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Fear of Mathematics Correlates Self-Esteem and Anxiety among Adolescent Students: A Descriptive, Relational and Cross Sectional Study

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Abstract:- The aim of this study is to investigate the correlation between adolescent student respondents' Fear of Mathematics and self-esteem in relation to their anxiety levels and as well as to verify the gender differences in these two anxieties and self-esteem; to investigate whether the educational qualification of the parent influences the fear of mathematics & also to examine the predictors of Self-Esteem and Anxiety from Fear of Mathematics among the adolescent student respondents'.

In this study the researcher used the random stratified sampling method. Data was obtained using a 24-item Mathematics Anxiety Rating Scale-Revised (MARS-R), 10-item Rosenberg Self-Esteem Scale (RSES) and 21 item Beck Anxiety Inventory (BAI). The scores of the three Tests were analyzed by using Karl Pearson Correlation Coefficient to investigate the correlation between Fear of mathematics, Self-Esteem and anxiety level and an independent samples t-test in order to examine gender differences in Fear of Mathematics, Self-esteem and anxiety level, one way ANOVA Test to investigate the difference in demographic variables across their selected categorical variables and also the Linear Regression Analysis to find the influence of Fear of Mathematics on Self-Esteem and Anxiety level. A total of 240 adolescent student respondents aged between 15 and 17were involved in this study, of three different schools from Bangalore. Of the total 120 male and 120 female.

The study concludes that a significant negative correlation between fear of math and self-esteem (r =-.277* at p<0.01), a significant positive correlation between fear of mathematics and anxiety (r = .471* at p<0.01) furthermore there was a significant negative correlation between anxiety and self-esteem (r = -.371* at p<0.01). No significant gender differences were found in Fear of mathematics, Self-esteem and in their anxiety level among the adolescent's student respondents. Analysis of Variance analysis (ANOVA) indicated that there are significant differences found in Fear of Mathematics with regard to Educational Qualification of both the father (p = 0.002 where p<.05) and mother (p = 0.028 where p<.05), for those student respondents whose parents were below under-graduation. Linear Regression analysis indicated that Fear of Mathematics influences Self-Esteem negatively by 5.2% and Anxiety level positively by 22.2%, asβ values indicate that the variable emerges as a significant predictor.

This study emphasizes the significance in understanding the fear of mathematics and its relational study with self esteem and anxiety among the adolescents. Implications of the findings are further discussed in the study.

Keywords:- *Adolescence, Fear, Mathematics, Anxiety, Mathematics anxiety, Self-esteem.*

I. INTRODUCTION

Mathematics seems to be like a nightmare to most of the students!!

"I fear in mathematics. I get scared if I hear the subject mathematics, my hands sweats……..Mathematics is really difficult to me I don't feel like asking any doubts to my teachers, as I know I cannot solve them. Neither I don't ask my friends, because I do not wanted my friends to laugh at my mistakes and also, I don't want my teacher to embarrass me in front of my friends……if I ask , my friend might think, you do not know this also……or I am lazy or my parents do not help me, but the truth is,I am not confident of the basics in mathematics and so I don't understand the subject mathematics."

-K.A.F (2022)

-One of the student respondents.

As in quotation above, some of the students feel fear and is anxiety about one's ability to do mathematics. Mathematics is a major dilemma among pupils. Numbers are used daily for various activities that go beyond academic and scientific activities and that are performed by people without a higher level of training but who have had adequate encouragement and experience to master the use of numbers. However, several myths around mathematical thinking create barriers within individuals and impede individuals' understanding and application of numbers (Phelps-Gregory et al., 2020).A large number of individuals in the population experience difficulties performing mathematical tasks, which generates feelings of frustration, anxiety and rejection. Failure to achieve full knowledge about Mathematics fundamentals leads them to develop Mathematics Anxiety (Carmen, Anca, and Costina-Ruxandra, 2016).

