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COMPARATIVE ANALYSIS OF LIKERT AND VISUAL ANALOGUE SCALE IN IDENTIFYING FACTORS CONTRIBUTING TO ACADEMIC STRESS OF STUDENTS

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Abstract

The global prevalence of academic stress and declining mental well-being among students is frequently linked to escalating academic expectations and challenging coursework. Despite considerable scholarly attention, a gap persists in comprehending the intricacies of measuring academic stress. This study seeks to fill this void by examining the primary factors influencing academic stress and assessing the efficiency of two response scales, the 5-point Likert scale (LS) and the Visual Analog Scale (VAS), about their validity, reliability, and precision in evaluating various dimensions of academic stress among students. The research adopts a quantitative approach, employing a structured questionnaire with 34 questions to measure the levels of stress. The Analysis revealed slight differences in factor loadings, with the LS yielding eight factors and the VAS identifying nine factors. The study identified the primary dimensions of academic stress among students as "Teaching Method Stress (TTMS)", "Parent's Expectations Stress (PES)", "Class Test Stress (CTS)", "Group Work Stress (GWS)", "Exam Result Stress (ERS)", "Competition with Classmate's Stress (CCS)", "Content Difficulties' Stress (CDS)", "Time Management's Stress (TMS)", and "Presentation Anxiety (PA)". The model's excellent fit was confirmed by Comparative Fit Index (CFI) and Root Mean Square Error (RMSE) values of 0.869 and 0.077, respectively. It was observed that academic stress significantly varied among different educational levels and genders. Based on our findings, we recommend adopting VAS for enhanced precision in stress modeling. Additionally, we suggest developing targeted intervention strategies, such as stress-reducing programs tailored to specific dimensions identified.

Keywords: Validity, Reliability, Evaluating, Stress, Intervention

Introduction

Stress is a multifactorial element that can be defined as the exhausting interaction that exists between a person and his surroundings (Adom et al., 2020). For different people, the reaction and explanation of stress is entirely different. Stress is defined as an incident that strains someone's ability to face hardship. The learning ability and academic performance of students are affected by the social and emotional issues they face in their daily lives. Stress can influence students both in positive and negative consequences as stress plays a role not only in their academic life but also in their daily lives (Bukhsh, Shahzad & Nisa, 2011). Academic stress among college and university students is influenced by various factors, including demanding coursework, examinations, and tight deadlines (Karaman et al., 2019). The pressure to excel academically and maintain favorable grades contributes significantly to this stress. Additionally, the transitional nature of college life can induce stress in students and their families, particularly as they navigate the shift from high school to college or university. This period involves adapting to unfamiliar surroundings, establishing new relationships, and dealing with increased autonomy and responsibilities (Chandra, 2021; Asif et al., 2020). This study further investigates academic stress, employing a quantitative methodology with a structured questionnaire containing 34 questions on two measurement scales. The purpose is not only to identify the significant contributors to academic stress but also to explore the precise measurement scale for quantifying the academic stress of students from diverse educational backgrounds.

Problem Statement:

The statement of the problem is to identify significant stressors of Academic stress experienced by students and to compare two different response scales, the Likert scale and the Visual Analogue Scale (VAS) in terms of the validity, reliability, and precision to assess students' academic stress dimensions. Despite extensive scholarly attention to this issue, there is a gap in understanding the nuances of academic stress measurement. This study aims to address this gap by evaluating the principal factors contributing to academic stress and comparing the effectiveness of the two mentioned response scales.

Research Objectives:

1. Exploration of significant contributors to academic stress among students.
2. To examine and compare the efficiency of LS and VAS in measuring the academic stress of students.
3. To compare different dimensions of academic stress across different educational levels and gender.

Research Questions:

1. How do students perceive and experience academic stress across different educational levels and Gender?
2. What are the principal factors contributing to academic stress among students, and how do these factors manifest across diverse strata?
3. To what extent do the LS and the VAS yield comparable results in assessing academic stress levels among students?
4. Which is the more efficient scale between LS and the VAS in terms of validity, reliability, and precision in measuring academic stress?

Research Hypotheses:

H1. There is a significant difference in the perceived levels of academic stress among students across different educational levels, ranging from Grade V to postgraduate studies.

