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Impact of Mathematics Anxiety on Students Performance in Public Secondary Schools of Lyari, Karachi

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ABSTRACT

Mathematics is one of the core subjects. It is taught in almost all the fields related to sciences, which leads to the better opportunities in future. Mathematics anxiety is one of the most prominent issue found almost in all type of student at all ages, and is one of the area that is responsible to decline the student's achievement. The aim of the study is to identify the association of mathematics anxiety and students' performance in the context of Lyari, Karachi. Moreover, the study will find the association of mathematics anxiety and level of anxiety with the grades of students. In this research quantitative model was used for collecting data, for collecting data questionnaire was distributed among 70 students, belong to X class of public sector secondary school students of Lyari region. The mean ages of the students (mean=15) and data was analyzed through SPSS using of percentage and Linear Regression. The finding revealed that mathematics anxiety is having negative association with students' performance and mathematics anxiety increase with the class of students. It is recommended that teachers should teach mathematics with fun in order to overcome the fear of mathematics along with repeated drill and practice questions. Along with teachers, parents are also required to provide attention at home by providing interactive environment in order to polish their skills.

Keywords: Mathematics anxiety, Students and Performance.

INTRODUCTION

Mathematic anxiety has identified one of the significant areas of study and considered the center of the attention of many scholars. Mathematics is one of the compulsory and demanding subjects for the professional development, as it is taught in all level of schools. Mathematic anxiety has discovered as common problem among students at different level of schooling, due to having weak base subject. According to the Azhar, Iqbal and Imran (2025) Mathematics anxiety refers to the feeling of tension, fear and pressure which interrupt the ability to perform mathematical operations (Zakaria & Nordin, 2008). According to (Mutodi, 2014) mathematics anxiety is feeling of restless, helpless and fear from mathematical numbers and shape which effect the capability to solve mathematical problems. When math anxiety reached at severe level, it converts in to math-phobia (Azhar & Imran, 2024; Imran & Akhtar, 2023).

Math's anxiety is kind of negative response towards numerical functions. Moreover, it disturbed the ability to solve mathematic problem emotionally and psychologically. It causes low achievement among students due to having high anxiety level (Pletzer, Kronbichler & Nuerk, 2015). Students with mathematic anxiety appeared with having, either mathematic learning disability or cognitive disorder which interrupt the skills to perform mathematical operation. In other words, it produced overload on working memory which effect negatively on capability to accomplish mathematical calculation (Shah, Ali & Ahmad, 2024). Moreover, extreme negative attitude towards mathematics cause mathematic anxiety which negatively impact on ability to manipulate with numbers and shapes. It is found that students with higher mathematic anxiety are seem in the problem of lower mathematic achievement (Dowker, Sarkar & Looi, 2016). Further, it is found that advance problem-solving strategies could reduce mathematic anxiety and the level of achievement in mathematics can rise from low to high.

Moreover, motivation is playing vital role to reduce mathematic anxiety and increase the level of achievement among students as it modifies the capability to perform mathematical operations (Wang et al., 2015). Further, it is better to observed anxiety level at initiative stage to control the anxiety level among students in order to promote and develop the proficiency in mathematics operation (Cargnelutti, Tomasetto & Passolunghi, 2017). It is noticed that the roots of mathematic anxiety start growing from elementary and secondary level, it can be predicted that anxiety level increased with the level of schooling.

Further, the causes of mathematic anxiety are highlighted which are considered as target area to reduce the mathematics anxiety such as being physically or mentally absent, bad self -concept, bad coping skills, teacher attitude and preference on learning maths through practice or memorization without understanding (Shah, et al., 2025; Imran, et al., 2023). The most important cause behind furious mathematic anxiety is the methodology of teacher (Zakaria & Nordin, 2008). It is highlighted that mathematic anxiety can be caused due to the genetic factor, if the parents are having fear from mathematics automatically it will transfer

among their offspring.