Students have a **fear of mathematics** and they want to avoid studying the subject, which seems to be not possible in school days. **This fear of mathematics affects the student's self -esteem** as well and it magnifies during the examination time, causing the students negative attitude

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towards mathematics and hindrance the learner from focusing on the problem which they are tackling. **The fear of mathematics also tends to the learner get nervous, as their intensity of anxiety level increases** especially during the time of the test or examination, especially if they are Board Examination. This fear clouds their minds and the students could not perform as well. Some of the reasons attributed to the fear of mathematics may develop earlier to the learner and may have several possible causes like: hereditary, social and environmental. Fear of mathematics may be created due to the influence of the parents, teachers, classmates and seniors. In the same way, negative perception towards mathematics also may cause the fear of mathematics.

Fear of Mathematics, other names is Numerophobia, arithmophobia, math phobia **or mathematics anxiety.**

In this study the researcher uses the word fear of mathematics instead of mathematic anxiety though the literature review uses the term mathematic anxiety. Also the researcher was keen in investigating whether this fear of mathematics influences anxiety level of the adolescents.

Fear of Mathematics (Mathematics anxiety) involves undesirable emotional responses to Mathematics that influence their cognitive efficiency, capability to arrive at certain decisions, and academic achievement, which are rooted from self-esteem (Ruff and Boes, 2014). Wherein, self-esteem depicts an essential role in determining pupils' abilities and self-worth, it can define their Mathematics competence that becomes a significant measure of explaining how Mathematics Anxiety exhibits. Though treatable and yet debilitating, it always remains untreated. On the other hand, general anxiety is a much less specific type of anxiety and refers to an individual's disposition toward anxiety about events, behaviors, and competence (Spence, 1997). So it better to a check always, whether this fear of mathematics has influenced the anxiety level of the adolescent student respondents.

Meanwhile, self-esteem, as an intrinsic attribute, is vital in nurturing student's identity and character. Self-esteem is a global evaluation of self-image and self-worth.

Constructive self-esteem assures students create their standard that arrives at making right decisions in times of difficulty. During development, self-esteem serves as a driving force while students engage in various learning experiences.

Fear of mathematics makes it imperative to address ways to prevent Fear of mathematics (Mathematics Anxiety) and promote self-esteem. When pupils feel uncomfortable on Mathematics subject, they become unable to solve word problems, and participate less actively in class. Thus, they develop fear and become astounded. This may increase the risk for the development of anxiety level which is likely transition during this adolescent period. As a result, adolescence is a particularly important time regarding the development of psychopathology. This period often sets the stage for future beliefs about the self and others, developmental concerns, and interpersonal relationships, which all are factors that are important to the development of anxiety. Therefore, an accurate understanding of the vulnerability factors and the features of anxiety disorders is important for mental health professionals.

Adolescents who feel fearful of Mathematics may be unable to demonstrate vitality and become less creative in doing class activities limiting them to demonstrate their factual self-worth and potential. Literature studies on Anxiety in adolescents, mentioned that, *"Anxiety is one of the most complex nervous disorder affecting adolescents"*..

Thus, Mathematics anxiety, self-esteem and their anxiety level remain closely related.

II. LITERATURE REVIEW

According to Seema and Kumar (2017) pupils who have higher levels of self-esteem tend to have high level of proficiency in Mathematics than those having poor self-esteem. This can be associated by how pupils were motivated to learn and engage in Mathematics lessons. Thus, it indicates that pupils who have high level of self-esteem tend to understand Mathematics better.

Candelaria M. Balmeo & Frederick Edward T. Fabella (2018) concluded in their study that there was a significant difference on the level of Mathematics Anxiety between Pupil-respondents with high self-esteem and low self-esteem, in which pupil-Respondents with high self-esteem level had low extent of Mathematics Anxiety While those with low self-esteem level, had exhibited high extent of Mathematics Anxiety. This only means that one way to prevent pupils to exhibit Mathematics Anxiety is to promote their self-esteem.

Dan, Bar Ilan & Kurman (2013) studied how attachment dimensions – anxiety and avoidance, self-esteem – and three subscales of test anxiety – cognitive obstruction, social derogation and tenseness – are related in 327 Israeli adolescents and college students, and found that college students revealed higher test anxiety than did high school students on the cognitive obstruction and tenseness scales, whereas high school students revealed higher social derogation than college students; that anxious attachment was related to all three sub-scales of test anxiety and avoidant attachment was related to cognitive obstruction among college students and to tenseness among high school students; and that most of the correlations between anxious attachment and test anxiety were mediated by self-esteem among high school students.