H2. Gender differences significantly influence the levels of academic stress experienced by students.

H3. Specific factors, such as Teaching Method Stress (TMS), Parent Expectations Stress (PES), and Exam Result Stress (ERS),

contribute significantly to the overall academic stress experienced by students.

H4. The VAS demonstrates higher reliability, validity, and precision in measuring academic stress compared to the five-point Likert scale.

H5. The factor loadings and structure of academic stress dimensions differ between the LS and the VAS.

H6. The adopted stress model exhibits an excellent fit to the data for measuring the academic stress of students.

Delimitation of Study:

The study focuses on a specific geographic area, focusing on students ranging from Grade V to postgraduate levels acknowledging that cultural and contextual factors within this defined scope may exert an influence on the results and the findings might not be directly applicable to students beyond this specified educational range. Additionally, the study delimits itself to the comparison of two response scales, foregoing exploration of alternative measurement tools or response formats that could offer diverse perspectives on academic stress. Finally, while the research identifies specific dimensions of academic stress based on examined factors, it acknowledges the potential incompleteness of this characterization, recognizing that other relevant stressors may exist beyond the identified factors.

Significance of research:

This research contributes valuable insights into the pervasive issue of academic stress among students. The study goes beyond merely identifying the factors contributing to academic stress by innovatively comparing the effectiveness of two response scales, the LS and the VAS. The lack of a standardized and precise method for assessing academic stress hampers the development of targeted intervention strategies. Therefore, there is an urgent need to bridge this gap by exploring innovative measurement approaches and identifying specific stress dimensions, ultimately empowering educational institutions with actionable knowledge to alleviate the detrimental impact of academic stress on students' well-being.

Literature Review:

Several researchers (Gao et al., 2020; Capone et al., 2020) have undertaken extensive investigations into general stress levels among college students, as well as psychological stress in specific contexts. Annually, a multitude of students enroll in educational institutions with aspirations of attaining degrees, securing desirable employment, and leading fulfilling lives. Academic stress in college students is linked to variables within the academic environment, encompassing coursework, collaborative projects, and organizational engagement, in addition to attitudes, perspectives, and conduct toward academic demands (Ramón-Arbués et al., 2020). Globally, it is estimated that 12-50% of college students meet at least one diagnostic criterion for one or more mental disorders, as reported by Li et al. (022). The survey conducted among 128 Grade 11 students attending competitive private schools in the United States revealed a connection between high and persistent stress, particularly related to academic performance and the college application process, and increased rates of drug and alcohol use, according to Can et al. (2019). The stressors that college students face are multifaceted and can include academic pressures stemming from exams and heavy workloads, or lack of leisure time, competitive environments, anxieties about not meeting parental expectations, the challenges of forming new personal relationships, and the adjustment to unfamiliar locations, as noted by Zhang et al. (2022). These factors are often perceived as highly stressful by students and can have a significant impact on both their academic performance and their overall well-being. Freire et al. (2019). Moreover, biological factors, such as age and gender,

especially being female, as well as financial difficulties, contribute to the stress experienced by college students. Researchers have advocated assessing students' academic stress using questionnaires and many subjective techniques are available for gauging stress levels, but this study specifically emphasizes the Likert scale and the Visual Analogue Scale (VAS) due to their common usage in stress assessment questionnaires. The Likert scale is a non-comparative scaling method with a one-dimensional nature whereas the VAS is typically used to assess qualities within a range of values (Yusof et al., 2019). The Likert Scale (LS) commonly consists of 5 points,7 points, and 10 points whereas the VAS mostly consists of 10 point or 11-point continuous scale from 0 to 10 or 1- 10. (Cheng et al. (2022). This allowed for a more accurate comparison of the various stressors which would have been possible with a Likert scale. In general, these two techniques are dependable and effective. According to Grant et al. (1999), there were no appreciable differences between VAS and Likert scales despite the former having better sensitivity. Recently, some researchers used VAS to measure academic stress with a sufficient measure of internal reliability (Shehadeh et al. 2020; Martincova & Bila 2023; Zhang et al., 2022). The results of the study provisionally imply that the choice between a VAS and a Likert scale has no impact on experience sampling research (ESM) (Delventhal, 2023) and have explored different demographic factors like age and gender (particularly in females) as well as financial difficulties add to the stress experienced by college students.

