RELATIONSHIP BETWEEN ANXIETY, ACADEMIC PROCRASTINATION AND SELF-EFFICACY: THE MODERATING ROLE OF SELF-EFFICACY AMONG UNIVERSITY STUDENTS KARACHI PAKISTAN

Zainab Akbar, Dr Sheeba Farhan

M Phil Scholar, Department of Psychology Federal Urdu University of Arts Science and Technology Abdul Haq Campus Karachi- Email: uniquefriend786@gmail.com

(Assistant Professor) Department of Psychology, Federal Urdu University of Arts Science and Technology Abdul Haq Campus Karachi- Email:sheeba.qazi@fuuast.edu.pk

Corresponding Author: *
Zainab Akbar

Abstract

This study aimed toward explore the connections amongst anxiety academic procrastination and self-efficacy in higher education students, with a moderating role of self-efficacy. A sample of 350 university students (189 males and 161 females), aged 18 to 25, participated in the study. The measures used included the Demographic Information Form, Academic Procrastination Scale-Students (Solomon & Rothblum, 1986), State-Trait Anxiety Inventory (Charles, Spielberger, Gorsuch, & Lushene, 1964), and General Self-Efficacy Scale (Schwarzer & Jerusalem, 1995). Descriptive measurements, Pearson correlations, regression analyses and moderation models applied to investigate the data. The findings discovered major positive relationships amongst anxiety, self-efficacy and academic procrastination ($r = .269$, $p < .01$; $r = .142$, $p < .01$; $r = .323$, $p < .01$), supporting the first hypothesis. Regression investigates indicated, self-efficacy significantly weakened the relationship amongst anxiety and academic procrastination. Anxiety positively predicts procrastination; however, the significant interaction term suggests that higher self-efficacy weakens this relationship. The model explanations for 10% of the change in academic procrastination ($R^2 = .10$), with the interaction term explaining an additional 2% ($\Delta R^2 = .02$), pointing out the protecting role of self-efficacy ($p < .001*$), confirming the second hypothesis. Additionally, gender differences were studied in academic procrastination, state-trait anxiety, and general self-efficacy. The outcomes indicated no statistically major gender differences in academic procrastination, state-trait anxiety or general self-efficacy. The study points out the potential for targeted interventions, such as self-efficacy training and anxiety management programs, to improve academic performance and well-being.

INTRODUCTION

Anxiety and procrastination are general issues impacting people globally. WHO identify that anxiety disorders affect over 264 million adults global (WHO, 2017), whereas academic procrastination remains prevalent among college students, with up to 39.7% affected in China (Pang & Han, 2009). Procrastination is one of the most common experiments faced by students with approximately one-third of the general population identifying it as a major problem to learning (Steel & Ferrari, 2013). In the United States, 95% of college students admitted to engaging in academic procrastination with nearly half postponing at least 50% of their academic tasks (Ellis & Knaus, 1977; Balkis & Duru, 2007). Studies indicate that between 80% and 95% of students engage in procrastination with nearly half doing so habitually and to a problematic extent (Steel, 2007).

Some studies revealed that undergraduate students procrastinated more frequently on term papers (46%) compared to weekly readings (30%) and exam preparation (28%) (Solomon & Rothblum, 1984). Similarly, study reported that 83% of students spent at least an hour daily procrastinating with writing assignments being the most common source of delay.

This study, however, emphasizes internal factors contributing to procrastination (Klassen & Kuzucu, 2009). Another study explored the timing of procrastination during an academic semester discovering that students tended to procrastinate more during the middle of the semester than at the beginning or end (Moon & Illingworth, 2005). Academic postponement is measured unhealthy manners that disturbs the learning process, leading to poor academic performance and adverse emotional outcomes (Liu et al., 2020). The causes and effects of procrastination remain subjects of ongoing debate among psychologists. Some of its negative consequences include reduced self-confidence and self-efficacy, lost chances, failure to meet time limit and inadequate or substandard effort. Additionally, procrastination is often associated with heightened anxiety and stress levels (Klingsieck, 2013).

Self-efficacy an essential factor for goal achievement is found toward negatively associate with educational postponement (Przepiorka, 2019). Self-efficacy demarcated as the confidence in one's talent to do wanted goals, plays a vital part in motivating persons to pursue high achievements, reducing tendencies toward academic

procrastination (Syukur et al., 2020). Another study has revealed a major adverse connection amongst self-efficacy and educational postponement (Przepiorka,2019). Current study explored difficult associations amongst anxiety, self-efficacy and procrastination, offering insights into the psychological mechanisms that influence these behaviors. By exploring these dynamics, the research seeks to support the development of targeted strategies to enhance self-efficacy, alleviate anxiety and minimize the adverse effects of procrastination.

Anxiety and Procrastination

Anxiety is described as an emotional response triggered by the perception of a threat, characterized by figurative, defensive and unclear aspects (Lazarus & Averill, 1972). It remains narrowly linked toward the distress of potential upcoming dangers otherwise risks (Reiss, 1991). Exploration demonstrated that nervousness can meaningfully impair educational presentation (Macher, Paechter, Papousek, & Ruggeri, 2012). Additionally, studies involving graduate students have shown a strong positive correlation between academic procrastination and anxiety, especially concerning tasks such as writing assignments, exam preparation and completing weekly readings (Onwuegbuzie, 2004; Onwuegbuzie & Jiao, 2000).