Mathematics anxiety is experienced by pupils when they are at school or when they are with their peer. Liew, Lench, Kao, Yeh, and Kwok (2014) examined the roles of avoidance temperament, which referred to "fear and behavioral inhibition," and evaluative threat, which referred to "fear of failure and feeling unintelligent" in standardized Mathematics test and course grades in 184 students in the collegiate level showed that avoidance temperament and evaluative threat were related to each other and were negatively related to Mathematics test scores. It was concluded that these results can cause Mathematics Anxiety

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affecting students' academic performance. It was suggested that factors attributed to Mathematics Anxiety must be put into consideration to establish appropriate interventions that are focused in emotion regulation and stress management.

Studies have found a moderate positive correlation between Mathematic Anxiety and test anxiety (Hembree, 1990; Kazelskis et al., 2000; Devine et al., 2012).

Fingernail biting, hand trembling, heart pounding, insomnia, nervousness, nightmares, palmar perspiration, pressures or pains in the head, shortness of breath when not exercising or working hard, and sick headaches, as well as a frequently objectless feeling of uncertainty and helplessness, a blocking of communication, an intellectual and emotional preoccupation, and an interference with thinking processes and concentration are all indicators of anxiety (Rosenberg, 1965, 147). The same author also points out that there are certain factors associated with **low self-esteem which may be expected to create anxiety**: instability of self-image, the "presenting self", vulnerability, and feelings of isolation (idem, 151).

Hoover-Dempsey et al., 2001; Patall, Cooper, & Robinson, 2008), one recent study asked if parental involvement might predict children's math achievement through a reduction in children's math anxiety (Vukovic, Roberts, & GreenWright, 2013). To test this hypothesis, researchers measured children's math performance and anxiety as well as parental involvement using a self-report survey. The results indicated that holding high parental expectations and providing strong support at home was associated with are reduction in children's math anxiety, which in turn relates to higher math achievement. However, interpretation of the results of this study has three important caveats: (a) These effects were reported at a single time point rather than longitudinally, (b) none of the other parent involvement factors (i.e., direct support with homework, communicating with child's teacher, Homework understanding, etc.) predicted children's math achievement, and (c) the researchers did not measure the parents' own levels of math anxiety.

According to Carl Rogers (as cited in Mcloed, 2014) in his Humanistic Psychology claimed that the main source of problems among individuals is that they despise themselves and consider themselves worthless. With this notion, Rogers believed that giving unconditional acceptance to person can improve one's self-esteem.

Eysenck (1992) discusses a whole range of anxiety-related phenomena, for instance, increased physiological arousal, selective attention, and distractibility.

The results obtained from the Researches conducted by Neyers, 2002; Neyers, 1998 and Markyshor, 1997 showed that students who love math and enjoy involving in the activities required applying mathematical knowledge gain more academic achievement in math courses. Conversely, students who experience a range of negative emotions such as irritability and lack of peace to confusion, distress and fear of math, will have less success in this course (Fenma, 1989; Kirk, 2002). Neyers (2002) suggests that one of the ways to improve math performance and reduce math anxiety, is utilizing formal math teaching beside math students and dealing with negative feelings against this course.

For the tasks under consideration here in this study, however, understanding about the fear of mathematics among the adolescents and how it influences self-esteem and their anxiety level which are most relevant.

A. Hypothesis

H_0: There is no significant relationship between fear of mathematics, self-esteem, and anxiety level among the adolescent student respondents.

B. Significance of the Study

This study emphasizes the significance in understanding of fear of mathematics and its relational study with self esteem and anxiety level.

This study can be beneficial for teachers in helping them consider learning activity and teaching strategy that can outdo Mathematics Anxiety and promote good self-esteem among pupil and can reduce the psychological and physiological factors of anxiety in turn. Suggesting the teachers to follow the ***Expectancy Theory:*** *A motivational theory where a person creates a future scenario that seems attractive and attainable to him or herself, and if he or she can see what it takes to get to this future and believe he or she has what it takes to get there, this person will be motivated to make that scenario come true (Baker, 1992)*

A pupil's level of self-esteem can serve as a powerful motivational force where children are generally motivated to act in ways that enable them to feel good about themselves.