Research Methodology

The sample of 1000 students was taken from a diverse student population of Lahore city that was divided into four strata; Grades V to VIII, secondary and higher secondary, graduate and postgraduate students enrolled in schools and higher education institutions. The purpose was to check the reliability of the Likert-type scale and VAS for diverse categories of students' age and knowledge in measuring academic stress. The sample comprises 250 students from Grades V to VIII, 350 students from secondary and higher secondary, 250 from undergraduate, and 150 students from postgraduate levels, utilizing convenience sampling and, whenever possible, simple random sampling. Before collecting data from the respondents, their consent was obtained. The students who expressed willingness to participate in the study were requested to complete two questionnaires, both containing identical questions but presented on two different response scales, LS and VAS. These measures were utilized to assess the academic stress experienced by students, using a 34-item questionnaire originally developed by Lin & Chen (2009) at Nan Kai University of Technology in China. While the questionnaire was initially designed for responses on the LS, it was adapted to measure students' academic stress on the VAS scale. Various statistical analyses were employed for comparison between the two scales, including Cronbach's alpha, normality diagnostics tests, intra-class correlations, and principal component Factor analysis. To validate the identified dimensions in assessing academic stress among students, Structural Equation Modeling (SEM) was employed.

Results

Intra-class Correlation between the responses of the Likert Scale and VAS

The intra-class correlations between the two measures were significant at a 5% level of significance for all the responses, however, the correlation values were around 0.2—0.547, indicating, weak to moderate correlations between the two responses obtained by VAS and LS. Similarly, the Average Measures of intra-class correlations reflected a similar pattern, with correlations hovering around 0.2 or higher. This indicates a

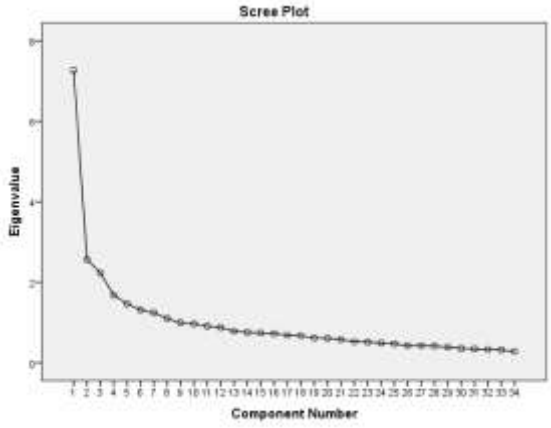
moderate level of correlation between responses obtained from both scales.

Comparison of Principal Component Factor Analysis (PCFA) for VAS and Likert scale Data:

Initially, the p-values obtained from Bartlett's test of sphericity for both LS and VAS indicated that the variables were indeed correlated, making them suitable for factor analysis. Additionally, the Kaiser-Meyer-Olkin (KMO) test values for both LS (0.853) and VAS data (0.870) exceeded the recommended threshold of 0.80, affirming that the dataset was highly conducive for factor analysis to proceed. Figure 1 shows extracted factors by fixing the Eigenvalue at 1, It can be observed that in data obtained by using LS, eight factors are extracted from 34 items which explain 55.45% of the total variation whereas, for VAS data, nine factors are extracted from the same items explaining 61% of the total variation. The results indicate that VAS explains more variation as compared to the Likert Scale. To extract the main dimensions, the values greater than or equal to 0.40 have been taken as a criterion for significant factor loadings (Hair et al. 2020).