Procrastination is performance of delaying otherwise postponing tasks (Oxford Dictionary), has deep historical roots. A researcher traces its origins back over 2,800 years to ancient Greece, suggesting that procrastination has long been recognized as a common and pressing issue (Steel, 2007).When considering the consequences of procrastination, this behavior has been linked to numerous adverse outcomes, including heightened stress levels, increased psychological strain, more frequent physical health issues, lower academic performance, missed deadlines, prolonged study durations (especially among college students), and greater instances of daily procrastination (measured in hours) as well as task-related delays (evaluated based on the time available versus the time a student starts an assignment). Additionally, procrastination often leads to conflicts in personal relationships due to its negative effects (Steel, 2007; Tice & Baumeister, 1997; Grunschel & Schopenhauer, 2015; Klassen et al., 2008). Certain investigations suggest extra complex plus multifaceted relationship between anxiety and academic procrastination. For example, research with American college students has shown that procrastinators

initially experience less stress and anxiety than timeliness and here also seems to remain an adverse connection amongst unease and postponement early in the academic session. But academic session progresses, procrastinators tend to practice extra pressure and unease related to persons who don't postpone (Tice & Baumeister, 1997).

Additionally, a pilot study by some researchers confirmed the correlation between anxiety and procrastination and identified potential neurobiological evidence linking the two. The study showed that both unease and characteristic postponement were associated with activity in the right hippocampus, and a positive correlation was found between the right hippocampal grey matter volumes and both trait anxiety and procrastination (Zhang et al., 2020). Academic life, both in schools and universities, is often characterized by tight deadlines and heavy workloads. Students are required to manage these academic pressures while coping with stress and anxiety related to their studies (Misra & McKean, 2000). some researchers noted that academic procrastination frequently involves significant levels of anxiety (Rothblum, Solomon & Murakami, 1986). While numerous studies have identified a positive correlation amongst educational postponement and educational nervousness, it does not establish a direct fundamental link between the two (Onwuegbuzie, 2000).

Anxiety leads individuals to delay tasks, with procrastination becoming more pronounced as deadlines approach, often leading to last-minute delays. However, few repeated measures studies have examined by what method this relationship occur over time about unease and procrastination (Steel., 2007). Researchers found that individuals with high levels of procrastination tended to experience more anxiety throughout the semester, although they reported decrease anxiety earlier quantities of term (Rothblum et al., 1986). Further schoolwork found related outcomes, indicating that correlation between postponement and unease increases toward close the education session (Assur, 2003; Lay & Schouwenburg, 1993). Transect correlation investigates in these research discloses a significant progressive connection among postponement and anxiety, particularly quiz and lecture anxiety. However, most of the studies have measured this correlation at a single point in time, limiting the scope of the findings to specific moments. Interestingly, other research interrelated procrastination to declines in bodily and psychological health, suggesting

that procrastinators may experience higher levels of stress and illness, particularly toward close the education session (Tice & Baumeister, 1997).

Self-Efficacy as a Moderating Factor

Previous research has pointed out the role of self-efficacy in academic procrastination. Bandura defines self-efficacy as individuals' beliefs in their ability to organize and carry out actions required to manage future situations. Self-efficacy, a key component of Bandura's Social Cognitive Theory, posits that people are more likely to attempt tasks they believe they can succeed at. Those with high self-efficacy view difficult tasks as challenges to be mastered, remain committed to their goals, and recover quickly from setbacks (Bandura, 1995). On the other hand, individuals with low self-efficacy tend to avoid challenging tasks, believing they lack the ability to complete them, and often focus on negative outcomes. Thus, it is likely that persons with little self-efficacy are more disposed to postponement since they struggle with setting goals and managing tasks effectively. Active procrastinators, however, may share self-efficacy beliefs similar to non-procrastinators (Chu & Choi, 2005).

The origin source of procrastination often falsehoods in a person's lack of sureness in his talent to finish a mission, a concept Albert Bandura termed "self-efficacy" (Bandura, 1977; Barrows et al., 2013). Study highlighted scholars with great self-efficacy in understanding and script adopt strategic learning approaches, focusing on time management, effective study habits, and thoughtful engagement with their academic work. students having little self-efficacy incline to take a more relaxed, careless approach to their studies, investing less time and effort in academic tasks (Prat-Sala & Redford, 2010). Meta-analysis of 104 studies involving student populations revealed a significant negative correlation between self-efficacy and procrastination, this finding suggests that the lower an individual's self-efficacy, the more likely they are to procrastinate (Van Eerde's, 2003). Similarly, a researcher found self-efficacy to be a strong and consistent predictor of procrastination across 216 studies. He argued that fear of failure is closely linked to low self-efficacy and procrastination, but even independently of fear of failure, self-efficacy directly influences academic procrastination. Steel also hypothesized that procrastination could lead to poorer performance, which in turn lowers self-efficacy and results in more procrastination (Steel, 2007). In many studies, self-efficacy has been connected to self-regulation in

relation to procrastination. Low self-efficacy for self-regulation has been identified as a predictor of higher procrastination. Self-efficacy for self-regulation was a stronger interpreter of procrastination than self-regulation alone, though low self-efficacy for self-regulation was only associated with higher procrastination in girls (Klassen & Kuzucu, 2009).

