needs and granting

individuals with identified mental health issues reduced course loads, alternate evaluations, or flexible deadlines, faculty members can promote a helpful academic culture.

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