Particularly, understanding the fear of mathematics and factors leading to it can provide an insight to how teachers can improvise or device a strategy to counteract Mathematics Anxiety and the negative effects towards learning Mathematics and how it can help students to build a positive attitude in believing themselves will increase their self-esteem.

Through this study the school management can provide development projects to strengthen teachers' ability to become adapt in handling students with problems in academics, particularly in Mathematics, and make the school conducive for learning. Also, it can help parents to accept criticism and parents become aware of their child's fear of mathematics when they get more involved with their homework and encourage them to become more assertive in taking Mathematics as a subject and dealing with Mathematics activities as opportunity to grow, learn, and develop.

Lastly, it will be beneficial to students by making necessary adjustment and identifying necessary learning strategies in handling Mathematics Anxiety that will enable them to discover their true academic potentials, thereby boosting their self-esteem and reducing their anxiety level.

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C. Statement of Problems:

Often students face a common problem when they Discuss Mathematics. The students often complain that when the teachers make them understand concepts and show various examples at school they understand them, but it is different when they sit back at home and complete their homework or practice it. Students tell that they had understood the concepts back at school but afterward they either skip some part of the understanding part, they forget one or two-step of what was taught or they complete don't understand.

Students struggle to understand the theorems and concepts and also have Difficulty in Retaining the Formula's and hence *the fear exists in adolescence which affects their self-esteem.*

So this struggle to perceive the subject means that a student is bad at mathematics?

No it is not. Students shall not be conveyed that they are not good at math. Actually, it is just that some students have less thinking and analytical skills that are necessary to become an Excellent Student in Math. And a student can improve his/her performance with regular practice and hard work. Fear can always be overrun. We need to be determined towards our goal and try to overcome these fear, so that it will not influence self esteem negatively and lead to more anxiety level.

Hence researcher finds that there is a need for this study is to show how the student respondents fear in mathematics leads to low self esteem and create anxiety within them, the researcher thus studies in depth to find out whether, *"Fear of Mathematics correlates self-esteem and anxiety among adolescent student respondents aged between 15 and 17 from 3 different schools from Bangalore",*From the results, recommendations were forwarded.

D. Research Questions

The study aims to answer the following questions:

a) Are there any effects in the demographic variables across their selected categorical variables among the adolescent student respondents in terms of the following:
   - Gender
   - Occupation of the parent

b) Are there any effects in the level of fear of mathematics, Self-esteem and anxiety exhibited *with regard* to *Educational Qualification of the parent* among the student respondents?

c) Is there any correlation between Fear of mathematics, Self-Esteem and anxiety level among the adolescent student respondents?

d) How much does the Fear of Mathematics influence on Self-Esteem and on Anxiety level?

III. METHODOLOGY

A. Design and Instrumentation

A descriptive survey design was adopted using survey method to carry out the study. Descriptive survey design was used because it provides a more accurate picture of events and seeks to explain people's perception and behaviour on the basis on the data gathered at a point in time (Gay, 1992; Frankel &Wallen, 2000 The main idea behind using this type of research is to better define an opinion, attitude or behaviour held by a group of people on a given subject. Data for the study was collected through the use of questionnaire. Singh (2007) retains that a questionnaire is almost always self-administered which allows respondents to fill them out themselves.

B. Research Materials

- Questionnaires
- Peer reviewed Journals
- Books
- Magazines
- On-line documents from some relevant and reliable internet sources.

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Tools Used:

Sl.No:	Name of the tool	Author, Year, and Reference	No Of Items	Factors	Reliability Value
1	*MARS-Math Anxiety Rating Scale*	Barbara S. Plake and Clair S. Parker. Plake, B. S. And Parker, C. S. (1982). The development and validation of a revised version of the Mathematics Anxiety Rating Scale, Educational and Psychological Measurement, 42, 551-557. Instrument reproduced with permission of Richard M. Suinn, the Rocky Mountain Behavioral Science Institute, Inc., and Educational and Psychological Measurement	Learning Mathematics Anxiety = 16 items Mathematics Evaluation Anxiety= 8items	1. Learning Mathematics Anxiety 2. Mathematics Evaluation Anxiety	The scale has excellent reliability, with an alpha of .98.
2	*Self-Esteem Scale- RSES*	Rosenberg, M. (1979). Conceiving the Self New York: Basic Books. Instrument reproduced with permission of Morris Rosenberg. AVAILABILITY: Dr. Morris Rosenberg, Department of Sociology, University of Maryland, College Park, MD 20742.	10 items 5 Positive sentences 5 negative sentences		The RSE has a Guttman scale coefficient of reproducibility of .92, indicating excellent internal consistency. Two studies of two-week test-retest reliability show correlations of .85 and .88, indicating excellent stability.
3	Beck's Anxiety Inventory	Beck, A.T., Epstein, N., Brown, G., & Steer, R.A. (1988). An inventory for measuring clinical anxiety: Psychometric properties. Journal of Consulting and Clinical Psychology, 56, 893-897.	21 items scale		Internal consistency for the BAI = (Cronbach's a=0.92) Test-retest reliability (1 week) for the BAI = 0.75 (Beck, Epstein, Brown, & Steer, 1988)

Table 1: Psychological Assessment tools used in this study

C. Selection of Participants

The population of the study included the adolescent students of class X to XII, aged between 15 and 17 years from 3 different schools , Bangalore-Karnataka, consisted of 120 boys and 120 girls. So the sample size for the study was (n) = 240 students.

The researchers selected their sample using stratified random techniques for verifying the kind of relationship between fear of mathematics and their self-esteem and anxiety level among adolescents.

D. Data Collection Procedure

In research, it is the dream of every researcher to have high response rate. As a result, names of students who participated in the study were not recorded on the instrument. At the meeting, the purpose of the study, its duration, and potential benefits were explained to the heads and teacher as well as all other participants for their consent to participate in the study. The informed consent letter was collected from student participant. Then, the research tests were given to them. They were asked to express their opinion carefully and as honest as possible.

E. Apparatus

The demographic sheet and the questionnaires were in pencil-and-paper format.

F. Data analysis

The information was gathered collectively at school, and then obtained data were an analyzed using SPSS tool-(Statistical Package Program for Social Science) version 28.0, the t-test, one-way ANOVA, Scheffe post hoc test, Karl Pearson's correlation coefficient and the linear regression analysis. Its aim was determining the statistical characteristics from descriptive statistics (mean, standard deviation, etc.).

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IV. RESULTS AND DISCUSSION

A. ***Research Question One:*** *What is the difference in demographic variables across their selected categorical variables among the adolescent student respondents in terms of the following?*

a) Gender
b) Occupation of the parent

a) Gender

To verify the gender effect regarding fear of mathematics, self esteem and anxiety among the adolescent student respondents and their selected socio demographic variables with independent sample T-test.

[1]H₀: *There is no significant gender difference with regards to Fear of mathematics, Self-Esteem and Anxiety among the adolescent student respondent.*

	Gender	N	Mean	SD	t-value	
Fear of mathematics	Male	120	**7.74**	1.472		
					-1.25	
	Female	120	7.97	1.347		
Self-esteem	Male	120	18.02	4.162		
					0.636	
	Female	120	17.66	4.312		
Anxiety	Male	120	15.78	13.247		
					-1.77	
	Female	120	18.72	12.492		

Table 2: Independent sample t tests for gender difference in Fear of mathematics, Self-Esteem and Anxiety.

Table 2 shows the result of independent sample t-test was performed to analyse gender difference in Fear of mathematics, Self-esteem and Anxiety. A perusal of Table 2 shows that the mean difference was not significant for *Fear of mathematics* (t (.238)= -1.250, p>.05),*Self-Esteem* (t(.238)=.636,p>.05)*and Anxiety* (t (.238)= -1.770,p>.05) . **Hence [1]H₀ was supported.**

b) Occupation of the parent

To investigate the difference in Fear of mathematics, self esteem and anxiety with regard to Occupation of the parent using one way ANOVA Test among adolescent student respondents.