Figure 1:

Screen plot showing extracted factors having Eigen values greater than one for VAS and LS:



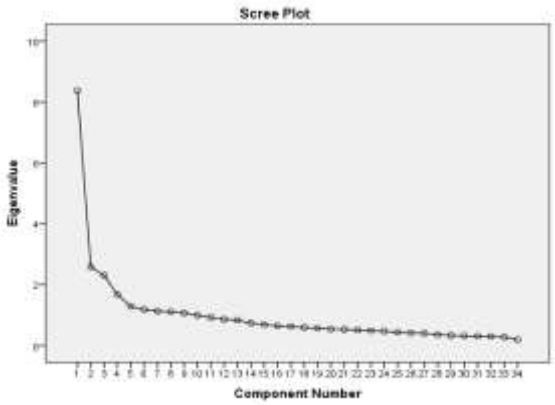


Table 1 presents the number of factors extracted using PCFA and the factor loadings of items across the different factors for both LS and VAS data. The second column contains the questionnaire items, the third column (FL for VAS data) displays the factor loadings for VAS data, the fourth column (EFVAS) indicates the factors where the corresponding items exhibit the highest loadings for VAS data, the fifth column illustrates the factor loadings based on LS data, and the last column (EFLS) specifies the factors with which the items demonstrate high loadings for LS data.

Kolmogorov-Smirnov test for VAS data

Factors	Statistic	Sig
F1	.059	0.200*
F2	.042	.200*
F3	.037	.200*
F4	.050	.053
F5	.038	.200*
F6	.050	.077
F7	.067	.071
F8	.063	.052
F9	0.07	0.064

See Appendix A

It is evident that the factor loadings are higher for VAS when compared to LS data, and some items load onto different factors for different item scales. Also, it is worth noting that items with low factor loadings tend to load onto a different factor during factor exploration. Furthermore, it can be observed that all factor loadings were above

± 0.4 for VAS data as compared to LS data, for which some loadings are below 0.4.

Normality Diagnostics for Extracted Factors of VAS and LS Data:

To check the normality of different extracted factors, the items that exhibit significant factor loadings on their corresponding factors are aggregated to form a construct, and the Kolmogorov-Smirnov test is applied to check the normality of the extracted factors by both LS and VAS data.

Table 2: Normality diagnostics tests for VAS and LS data

Kolmogorov-Smirnov test for LS data

Factors	Statistic	Sig
F1	.073	0.02
F2	.076	.019
F3	.093	.001
F4	.140	.000
F5	.137	.000
F6	.102	.000
F7	.104	.000
F8	.101	.000

The extracted factors from VAS data exhibit $p > 0.05$ for the Kolmogorov-Smirnov test, suggesting that these factors adhere to a normal distribution. Conversely, factors derived from LS data display a departure from normal distribution ($p<0.05$). This provides compelling evidence that the data stemming from VAS exhibits a more consistent adherence to normal distribution.

Comparison of VAS and LS results

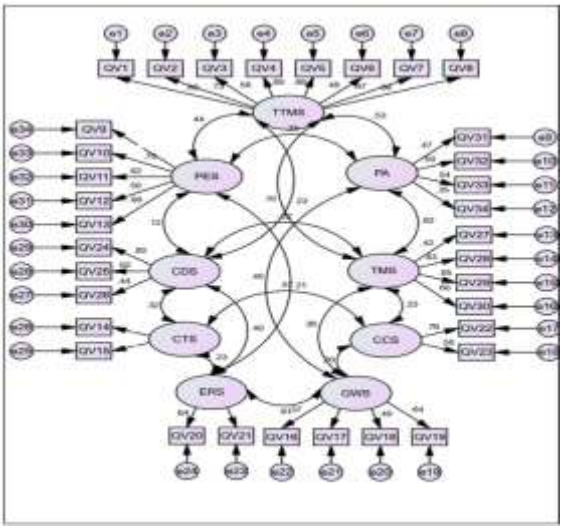
The statistical analysis of both scales indicates that LS is easy to comprehend but the data produced by the VAS scale perform better in terms of reliability. This result is consistent with the findings by Abend et.al (2014). Their paper provides important implications for the utilization of VAS in clinical and research settings, emphasizing its potential as a valid and reliable instrument for assessing acute anxiety levels. Additionally, Hasson & Arnetz (2005) noted that the Likert Scale may be susceptible to extreme response bias as compared to VAS. The extracted factors explored from VAS data explained more variation with high factor loadings as compared to LS. Furthermore, the factors extracted through VAS data follow a normal distribution. We can assume that the data obtained through VAS is more suitable for advanced statistical analysis including Confirmatory Factor Analysis and comparisons of mean scores across different categories of demographic variables.