The theoretical outline of this study delivers the groundwork for understanding the psychological factors manipulating academic procrastination, anxiety and self-efficacy. Appraisal Anxiety Theory (Lazarus & Folkman, 1984) recommends that procrastination arises from how individuals cognitively calculate tasks, mostly when they feel powerless of handling challenges due to low self-esteem formed by past experiences. Bandura's Self-Efficacy Theory underlines that persons' belief in their abilities stimuli their task choices, effort and perseverance those with high self-efficacy are more likely to recruit and continue in tasks, while those with low self-efficacy have a tendency to avoid them. Cognitive Theory further describes procrastination as a result of the communication between personal thoughts, behaviors and the learning atmosphere, all of which influence inspiration and academic appointment. Attribution Theory discovers

how individuals understand success and disappointment, which in turn disturbs their motivation those who attribute disappointment to inner, stable reasons may become more disposed to procrastination. Lastly, Temporal Motivation Theory (TMT) suggestions a complete view by mixing origins from self-efficacy, motivation, task aversiveness and time awareness, explaining why persons delay tasks even when they know their position. Together, these outlines deliver a complete understanding of the compound interaction amongst cognition, emotion and behavior in academic situations.

Gender and Contextual Factors

Anxiety remains a common psychological experience, but research suggests that gender differences exist in the prevalence and intensity of anxiety across various domains. Several studies have explored these differences, particularly in academic and general anxiety levels among male and female students. Researchers found that adolescent females reported higher levels of anxiety compared to adolescent males, indicating a greater vulnerability to anxiety-related challenges among females. This trend has been observed in academic settings as well, particularly in mathematics related anxiety (Lewinsohn et al., 1998).

Researchers investigated research self-efficacy and academic performance among postgraduate students at Tehran University of Medical Sciences. Their findings revealed no significant difference in research self-efficacy between male and female students, suggesting that gender doesn't performance a main character in determining research related self-efficacy at postgraduate level (Tiyuri et al, 2018). Similarly, others researchers found no gender differences in research self-efficacy among students at Isfahan University of Medical Sciences, reinforcing the idea that self-efficacy in research activities is not significantly influenced by gender (Ashrafi-Rizi et al, 2015). Researchers conducted a study exploring the relationship between personality traits and academic procrastination. Their findings revealed no significant differences in procrastination levels between male and female students, suggesting that gender alone is not a determining factor in procrastination behaviors. Instead, they found that conscientiousness and neuroticism played a more prominent role in predicting academic procrastination (Johnson & Bloom, 1995). However, studies in other academic areas present a different perspective. Self-efficacy, academic engagement and achievement in biology among Ethiopian high school students. Their results indicated that female students had lower self-efficacy in biology than their male counterparts, who also demonstrated higher academic engagement and achievement in the subject (Mohammadi, Bytamar, Saed, & Khakpoor, 2020). Gender disparities in self-efficacy have also been observed in STEM (Science, Technology, Engineering, and Mathematics) fields. Zeldin and his colleagues found that men's self-efficacy beliefs in STEM careers were primarily shaped by mastery experiences, whereas women's self-efficacy was more influenced by social persuasions and vicarious experiences (Zeldin, Britner, & Pajares, 2008). Similarly, another study found that males generally had higher mathematics self-efficacy than females (Pajares, 2005), a trend further supported by Huang's meta-analysis, which confirmed that males tend to exhibit higher self-efficacy in math, science, and technology subjects, while females demonstrate higher self-efficacy in language and humanities disciplines (Huang, 2013).Moreover, some researchers studied speaking self-efficacy and found that male students exhibited higher speaking self-efficacy than female students, although no significant gender differences were observed in English speaking ability (Sundari &

Dasmo, 2014).These findings suggest that gender differences in self-efficacy are domain specific rather than universal. While research related self-efficacy appears to be similar across genders, disparities are evident in STEM fields, mathematics, and language related skills. This highlights the need for targeted interventions to boost self-efficacy in areas where gender disparities exist, ensuring equal academic opportunities for both male and female students.

Several students in Pakistan suffer from anxiety and procrastination, which harmfully disturb their academics and psychological health (Khan et al., 2006; Ahmad et al., 2013). Related patterns are seen in further Asian countries such as India, China and South Korea (Singh et al., 2018; Wang et al., 2011; Lee et al., 2016). Whereas self-efficacy plays a main character in motivation (Chen et al., 2019), it stills under investigated in Pakistan and Bangladesh (Hossain et al., 2022). This study discovers how anxiety, procrastination and self-efficacy are connected among university students and highlights ways to improvement their academic routine and psychological well-being. It aims to provide responsiveness that can support educators and professionals in speak to these challenges successfully.