Moreover, the anxiety level of students can have increased with their age. They develop the concepts in their mind which is capable to develop attitude according to the concept. The positive or negative attitude take them to the anxiety or fear which destroy the capability to perform mathematical operations (Dowker et al., 2016).

Research Objectives

The following are the objectives of the study:

1. To determine the relationship between mathematic anxiety and secondary school students performance.
2. To examine, mathematic anxiety level increase with the level of schooling or grades of secondary school students.

Scope of the Study

The study is carried within the area of Lyari (Karachi) and identified the problem to cope with the problem of mathematics anxiety. Moreover, the study is helpful for different educational institution(schools) to identify the problem of mathematic anxiety and deal with the subject which will be helpful to lead towards the bright future. Further, the study will add a piece of information into the domain.

LITERATURE REVIEW

It is observed that mathematics anxiety and student's achievement is having negative relationship with each other. Students with high mathematic anxiety are found with low performance or level of achievement resultant failure in mathematical activities (Cargnelutti et al., 2017). Mathematics anxiety decrease the proficiency level in mathematics efficiency of students (Chang & Beilock, 2016). The result of the study indicates that there is negative relationship between mathematics anxiety and student's performance in mathematics. In other words, mathematics anxiety leads to poor result in mathematics which in tur lead to the avoidance of performing mathematical activity (Carey, Hill, Devine, & Szücs, 2016).

Mathematics anxious lead to the poor capabilities of performing mathematics related task or activities. It makes them nervous that attached with the thoughts, thinking, intelligence and rezoning skills of an individual (Ahmed, Batool & Haq, 2025; Shah, et al., 2025). It leads to the low performance because math anxious involve in two tasks such being worried and thinking to complete mathematics activities, which result ability to perform mathematics must suffer. Math's anxiety impairs the ability to solve mathematics operations (Chang & Beilock, 2016).

Moreover, it is further extracted from the result of the study that mathematics anxiety effect negatively on the mathematics related activities such as manipulative activities even manipulation of simple counting (Ahmad, Mankash, & Sewani, 2024; Shah, Ali & Ahmad, 2024; Akram, Ahmad & Sewani, 2024). It is discovered that anxiety trigger on working memory that harm or deplete the capabilities to perform mathematics related activities or basic simple mathematical operations (Sorvo et al., 2017). Mathematics anxiety impaired the mathematical

achievement (Passolunghi & Mammarella, 2016).

It is concluded from the study of (Artemenko et al., 2015) that math anxiety impaired the simple mathematics calculation and operations. Highly mathematics anxious are unable to perform 2-digit operation such subtraction based on borrowing or carrying problems. The concept is further agreed and discussed that mathematics anxious individual are less likely to involve in the mathematics and arithmetic's related skills. The chance of development of calculation skills is reduce (Malanchini et al., 2017). In other words, it can be said that mathematics anxiety and performance is having negative relationship with each other. Mathematics anxiety negative impact on individual performance. Thus, it can be said that an individual struggling with mathematics anxiety unable to perform well in mathematics calculation in academics as well as in ordinary life (Ching, 2017). It is accepted and explained that mathematics anxiety is basically a factor that is responsible of lack of involvement of students in mathematics class as well as reduction in the level of performance of students and secure good position is difficult for students. Moreover, Dyslexia, low self-perception, dyscalculia and anxiety are one of the areas which are responsible to effect the learners' performance (Mundia, 2012; Stoehr, 2017). It is further supported that the impairment behind the mathematics performance is due to the mathematics anxiety. In other words, individual dealing with anxiety are more likely to having low performance level in mathematics (Núñez-peña & Suárez-pellicioni, 2015). Further, it is supported that mathematics anxiety reflect on the capability of numerical capability as poor performance while dealing with the numbers (Morsanyi et al., 2014).

Moreover, it further discussed that mathematics anxiety is the element which is responsible to deactivate the learner's performance. In other words, mathematics anxiety is having capability of deteriorate mathematics achievement and performance (Pletzer et al., 2015). Further, self-concept, anxiety/phobia, dyscalculia, low self-efficacy are factors that are responsible for the low performance (Mundia, 2012). However, it is evidenced that mathematics anxiety is having negative association with mathematic performance and achievement. In nut shell, an individual who is struggling with mathematics anxiety are unable perform well in mathematics (Foley et al., 2017).