[2]H₀: There will be no significant difference in Fear of Mathematics, self esteem and anxietywith regard to Occupation of the paren

	Occupation of the parent	N	Mean	SD	F-value	p
Fear of mathematics	Employed	210	**7.86**	1.409	8	
	Unemployed	7	8.97	0.943	2.083	0.103
	Homemaker	21	7.45	1.488		
	Retired	2	7.48	0.378		
Self-esteem	Employed	210	17.92	4.537		
	Unemployed	7	15	3.266	1.017	0.386
	Homemaker	21	17.86	4.016		
	Retired	2	19	1.141		
Anxiety	Employed	210	17.04	12.719		
	Unemployed	7	26	16.32	1.249	0.293
	Homemaker	21	16.95	13.977		
	Retired	2	11	5.657		

Table 3: Differences in Fear of Mathematics, S*elf esteem and Anxiety with* regard to Occupation of the parent

Table 3 shows the results indicate that there is no significant differences withregard to the occupation of the parent for Fear of MathematicsM=8.97,F=2.083,p>.05), Self-Esteem (M=19.00, F=1.017,p>.05) and anxiety level (M=26.00, F= 1.249, p>.05). *Hence the [2]H₀, was supported.*

B. ***Research Question Two:*** *Are there any effects in the level of fear of mathematics, Self-esteem and anxiety exhibited with regard to Educational Qualification of the parent among the student respondents?*

- **[3]H₀:** There will be no significant difference in Fear of Mathematics, Self-Esteem and Anxiety level with regard to to Educational Qualification of the Father.

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	Educational Qualification of the father	N	Mean	SD	F-value	p
Fear of mathematics	Below Under Graduation	68	**8.22**	1.443		
	Under Graduation	83	7.97	1.236	6.301	0.002
	Post Graduation	89	7.46	1.461		
Self-esteem	Below Under Graduation	68	17.87	3.863		
	Under Graduation	83	17.54	4.837	0.337	0.714
	Post Graduation	89	18.1	4.548		
Anxiety	Below Under Graduation	68	19.43	12.882		
	Under Graduation	83	18.35	13.264	3.363	0.04
	Post Graduation	89	14.55	12.32		

Table 4: Differences in Fear of Mathematics, S*elf esteem and Anxiety with* regard to Educational Qualification of the Father

Table4 shows the analysis of Variance (ANOVA)which was done to analyse the difference in Fear of Mathematics, *self esteem and anxiety level* with regard to Educational Qualification of the Father, the table 4 shows the results of variance of Fear of Mathematics, *self esteem and anxiety level* .The results indicate that there is no significant differences with regard to the Education Qualification the Father Self-Esteem (M=18.1, F=0.337,p>.05) however the result also indicated that there is significance difference in the level of fear of mathematics (M=8.22,F= 6.301, p<.05) and anxiety level (M=19.43,F= 3.363, p<.05) . *Hence the* $^{3}H_0$*, was supported for self-esteem and rejected for fear of mathematics and anxiety level.*

- $^{4}H_0$**:** There will be no significant difference in Fear of Mathematics, Self-Esteem and Anxiety level with regard to to Educational Qualification of the Mother.

	Educational Qualification of the mother	N	Mean	SD	F-value	p
Fear of mathematics	Below Under Graduation	76	8.13	4.176		
	Under Graduation	81	7.92	4.284	3.619	0.028
	Post Graduation	83	7.54	4.892		
Self-esteem	Below Under Graduation	76	18.03	3.863		
	Under Graduation	81	17.51	4.837	0.345	0.709
	Post Graduation	83	18	4.548		
Anxiety	Below Under Graduation	76	18.2	12.356		
	Under Graduation	81	17.46	13.725	0.502	0.606
	Post Graduation	83	16.17	12.728		

Table 5: Differences in Fear of Mathematics, Self esteem and Anxiety with regard to Educational Qualification of the Mother

Table 5 shows the analysis of Variance (ANOVA)which was done to analyse the difference in Fear of Mathematics, *self esteem and anxiety level*with regard to Educational Qualification of the Mother, the table 5 shows the results of variance of Fear of Mathematics, *self esteem and anxiety level* .The results indicate that there is no significant differences with regard to the education of the Mother.Self-Esteem (M=18.03, F=0.345,p>.05)) and anxiety level (M=18.2,F=0.502, p>.05) .however the result also indicated that there is significance difference in the level of fear of mathematics (M=8.13,F= 3.619, p<.05.*Hence the* $^{4}H_0$*, was supported for self-esteem & anxiety level and rejected for fear of mathematics.*

C. ***Research Question Three:*** *Is there any correlation between Fear of mathematics, Self-Esteem and anxiety level among the adolescent student respondents?*
Relationship between fear of Mathematics, self-esteem and anxiety among adolescents using Karl Pearson's correlation.