Hypotheses

. There would be a significant relationship between Anxiety, academic Procrastination and self-efficacy among university students.

. Self-efficacy would play a moderating role between anxiety and academic procrastination.

. There would be gender difference in the level of anxiety, academic procrastination and self-efficacy

METHODOLOGY

Study Design

The investigation design of this research was correlation, which collected data from a sample of university students from Karachi Pakistan at a single point in time. This study employed amongst self-efficacy, anxiety and educational procrastination among institution of higher education scholars. A survey design was used, where participants completed a questionnaire that measured self-efficacy, anxiety, and academic procrastination. This study utilized quantitative methods to collect and analyze data and statistical analysis was used to examine the relationships between variables.

Sample Size

The sample of the present study was comprised of 350 students (189 males and 161females). The sample was recruited from different departments and various academic

year students who were studying in the university. The age range of the entire sample started from 18 years to 25 years.

Sampling Technique

Students were nominated using a simple random sampling method based on designated criteria.

Procedure

Participants were recruited from different departments and locations from the university in Karachi Pakistan. Initially, a consent form was introduced. Participants were invited to examine the permission form and any queries were talked to the concerned authority and carried out to assess the possibility for intended purposes. Disadvantage and advantage analysis was talked to the applicants. Once obtaining agreement, the procedure of employment was introduced. Students were nominated using a simple random sampling method based on designated criteria. Participants were informed about the purpose of the schoolwork and were guaranteed that the documents would be used purely for investigation purposes and their identities would not be revealed to anyone. The participants (students) were requested to sign the consent form if they approved their willingness to participate. After completing the consent form, the standardized

questionnaires, Academic Procrastination Scale, State Trait Anxiety Inventory and The General Self-Efficacy Scale were administered. After the completion of questionnaires, the examiner thanked all participants.

Measures

Academic Procrastination Scale-Students (Solomon & Rothblum,1986)

PASS is a 33-item scale; each answered on a 1 to 5 Likert scale. Item cover changed features of academic procrastination behavior. Test retest reliability is 0.8 over a 2-week period and convergent validity is 0.73 and divergent validity is 0.10. Item scores are summed to produce a total score ranging from a minimum of 20 to a maximum of 80, with greater scores signifying greater procrastination tendencies.

State Trait Anxiety Inventory (Charles, Spielberger, Richard, Gorsuch & Robert, 1964)

The State-Trait Anxiety Inventory (STAI) is a widely validated self-report instrument consisting of 20 items rated on a 4-point Likert scale (1-4) with total scores ranging from 20 to 80. Greater scores show greater levels of anxiety, it is designed to measure both state and trait anxiety. Originally developed in 1964 by Spielberger, Gorsuch, and Lushene, the STAI has been translated into more than 30 languages for

use in cross-cultural research and clinical settings (Sesti, 2000). Multiple studies have evaluated the STAI's reliability and validity confirming its effectiveness as a tool for assessing anxiety in both research and clinical applications (Sesti, 2000).

The General Self-Efficacy Scale (Schwarzer & Jerusalem, 1995)

It established by Schwarzer and Jerusalem (1995) is a 10-item measure. Each item is rated on a 4-point Likert scale (1–4) covering various dimensions of general self-efficacy. The test-retest reliability of the GSES has been reported to range from 0.75 to 0.91 over intervals of two to six months indicating strong consistency over time. The total possible scores on the GSES range from 10 to 40 with greater scores showing greater levels of self-efficacy.

RESULTS

Table 1

Demographic statistics of the study characteristics

Characteristic	N	%
Age		
18-21	173	49.4
22-25	177	50.6
Gender		
Male	189	54
Female	161	46
Qualification		
Intermediate	69	19.7
Graduation	225	64.3
Master	45	12.9
M.Phil.	11	3.1
Marital Status		
Single	330	94.3
Married	19	5.4
Divorced	1	.3
Family Structure		
Joint Family System	157	44.9
Nuclear Family System	193	55.1
Socio Economic		
Lower Class	10	2.9
Upper Middle	77	22.0
Middle	226	64.6
Lower Middle	12	3.4
Upper Class	25	7.1
Employment		
Employed	107	30.6
Unemployed	243	69.4

Note N=350
Table 2
Descriptive statistic of demographic

	Minimum	Maximum	Mean	Std. Deviation
Age	1	2	1.51	.501
Gender	1	2	1.46	.499
Qualification	1	5	2.98	.698
marital status	1	3	1.06	.250
family structure	1	2	1.55	.498
socio-economic	1	5	2.90	.804
Employment	1	2	1.69	.461

Table 3
Descriptive Statistics of scale

	Minimum	Maximum	Mean	Std. Deviation
APTotal	33	124	78.55	15.062
STAITotal	20	77	47.95	7.564
GSETotal	10	40	26.76	5.579

Note: AP (Academic Procrastination), STAI (State Trait Anxiety Inventory), GSE (General Self-Efficacy)

Table 3 shows total number pf participants (350), AP Minimum 33 and Maximum 124 with M=78.55 and SD= 15.06, STAI Minimum 20 and Maximum 77 with M=47.95.55 and SD=7.56 and GSE Minimum 10 and Maximum 40 with M=26.76 and SD= 5.57.