Confirmatory Factor Analysis:

Confirmatory factor analysis was used to test the goodness of fit of the proposed measurement model on VAS data. For this purpose, the main dimensions extracted by PCFA were named based on items showing high factor loadings on respective factors. The explored factors (In table 3) are named the "Teaching Method Stress (TTMS)", "Parent's Expectations Stress (PES)", "Class Test stress (CTS)", "Group Work Stress (GWS)", "Exam Result Stress (ERS)", "Competition with Classmate's Stress (CCS)", "Content Difficulties' stress (CDS)", "Time Management's stress (TMS)" and "Presentation Anxiety (PA)".

Figure 2:

Path diagram showing measurement model for different dimensions of Academic stress of students.



See Appendix B and C

The model fit indices, specifically the Comparative Fit Index (CFI) at 0.869, the Tucker-Lewis Index (TLI) value (0.855), and the Root Mean Square Error of Approximation (RMSE) at 0.077 confirmed that the model is suitable for assessing the academic stress of students. Table 3 demonstrates that all regression weights, each with significant p-values ($p<0.0001$), play a substantial role in elucidating the variance of the derived constructs. Furthermore, the factor loadings depicted in the table surpass a threshold of 0.4, signifying their adequacy for the sample size (Hair et.al (2020). The Critical Ratios, ranging from 7.106 to 11.214, affirm the significance of both factor loadings and the structural associations between observed variables and latent factors. The Standardized Regression Weights show that all observed variables exhibit positive correlations with their respective constructs. Considering these factor loadings, in conjunction with Critical Ratios and model fit indices such as CFI, TLI, and RMSE, can be concluded that the model is well-suited for the gathered data. Examining the covariances in Table 4, it is evident that certain dimensions of academic stress are correlated with each other, while others are orthogonal, indicating that they measure distinct aspects of academic stress.

Comparison of Various Dimensions of Academic Stress among Different Educational Levels and Gender Categories of Students:

The Analysis of Variance (ANOVA) and Two Independent Samples t-test is applied to compare mean scores for extracted dimensions of academic stress across gender (Male, Female) and different educational levels (Grades V to VIII, secondary and higher secondary, graduate and post-graduate).

See Appendix D

It can be observed that mean scores for different constructs of academic stress are different for TTMS and GWS for female and male students. But other stressors including PES, CTS, ERS, CCMS, TMS, CDS, and PA are the same for both categories of gender having insignificant p-values. It can also be observed that the mean scores for female students are statistically significantly higher for TTMS and GWS as compared to male students.

See Appendix E

By examining the p-values of different stresses for different educational levels in Table 6, we can observe that mean scores are different for all constructs except PES. We can assume that students from all educational levels have a fear of not meeting their parent's expectations. Furthermore, the Fisher's Least Significant Difference (LSD) post hoc test elaborates on the fact that the mean scores for undergraduate and postgraduate are the same for TTMS, GSW, CDS, PA, and TMS but are different for secondary and higher secondary students. On the other hand, the mean scores for CTS are different in secondary and postgraduate students but are the same for graduate and higher secondary students. The same is the case for ERS. The ERS mean score is higher for higher secondary and graduate students as compared to secondary and postgraduate students. Also, the graduate student's mean score is different concerning CCS from other students. TTMS is different both for gender and educational level but stress due to fear of not meeting with parent's expectations is the same across gender and concerning different categories of students including Grades V to VIII, secondary and higher secondary, graduate, and postgraduate students. Although the stress due to competition with classmates is not different concerning gender across different categories of educational levels it is statistically significant. We can assume that students from different strata of education have different attitudes towards competition with classmates. Also, the mean score for Class test stress (CTS) is not the same for students with different educational status. The stress for

TMS also varies for students studying in different grades.

Conclusion:

The study's findings indicated that there wasn't a significant difference in the responses obtained from two different measurement scales (VAS and LS). However, the data collected through VAS proved to be more reliable and displayed a normal distribution, making it suitable for complex statistical analyses, including parametric tests and structural equation modeling. Importantly, the shift from a 5-point Likert scale to the VAS format led to an improvement in the distribution of data. Additionally, the results of Confirmatory Factor Analysis (CFA) suggested that the model was a good fit for the collected data, particularly after transitioning from the Likert scale to VAS. Moreover, the study identified the primary dimensions of academic stress among students as "Teaching Method Stress (TTMS)", "Parent's Expectations Stress (PES)", "Class Test Stress (CTS)", "Group Work Stress (GWS)", "Exam Result's Stress (ERS)", "Competition with Classmate's Stress (CCS)", "Content Difficulties' Stress (CDS)", "Time Management's Stress (TMS)", and "Presentation Anxiety (PA)". It was observed that academic stress significantly varied among different educational levels and genders.