- **Objectives:** To investigate the kind of relationship between fear of Mathematics and self-esteem among adolescent student respondents.

$^{5}H_0$*: There is no significant relationship between fear of mathematics and self-esteem among adolescents.*

Self-esteem	Fear of Mathematics	
Self-Esteem	1	-.277**
Fear of Mathematics	-.277**	1

Table 6: Relationships between Fear of Mathematics and Self-Esteem

**. Correlation is significant at the 0.01 level (2-tailed).

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Table 6 shows the Karl Pearson Correlation analysis of self-esteem and fear of mathematics indicates: very low negatively correlated and statistically significant (r=-.277 at p <0.01). Hence $^{5}H_{0,}$ the null hypothesis was rejected and alternate hypothesis was accepted.

It can be also understood from the table 6computed assumes that student respondents with high level of fear of mathematics would lead to lower level of self-esteem.

- **ii) Objectives:** To investigate the kind of relationship between Fear of mathematics and anxiety among adolescents.

^{6}***H₀:*** *There is no significant relationship between Fear of mathematics and anxiety among adolescents.*

Fear of Mathematics	Self-Esteem	
Fear of mathematics	1	.471**
Anxiety	.471**	1

Table 7: Relationships between Fear of Mathematics and Anxiety

**. Correlation is significant at the 0.01 level (2-tailed).

Table 7 shows Karl Pearson Correlation analysis of fear of mathematics and anxiety from the above data indicates the relationship as low positively correlated and statistically significant (r=.471 at p <0.01). Hence $^{6}H_{0,}$ the null hypothesis was rejected and alternate hypothesis was accepted.

It can be also understood from the table7 computed assumes that student respondents with high level of fear of mathematics would lead to higher level of anxiety.

- **Objectives:** To investigate the kind of relationship between anxiety and self-esteem among adolescents.

^{7}***H₀:*** *There is no significant relationship between anxiety and Self-Esteem among adolescents.*

	Anxiety	Self-Esteem
Anxiety	1	-.371**
Self-Esteem	-.371**	1

Table 8: Relationships between Anxiety and Self-Esteem

**. Correlation is significant at the 0.01 level (2-tailed).

Table 8 shows Karl Pearson Correlation analysis of anxiety and self-esteem from the above data indicates the relationship as low negatively correlated and statistically significant (r=-.371 at p <0.01). Hence $^{7}H_{0,}$ the null hypothesis was rejected and alternate hypothesis was accepted.

It can be also understood from the table8 computed assumes that student respondents with high level anxiety would lead to lower level of self-esteem.

D. ***Research Question Four:*** *How much does the Fear of Mathematics influence on Self-Esteem and on Anxiety level?*

- Objectives: To investigate the predictors of Self-Esteem from Fear of Mathematics.

^{8}*H₀: There will be not significant influence of Fear of Mathematics on Self-Esteem.*

Predictors Variable	Std.Beta Value	t-value	Model Summary
Fear of Math	-.227	-3.600	R=.277 R^2 =.052 Adjusted R^2=..048 F= 12.957 P< 0.05

Table 9: Regression Analysis of Fear of Mathematics on Self-Esteem

*p<0.05 Dependent Variable: Self-Esteem

Table 9 shows Linear Regression analysis which was done to find the influence of Fear of Mathematics on Self-Esteem. Self-Esteem was the dependent variable and Fear of Mathematics was the independent variables for the analysis. The result showed that ***Fear of Mathematics influences negatively Self-Esteem by 5.2%*** (ie, Fear of mathematics decreases the Self-Esteem)**,** as**β** values indicate that the variable emerge as significant predictors.

- **Objectives:** To investigate the predictors of Self-Esteem from Fear of Mathematics.