Table 4

Person Correlation in Academic Procrastination State Trait Anxiety Inventory and Self-Efficacy(N=350)

Variable	M	SD	1	2	3
.Academic Procrastination	78.55	15.06	1		
State Trait Anxiety Inventory	47.95	7.56	.269**	1	
General Self-Efficacy	26.76	5.57	.142**	.323**	1

**p<.01*

The table 4 indicate a significant positive correlation between anxiety and academic procrastination ($r = .269$, $p < .01$). A smaller, yet significant positive correlation was found between self-efficacy and academic procrastination ($r = .142$, $p < .01$). Anxiety and self-efficacy also showed a moderate positive correlation ($r = .323$, $p < .01$), indicating these variables are interrelated.

Table 5

Regression Coefficient of Academic Procrastination, State Trait Anxiety Inventory and General Self-Efficacy (N=350)

Variable	B	SE	T	p	95%CI
Constant	7.35	16.41	.44	.654	[-24.93, 39.65]
State Trait Anxiety Inventory	1.43	.35	4.03	.000	[.73, 2.13]
General Self-Efficacy	1.82	.61	2.96	.006	[.61, 3.03]
Interaction Term	-.036	.013	-2.773	.006	[-.06, -.01]

Note CI=Coefficient Interval

Table 5 shows the regression coefficient of state trait anxiety, self-efficacy and Academic procrastination. The R^2 value of. 09 the predictors explained 9% change in the conclusion variable with F (12.219), p<.01 the result discovered that state trait anxiety inventory (β=.72, p<.001), self-efficacy (β=.67, p<.01) positively predicted academic procrastination and interaction term (β=-.89, p<.01) negatively predicted academic procrastination.

Table 6

Moderation of Self-Efficacy between Anxiety and academic Procrastination

Predictor	SE	p	LL	UL	R	R²	ΔR²
Constant	.78	.00	42.48	64.25			
Anxiety	.82	.00	.26	.69			
Self-Efficacy	.82	.49	-.18	.39			
Anxiety and Self-Efficacy	.55	.00	-2.58	-.44	.31	.10	.O2

Note: SE= Standard Error, LL= Lower Limit, UL= Upper Limit, R2 = R- Squared, ΔR2 = Adjusted R-Squared

The table no 6 shows moderation analysis results, indicating that self-efficacy significantly moderates the relationship between anxiety and academic procrastination. Anxiety positively predicts procrastination, however, the significant interaction term suggests that higher self-efficacy weakens this relationship. The model accounts for 10% of the variance in academic procrastination (R^2 = .10), with the interaction term explaining an additional 2% (ΔR^2 = .02), highlighting the buffering role of self-efficacy. p< .001.

Table 7

Difference between Male and Female University Students on Academic Procrastination
Independent Samples Test

Variables	N	M	SD	t	P	95%CL	
						LL	UL
Male	189	77.89	14.15	-.88	.37	-4.60	1.74
Female	161	79.32	16.07	-.88	.37	-4.60	1.74

Note.N=350.M=mean; SD=standard deviation; p=probability value (significance), LL=Lower Level, UL=Upper Level

The table no 7 indicate that there is no statistically significant difference in academic procrastination between males (M = 77.89, SD = 14.15) and females (M = 79.32, SD = 16.07), t = -0.88.df=348, p > 0.05.95% for the mean difference ranged from -4.60 to 1.74, suggesting that any potential difference in procrastination scores is not meaningful. These findings indicate that gender does not significantly impact academic procrastination among university students.

Table 8

Difference between Male and Female University Students on State Trait Anxiety

Independent Samples Test

Variables	N	M	SD	t	P	95% CL	
						LL	UL
Male	189	48.22	7.57	.72	.46	-1.00	2.18
Female	161	47.63	7.56	.72	.46	-1.00	2.18

Note.N=350.M=mean; SD=standard deviation; p=probability value (significance), LL=Lower Level, UL=Upper Level

The table no 8 indicate that there is no statistically significant difference in state-trait anxiety between males (M = 48.22, SD = 7.57) and females (M = 47.63, SD = 7.56), t= 0.72.df=348, p > 0.05.95% for the mean difference ranged from -1.00 to 2.19, suggesting that gender does not have a significant impact on state-trait anxiety levels among university students.

Table 9

Difference between Male and Female University Students on General Self-Efficacy

Independent Samples Test

variables	N	M	SD	t	P	95% CL	
						LL	UL
Male	189	26.48	5.86	-1.0	.30	-1.78	.56
Female	161	27.09	5.22	-1.0	.30	-1.78	.56

Note.N=350.M=mean; SD=standard deviation; p=probability value (significance), LL=Lower Level, UL=Upper Level

The table no 9 indicate that there is no statistically significant difference in general self-efficacy between males (M = 26.48, SD = 5.86) and females (M = 27.09, SD = 5.22), t = -1.00.df=348, p > 0.05.95% for the mean difference ranged from -1.78 to 0.56, suggesting that gender does not have a significant impact on general self-efficacy among university students.