Recommendation:

Given that the VAS demonstrated higher reliability and a normal distribution compared to the Likert scale, future studies could consider adopting VAS or similar continuous measurement scales for assessing psychological constructs. With the identified stress dimensions, educators, counselors, and policymakers can develop targeted intervention strategies to address significant dimensions of stress. Tailoring interventions could potentially be more effective in reducing overall academic stress across different educational levels and genders and could help in developing personalized approaches for stress management.

Innovation/Research Gap:

The study underscores the significance of refining measurement tools to improve the accuracy and sensitivity of data regarding academic stress, ultimately contributing to the enhancement of student well-being and the improvement of educational practices. The innovative aspect of this research lies in the successful transition from a traditional Likert scale to the VAS format for measuring academic stress among students. Researchers should continue to explore and refine measurement tools to enhance the accuracy and sensitivity of data collection. While the study identified key dimensions of academic stress, further research could validate and extend this model in diverse educational settings and cultural contexts. Cross-cultural studies might help determine the generalizability of the identified stress dimensions. Replication studies in different settings and with diverse populations can strengthen the reliability and generalizability of the findings.

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Appendix A

Table 1: Extracted factors of Academic Stress of students:

Constructs	*Sr.No*	*List of Questions*	*FL for VAS Data*	*EFVAS*	*FL for LS Data*	*EFLS*
Teacher's Teaching Method stress (TTMS)	*1*	*I cannot understand some teachers' tasks assigned to me.*	*0.724*	*F1*	*0.703*	*F1*
	2	*Some teachers assign difficult tasks and exercises.*	*0.762*	*F1*	*0.748*	*F1*
	3	*Some teachers put in extra workload.*	*0.782*	*F1*	*0.589*	*F1*
	4	*The content provided by teachers is not clear and understandable.*	*0.524*	*F1*	*0.685*	*F1*
	5	*Some instructors give excessive amounts of information, which makes it challenging for me to complete my studies and effectively absorb the knowledge.*	*0.601*	*F1*	*0.632*	*F1*
	6	*It is difficult for me to adapt to the teaching style of some teachers.*	*0.531*	*F1*	*0.604*	*F1*
	7	*It is difficult for me to cope with teachers' speed of instruction.*	*0.502*	*F1*	*0.382*	*F1*
	8	*I try to trace relevant data and information for many subjects.*	*0.382*	*F1*	*0.520*	*F1*
Parent's Expectations Stress (PES)	*9*	*My parents think that I never take my studies seriously.*	*0.733*	*F2*	*0.715*	*F2*
	10	*My parents are often not satisfied with my results.*	*0.630*	*F2*	*0.683*	*F2*
	11	*Currently, I am scoring lower marks as compared to my high school score.*	*0.597*	*F2*	*0.636*	*F2*
	12	*I am afraid that my grades will not meet my parents' expectations*	*0.791*	*F2*	*0.741*	*F2*
	13	*Sometimes my results are not perfect and go down despite my efforts.*	*0.622*	*F2*	*0.621*	*F2*
Class Test's stress (CTS)	*14*	*The pressure of my tests keeps me awake at night and I cannot take proper rest.*	*0.754*	*F3*	*0.763*	*F3*
	15	*I wake up late at night for preparing my all tests.*	*0.667*	*F3*	*0.745*	*F3*
Group Work's Stress (GWS)	*16*	*I found a lot of discrepancies in the subject content and class tests which caused me confusion.*	*0.447*	*F4*	*0.420*	*F3*