*[9]**H₀:** There will be not significant influence of Fear of Mathematics on Anxiety Level.*

Predictors Variable	Std.Beta Value	t-value	Model Summary
Fear of Math	.471	8.231	R=.471 R^2 =.222 Adjusted R^2=..218 F= 67.751 P< 0.05

Table: 10 Regression Analysis of Fear of Mathematics on Anxiety

*p<0.05 Dependent Variable: Anxiety

Table 10 shows Linear Regression analysis which was done to find the influence of Fear of Mathematics on Anxiety. Anxiety was the dependent variable and Fear of Mathematics was the independent variables for the analysis. The result showed that ***Fear of Mathematics influences Anxiety by 22.2%***,as**β** values indicate that the variable emerge as significant predictors.

V. CONCLUSION

The correlational results of this study found that there was very low negative relationship between fear of mathematics and self-esteem, a low positive relationship between Fear of math and Anxiety & a low negative relationship between self esteem and anxiety, hence the study reveals that the fear of mathematics and it's anxiety level has negative relationship with self esteem, this can be the reason students lack appropriate mathematical background which can overcome through regular practice, Since math is often cumulative and based on other mathematical skills, students who struggle with previous mathematical concepts will have anxiety when facing new concepts to learn and intense efforts taken by the students , hence there is positive relationship between fear of mathematics and anxiety levelthat lead the symptoms of anxiety and hence self-esteem is affected among the adolescent student respondents.

The results from the linear regression analysis it indicates that fear of mathematics influences positively anxiety and negatively self-esteem of the adolescent student respondents.

It is also found from the independent t-test that there were no significant gender difference were analysed from the results with regards to Fear of mathematics**,** Self-Esteem and Anxiety, hence the null hypothesis were supported in this study, unlike the Candelaria M. Balmeo, Frederick Edward T. Fabella (2018)of grade six pupils of santolan elementary school research study, However, it is not clearbecause research with large groups is lagging and the present study was done on adolescent students.

From one-way ANOVA test theresult obtained for the education qualification- below under graduation of the father indicates that there is a significant relationship in the level of fear of mathematics and anxiety level of the adolescent student respondents, also there is a significant relationship in the level of fear of mathematics for those students whose mother's educational qualification is below under graduation. From the result it is assumed that the educational qualification effects the fear of mathematics among the adolescent student respondents.

One-way ANOVA test also done for the occupation of the parents the results indicate that there is no significant relationship found among the adolescent student respondents in this study. Hence the null hypothesis was supported.

There are many ways an educator can help a child change their mindset about mathematics, thereby alleviating the child's math anxiety, but first the educator must develop a growth mindset themselves (Boaler, 2016). When an educator believes in a child's potential, adds appropriate math materials to increase excitement and interest, along with creating a positive connection between math and the child's world the brain can be "rewired" to change their mindset (Boaler, 2016).

The findings of several researches show that providing opportunities for cooperative, moderate and competitive learning at schools can reduce the students' anxiety (Slavin, 1990). In addition, Diversity in teaching methods and evaluation methods of students (based on the mightiness of flexibility in character) is another way to reduce mathematics.

anxiety in the educational environments (woolfolk, 1993 quoted from O'dea, 2006).

Enjoyment, feeling competent, and positive attitude toward Mathematics, and presence of peer with common interests about Mathematics were the factors recognized to attenuate Mathematics Anxiety.

It must be taken into account that a positive outlook can improve student's ability to learn and accomplish Mathematics activities effectively and improves one's self-esteem and thereby reduces their anxiety level.

The limitations of the study are the validity of the study was limited by the location of the study; the accuracy of the study was dependent on the honesty of the survey participants, it would be very easy to not be truthful about their morale or motivation and the consistency of how people rate their levels of basic desires is very subjective.

Understating these results recommendations were forwarded that Mathematics instructor to support and help the adolescence to become aware that math is important but math is not life itself and teachers can make the students stronger in their basics with lots of worksheets and motivate them through reward system using the B F Skinner's operant conditioning.

In conclusion, this correlational, cross sectional study provides some fruitful information for the area and so for the further studiesto expand the results of the current study, particularly given the increasingly more defined role of the school counselor's and teacher's responsibility for utilizing evidence-based interventions with students.Simple techniques that can be applied, such as mindfulness-based cognitive therapy (MBCT)- Body Scan exercises, relaxation techniques, breathing exercises and regular exercise, are effective in reducing anxiety and contributing to emotional well-being and reduce risk factors adolescents are exposed to this fear of mathematics, the greater the potential impact on their mental health.

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