Table 10

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.751
Bartlett's Test of Sphericity	Approx. Chi-Square	5326.120
	Df	1953
	Sig.	.000

KMO test and Bartlett's test of sphericity were conducted to assess the suitability of the data for factor analysis. The KMO measure of sampling adequacy was .751, indicating a moderate level of factorability, as values above .70 are considered acceptable for factor analysis.

Bartlett's test of sphericity was significant (χ^2 = 5326.12, df=1953 p < .001) suggesting that the data were appropriate for factor analysis. These results indicate that the sample was adequate and the data met the necessary assumptions for conducting exploratory factor analysis.

Table 11

Rotated Component Matrix

	Component		
	1	2	3
ap1	.380	.148	-.073
ap2	.291	.294	
ap3	.385	.167	.138
ap4	.340	.281	.159
ap5	.359	.172	.145
ap6	.350	.119	.168
ap7	.412		.065
ap8	.453	.130	.069
ap9	.451		
ap10	.439		
ap11	.268	.221	
ap12	.295	.249	.116
ap13	.513		
ap14	.520		-.061
ap15	.464		.106
ap16	.512	-.087	.109
ap17	.503	-.067	.097
ap18	.355	.116	.143
ap19	.316	.165	
ap20	.299	.160	
ap21	.359	.096	.115
ap22	.449		.178
ap23	.540	-.056	-.056
ap24	.257	.190	
ap25	.358	.143	-.257

ap26	.526		
ap27	.451	-.132	.222
ap28	.503	-.214	
ap29	.591	-.138	
ap30	.450		
ap31	.476		.110
apap32	.367	-.128	.185
ap33	.386	.142	
stai2	.066	.492	-.125
stai 3	.114	.115	.343
stai4	.160	-.183	.408
stai5		.379	
stai6	.136	-.170	.502
stai7	.051	.079	.418
stai8	.057	.478	-.120
stai9	.116		.425
stai10	.172	-.192	.546
stai11	.104	.355	
stai12	.059		.509
stai13	.091	-.148	.476
stai14			.442
stai 15		.362	
stai 16		.448	.102
stai 17	-.152	.247	.463
stai 18		.091	.580
stai 19		.253	.401
stai 20		.461	
gse 1		.569	-.131
gse2	-.116	.543	.064
gse3	.157	.371	
gse4		.382	.188
gse5	.055	.362	.217
gse6	-.093	.576	
gse7	.061	.427	
gse8		.564	
gse9		.474	
gse10		.517	
stai 1		.521	-.055

The principal component method is used to obtain the rotated component matrix and the rotation matrix was Varimax. The factor loadings were reported in table 11.

The table shows the results of the Rotated Component Matrix from the Principal Component Analysis (PCA) with Varimax rotation. The analysis reveals a three-factor solution, with distinct loadings for Academic Procrastination, Self-Efficacy and Anxiety. Items related to academic procrastination (AP) primarily loaded onto Component 1, while self-efficacy (GSE) items loaded onto Component 2, and anxiety (STAI) items

loaded onto Component 3. Some cross-loadings were observed, but the majority of items loaded strongly onto a single factor, indicating a clear distinction between the constructs. These outcomes confirm that the three-factor construction appropriately represents the underlying variables and is suitable for further analysis.

DISCUSSION

The present investigation meant to inspect the relationship between anxiety, academic procrastination and self-efficacy among university students in Karachi, Pakistan, while also exploring the moderating role of self-efficacy in the association among anxiety plus academic procrastination. The findings provided valuable insights into how these psychological constructs interact and influence academic behaviors, contributing to the present form of literature on student performance plus well-being.

The results in table 4 demonstrated a significant positive correlation between anxiety and academic procrastination, suggesting that students experiencing higher anxiety levels tend to procrastinate extra on educational responsibilities. This finding is reliable with previous researchers (Beutel et al.,2016; Carden, 2004; Ko & Chang, 2019; Vahedi et al, 2012; & Haycock et al., 1998, Milgram & Toubiana ,1999; & Rosario et al.,

2008, Tice & Baumeister, 1997), all of whom identified anxiety as a major forecaster of academic procrastination. A researcher also discovered that procrastination was strongly and consistently predicted by self-efficacy. He maintained that procrastination and low self-efficacy are closely connected to fear of failure, but that self-efficacy keep a direct influence on academic procrastination even when fear of failure is not present (Van Eerde's, 2003, Steel, 2007). Research considered the connection among self-efficacy, depression plus anxiety. The results indicated a adverse association between anxiety and depression and self-efficacy. One cognitive precondition for anxiety and depression is self-efficacy (Comunian, 1989). According to research, anxiety and self-efficacy are inversely correlated, indicating that lower anxiety is linked to higher levels of self-efficacy (Tahmassian & Jalali Moghadam, 2011, Barrows, Dunn, & Lloyd 2013).