	17	*I feel difficulty in sharing material with peers while working on reports and class tasks.*	*0.803*	*F4*	*0.761*	*F4*
	18	*I have difficulty finding appropriate groups for me when I am asked to work in groups.*	*0.683*	*F4*	*0.783*	*F4*
	19	*I am afraid that I cannot perform as per the expectations of my teachers and parents.*	*0.413*	*F4*	*0.403*	*F2*
Exam Result's Stress (ERS)	*20*	*I am afraid that I must reappear for those courses which I have failed.*	*0.512*	*F5*	*0.421*	*F5*
	21	*I am afraid that my results may be lower than that of my classmates.*	*0.743*	*F5*	*0.472*	*F3*
Competition with Classmate's Stress (CCS)	*22*	*I am afraid that my classmates will not show their struggles to compete with me and they will win more grades.*	*0.617*	*F6*	*0.524*	*F6*
	23	*My classmate often interrupts my studies with their chats.*	*0.745*	*F6*	*0.584*	*F6*
Content Difficulties' stress (CDS)	*24*	*The subjects and books having foreign languages are difficult for me to understand.*	*0.767*	*F7*	*0.465*	*F5*
	25	*I am a comparatively slow learner as compared to my classmates.*	*0.681*	*F7*	*0.673*	*F6*
	26	*Sometimes I feel that I am losing interest in my subjects.*	*0.440*	*F7*	*0.445*	*F1*
Time Management's stress (TMS)	*27*	*I am often unable to keep a balance between my studies and my social relations.*	*0.820*	*F8*	*0.780*	*F7*
	28	*I cannot manage my academics and other household activities.*	*0.833*	*F8*	*0.774*	*F7*
	29	*My social relations and domestic activities often interrupt my academic responsibilities.*	*0.691*	*F8*	*0.560*	*F7*
	30	*I am overburdened with an excess of subjects.*	*0.601*	*F8*	*0.595*	*F5*
Presentation Anxiety (PAS)	*31*	*I feel shattered when I present before my class and am afraid that they will laugh at me.*	*0.891*	*F9*	*0.777*	*F8*

	32	*I often feel bad when my classmates pass undesirable comments on me.*	*0.691*	*F9*	*0.671*	*F8*
	33	*Fear of speech captures me whenever I present or perform before my class.*	*0.761*	*F9*	*0.738*	*F8*
	34	*I feel bad when my classmates talk a lot about me. It suppresses my performance.*	*0.477*	*F9*	*0.526*	*F6*

Appendix B

Table 3: Standardized Regression Weights:

Items		***Constructs***	***Estimate***	***C.R.***	***P***	***Items***		***Constructs***	***Estimate***	***C.R***	***P***
QV1	<--	TTMS	.623			QV28	<---	TMS	.448	8.259	***
QV2	<--	TTMS	.733	11.214	***	QV29	<---	TMS	.827	8.318	***
QV3	<--	TTMS	.583	9.459	***	QV30	<---	TMS	.854	7.460	***
QV4	<--	TTMS	.688	10.663	***	QV26	<---	CDS	.599		
QV5	<--	TTMS	.662	10.546	***	QV25	<---	CDS	.440	6.130	***
QV6	<--	TTMS	.477	7.883	***	QV24	<---	CDS	.500	6.977	***
QV7	<--	TTMS	.665	10.326	***	QV15	<---	CTS	.799		
QV8	<--	TTMS	.680	10.798	***	QV14	<---	CTS	.436	6.692	***
QV13	<--	PES	.676			QV21	<---	ERS	.126		
QV12	<--	PES	.503	9.501	***	QV20	<---	ERS	.280	7.106	***
QV11	<--	PES	.623	9.135	***	QV22	<---	CCS	.645		
QV10	<--	PES	.704	9.905	***	QV23	<---	CCS	.763	10.424	***
QV9	<--	PES	.464	6.040	***	QV19	<---	GWS	.576		
QV31	<--	PA	.474			QV18	<---	GWS	.644	7.748	***
QV32	<--	PA	.586	7.934	***	QV17	<---	GWS	.494	6.450	***
QV33	<--	PA	.542	7.559	***	QV16	<---	GWS	.312	6.563	***
QV34	<--	PA	.623	5.681	***	QV27	<---	TMS	.348		

Appendix C

Table 4: Co-variances among different stressors of students' academic life.