Table 5 highlights the predictive relationships between anxiety, self-efficacy and academic procrastination. Conclusions recommend that while both anxiety and self-efficacy independently contribute to procrastination, their interaction has a moderating effect. Self-efficacy was also observed to be a significant forecaster of academic procrastination. study supports

Bandura's Self-Efficacy Theory, which recommends that persons with great self-efficacy exhibit greater confidence and persistence in task completion, reducing their tendency to procrastinate (Bandura,1995). Researchers meta-analysis and their review further confirm a strong negative correlation amongst self-efficacy plus procrastination (Van Eerde, 2003; Steel, 2007). Similarly, research by researchers highlighted self-efficacy as a key determinant in self-regulated academic behavior, reinforcing the meaning of confidence in academic achievement (Klassen& Kuzucu, 2009; Haycock et al. 1998).

Table 6 presents the outcomes of the moderation investigation examining the role of self-efficacy in the relationship between anxiety and academic procrastination. The findings indicate that anxiety meaningfully forecasts educational procrastination, higher anxiety levels are associated with increased academic procrastination. These findings align with prior research emphasizing self-efficacy as a defensive feature against anxiety related procrastination behaviors. The results were consistent with present works that demonstrated a positive correlation between anxiety and procrastination (Beutel et al;2016, Carden ;2004, Ko & Chang; 2019 & Vahedi et al; 2012, Haycock et al. 1998).

Additionally, researches connected with this study, confirming that scholars with higher anxiety levels procrastinate more on academic tasks (Milgram& Toubiana 1999; & Rosario et al. 2008, Tice & Baumeister, 1997). Regarding self-efficacy, the findings aligned with Bandura's Self-Efficacy Theory, which suggests that persons with great self-efficacy are extra confident and persistent in task completion, reducing procrastination tendencies (Bandura, 1995, Van Eerde, 2003; Steel, 2007, Klassen & Kuzucu ,2009; Haycock et al. 1998). The study's findings validated both hypotheses and reinforced the compound interaction amongst anxiety, procrastination and self-efficacy. These results underline the value of addressing psychological plus behavioral factors in educational interventions aimed at reducing educational procrastination amongst institution of higher education scholars. The current finding contributes to the growing body of literature emphasizing the protective role of self-efficacy in academic settings.

Table 7 shows that here is no major difference in academic procrastination between male and female university pupils. This finding is reliable with earlier research suggesting that educational procrastination is influenced more by personality traits and psychological factors rather than gender.

Researchers also found no major differences in educational procrastination levels between male and female pupils (Johnson & Bloom, 1995, Hess, Sherman, & Goodman, 2000). Additionally, emotional instability was known as a mediating influence, with individuals high in emotional instability being more prone to procrastination. These findings reinforce the disagreement that individual differences in personality and behavioral patterns play a more substantial role in procrastination than gender (Haycock, McCarty, & Skay, 1998). These findings support the decision that gender does not play a major role in educational procrastination (Ferrari, 1991, Johnson & Bloom, 1995). Hess and his colleagues found that individual changes such as eveningness (a preference for late sleep and wake times) and emotional instability were more significant forecasters of procrastination than gender (Hess, Sherman, & Goodman, 2000, Haycock, McCarty, & Skay ,1998).

Table 8 displays that there is no major change in general self-efficacy between male and female university pupils. This conclusion supports with earlier research signifying that gender may not be a influential factor in self-efficacy across several academic and professional domains. Tiyuri and his colleagues likewise informed no major difference in investigation self-efficacy amongst male and female postgraduate students, indicating that self-efficacy in academic settings may be influenced more by individual experiences and learning situations than by gender (Tiyuri et al, 2018, Ashrafi-Rizi et al, 2015). Some studies have knowledgeable gender changes in specific areas of self-efficacy. For example, investigation by Huang found that males generally shown higher self-efficacy in mathematics, science and technology subjects, while females recognized higher self-efficacy in verbal and humanities. Conversely, the study also mentioned no significant gender differences in social and health subjects, suggesting that gender disparities in self-efficacy are context dependent rather than universal (Huang, 2013, Zeldin, Britner, & Pajares, 2008, Mohammed et.al,2020, Sundari & Dasmo, 2014, Tiyuri et al, 2018 & Ashrafi-Rizi et al, 2015).

Table 9 shows that there is no major difference in state-trait anxiety amongst male and female university students. This result aligns with prior research suggesting that while anxiety levels may differ in specific contexts, overall state-trait anxiety does not significantly vary based on gender. A Researcher found no statistically significant differences in the anxiety levels of male and

female pupils, supporting the notion that anxiety is not inherently tied to gender (Akbayır 2019). Similarly, another study reported conflicting findings regarding mathematics anxiety, stating that while female students exhibited higher levels of mathematics anxiety particularly in more challenging subjects there was finally no statistically significant change in general math anxiety between male and female scholars. This reinforces the idea that while context-specific variations in anxiety may exist, general anxiety levels remain comparable across genders (Keshavarzi & Ahmadi, 2013).

Some studies have reported higher anxiety levels among females (Lewinsohn et al., 1998; Keshavarzi & Ahmadi, 2013), though these findings largely pertain to specific anxiety disorders or subject-specific anxieties, such as mathematics anxiety. The broader picture of general state-trait anxiety, as highlighted in the current study, suggests no significant gender differences, which supports with the findings of a researcher (Akbayır 2019). Although research indicates that women have a higher prevalence of diagnosed anxiety disorders with a male to female ratio of 1:1.7 to 1:1.79, this does not necessarily indicate a difference in everyday state-trait anxiety levels among students. The

outcomes of the current study recommend that male and female students may experience similar levels of general anxiety reinforcing the idea that anxiety-related tendencies are influenced by factors beyond gender alone.

Lastly, the study found no significant change in state-trait anxiety between male and female scholars. This supports with findings by some researchers (Akbayır, 2019; Keshavarzi & Ahmadi, 2013), who reported no significant gender changes in overall anxiety levels, although some context specific variations were observed. While research indicates that women may have a higher prevalence of diagnosed anxiety disorders (Lewinsohn et al., 1998), this does not necessarily translate to differences in general state-trait anxiety among students.

Taken together, these findings suggest that while gender-based differences in anxiety may appear in specific academic or clinical contexts, state-trait anxiety as a general psychological characteristic does not significantly differ between males and females.

Table 10 displays the outcomes of the Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of sphericity, which approve the suitability of the dataset for factor study. The KMO measure of test group sufficiency (.751)

indicates a moderate level of factorability telling that the data is suitable for identifying underlying factor structures. According to Kaiser (1974), KMO values above .70 are considered acceptable for factor analysis, supporting the adequacy of the sample in this study. Furthermore, Bartlett's test of sphericity was major (χ^2 = 5326.12, df = 1953, p < .001), representative that the correlation matrix is not a uniqueness matrix, thus justifying application of factor analysis. These results recommend that the dataset meets the essential statistical assumptions for conducting exploratory factor analysis (EFA), ensuring that meaningful latent constructs can be extracted. Consequently, the results support the reliability of the data structure and its potential to reveal underlying dimensions related to the study variables.

Table 11 shows the results of the principal component analysis (PCA) with Varimax rotation was led to discover the fundamental factor structure of the dataset. The rotated component matrix revealed a three-factor solution, indicating distinct constructs. The first component consisted primarily of academic procrastination (AP) items with strong factor loadings (e.g., ap13 = .513, ap14 = .520, ap29 = .591), suggesting that this factor represents Academic Procrastination. The second component included general self-efficacy (GSE) and some State-Trait Anxiety Inventory (STAI) items with notable loadings (e.g., gse1 = .569, gse6 = .576, stai1 = .521), indicating that this factor represents Self-Efficacy. The third component was primarily composed of STAI items with high loadings (e.g., stai10 = .546, stai18 = .580, stai6 = .502), suggesting that this factor represents Anxiety. Although some items exhibited cross-loadings (e.g., stai4 = .160 on Factor 1, -.183 on Factor 2, and .408 on Factor 3), the majority of items loaded strongly onto a single factor, supporting the distinctiveness of the three components. These conclusions recommend that the three-factor structure effectively represents the constructs of Academic Procrastination, Self-Efficacy, and Anxiety, validating their use in subsequent analyses.

Taken together, the outcomes of this exploration emphasize complex interplay among anxiety, self-efficacy and academic procrastination. The outcomes high point the importance of nurturing self-efficacy in students to moderate the adverse effects of anxiety on procrastination. Moreover, the lack of significant gender differences suggests that academic procrastination, self-efficacy and anxiety are best understood through psychological and behavioral factors rather than inherent gender distinctions. Future

research should accept a longitudinal design to explore how anxiety, self-efficacy and academic procrastination interrelate and change over time. Experimental studies are also suggested to calculate the helpfulness of self-efficacy teaching programs in decreasing both procrastination and anxiety among students. To develop the applicability of conclusions, future researches should contain applicants from diverse cultural, socioeconomic and educational backgrounds. Furthermore, researchers should investigate larger psychological concepts including motivation, personality traits, perfectionism and resilience to improve an extra complete awareness of the influences contributing to procrastination.

Conclusion

The present study examined the relationships between anxiety, academic procrastination and self-efficacy amongst institution of higher education pupils in Karachi, Pakistan, while also exploring the moderating part of self-efficacy in the connection between anxiety and academic procrastination. The conclusions exposed that greater levels of anxiety remained significantly connected with greater than before academic procrastination, approving previous investigation suggesting that students who involvement anxiety rise to delay academic tasks. As well, self-efficacy was found to moderate this relationship, its mean that students with greater self-efficacy were well talented to manage anxiety and procrastinate less. These findings match with prior studies suggesting that psychological traits rather than gender, show a more major part in influencing academic procrastination and anxiety. The results underline the importance of self-efficacy in moderating the negative influence of anxiety on academic behaviors, suggesting that interventions meant at improving self-efficacy could be helpful in decreasing procrastination amongst students.

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