Correlation	*between*	*Constructs*	*Estimate*	*S.E.*	*C.R.*	*P*	*Label*
TMS	<-->	CDS	-.026	.099	-.259	.795	par_26
CTS	<-->	CCS	1.770	.602	2.940	.003	par_27
ERS	<-->	GWS	1.644	.409	4.022	***	par_28
PES	<-->	CDS	.352	.218	1.616	.106	par_29
CDS	<-->	CTS	.502	.293	1.713	.087	par_30
TTMS	<-->	PES	1.843	.341	5.410	***	par_31
TTMS	<-->	PA	1.392	.266	5.228	***	par_32
CTS	<-->	ERS	.268	.235	1.136	.256	par_33
CCS	<-->	GWS	.950	.360	2.640	.008	par_34
PES	<-->	PA	.806	.252	3.203	.001	par_35
CDS	<-->	ERS	.480	.163	2.944	.003	par_36
TMS	<-->	GWS	.887	.212	4.181	***	par_37
PES	<-->	ERS	.452	.192	2.353	.019	par_38
PA	<-->	TMS	1.138	.238	4.771	***	par_39
PA	<-->	GWS	1.222	.259	4.724	***	par_40
TTMS	<-->	TMS	.252	.140	1.798	.072	par_41
TTMS	<-->	CDS	.555	.177	3.131	.002	par_42
TMS	<-->	CCS	.730	.234	3.121	.002	par_43

Appendix D

Table 5: Comparison of Academic stress across Gender

Comparison of mean scores for Academic stressors	***Mean Scores***		***Inference***	
Null hypothesis	***Gender***		***Sig.***	***Decision/Null Hypothesis***
The mean score of Teacher's teaching method's stress (TTMS) is the same across categories of Gender.	*Female*	*38.5068*	*.000*	*Rejected*
	Male	*29.4939*		
The mean score of Parent's expectations stress (PES) is the same across categories of Gender.	*Female*	*23.2783*	*.602*	*Retained*
	Male	*22.9061*		
The mean score of Class Test's stress (CTS) is the same across categories of Gender.	*Female*	*9.3762*	*.336*	*Retained*
	Male	*9.3991*		
The mean score of Group Work's stress (GWS) is the same across categories of Gender.	*Female*	*19.2715*	*.000*	*Rejected*
	Male	*15.5061*		
The mean score of Exam Result stress (ERS) is the same across categories of Gender.	*Female*	*9.6966*	*.510*	*Retained*
	Male	*8.9279*		
The mean score of the Competition with Classmate's Stress (CCS) is the same across the categories of gender.	*Female*	*10.9089*	*0.569*	*Retained*
	Male	*11.2304*		
The mean score of Content Difficulty stress (CDS) is the same across the categories of gender.	*Female*	*15.7864*	*0.528*	*Rejected*
	Male	*15.2843*		
The mean score of the "Time Management for Social Activity's Stress (TMS)" is the same across the categories of gender.	*Female*	*20.8515*	*0.100*	*Retained*
	Male	*20.4470*		

The mean score of the presentation's anxiety (PA) is the same across the categories of gender.	*Female* *Male*	*19.0060* *16.0096*	*0.614*	*Retained*

Appendix E

Table 6: Comparison of Academic stress concerning educational status:

Null hypothesis	*Sig.*	*Decision/Null Hypothesis*
The Means of Teacher's teaching method's Stress (TTMS) are the same across categories of class.	*.000*	*Rejected*
The Means of Parent's expectations stress (PES) are the same across categories of class.	*.174*	*Retained*
The Means of Class tests Stress (CTS) are the same across categories of class.	*.000*	*Rejected*
The Means of Group Work stress (GWS) are the same across categories of class.	*.000*	*Rejected*
The Means of Exam Result stress (ERS) is the same across categories of class.	*.003*	*Rejected*
The Means of the Competition with Classmate's Stress (CCS)) are the same across the categories of Class.	*0.000*	*Rejected*
The Means of Content Difficulties' Stress (CDS) are the same across the categories of Class.	*0.000*	*Rejected*
The Means of Time Management for Social Activity Stress (TMS)" is the same across the categories of Class.	*0.003*	*Rejected*
The means of presentation anxiety (PA) are the same across the categories of class.	*0.000*	*Rejected*