RESEARCH METHODOLOGY

Research Design

The study is based on positivist philosophy and quantitative in nature. Moreover, the study has examined the impact of Mathematics Anxiety on students' performance. The primary data were collected by using survey method based on Five point Likert scale.

Population & Sampling

The population of the study were students of X class from public secondary schools of Lyari (Karachi) region.

The study was carried by convenient sampling, and through convenience

sampling data were easily collected. The sample size of the study was 70 students of public secondary schools of X class. The sample size was equally divided in to 35 boys and 35 girls' students of different schools.

Data Collection & Data Analysis

The data were collected by using questionnaire. Questionnaire was designed and piloted for reliability and validity Samples used for piloting were 10 and was not included with the sample population. Reliability was calculated through Cronbach Alpha (.78), and validity was through expert opinion. The questionnaire was distributed among male and female students of public secondary schools.

The data was analyzed by using SPSS by applying Regression and percentage on collected data in order to draw an appropriate information based on authentic conclusion on Mathematics Anxiety and its impact on Students' Performance.

Analysis of the Questionnaire

Items	SA	%	A	%	U	%	DA	%	SDA	%
Mathematics is difficult than other subjects	19	27.7	19	27.7	10	14.7	13	19	8	11
Feeling of fear arise from mathematics book and math problems	9	14	1	28	9	11.3	23	30.3	12	16.3
Mathematics increase feeling of nervousness and confusion	13	18.3	24	31	17	16.3	18	20.3	10	13.7
Being worried for mathematics test even cannot sleep before night level of anxiety/fear from mathematics increase with the grade/classes level	15	20	17	23	7	10.3	15	20.3	17	26.3
Performing any mathematics exercise/problems without the help of teacher and classmate is impossible	16	21.7	17	24	6	9.7	16	23.2	15	21.3
Teacher teaching method is difficult; it seems that teacher has memorize the problem	14	19.3	24	34.7	10	13	12	18.7	10	14
Mathematic is difficult due to having old curriculum	10	12	10	13.7	11	16.7	21	31.7	18	26.3
	6	8.7	11	13.7	8	11.3	28	40.7	18	25.7

Burden of assignment and test create fear in mind in mathematics subject	12	17.7	12	17	10	13.7	20	28.7	16	23
Teacher attitude and atmosphere create fear among students	8	11.3	8	11.3	10	14.7	24	34	20	28.7
Bad scores in mathematics are reason behind the disliking of mathematics	7	10.3	9	12.3	11	15	25	36	16	23.3
Teacher insist to having one way to solve the mathematic problem	9	12	10	13.7	9	12.7	25	36.7	17	25

DISCUSSION

Mathematics anxiety is one of the most common problem that is responsible to create hurdles in the STEM course and close the door of better occupational opportunities. Mathematics has strong relation with students' performance, an individual with higher mathematics anxiety leads towards the low mathematics performance and achievement. In other words, mathematics anxiety cripples an individual mathematics/arithmetic skill. On the other hand, there is no evidence found that mathematics anxiety increases with the progress in next level of class. Moreover, there can be numerous reasons behind the mathematics anxiety such difficult method of teaching, difficult due to less interactive and old curriculum, burden of tests and assignments create anxiety, bad scores that lead to the demotivation or teacher attitude and atmosphere of the math's classroom. While burden of test and assignment is the most preferred area of the anxiety in the light of drawn result.

CONCLUSION

Mathematics anxiety has strong impact on students' learning and performance. Basically, mathematics anxiety takes over on the cognition of an individual which reduce the capability of arithmetic's articulation (Klados et al., 2015). Hence, it is found that mathematics anxiety depletes or reduce mathematics related performance or achievement of students. In other words, math anxious individuals are unable to perform well in mathematics. On the other hand, it is further concluded that mathematics anxiety does not increase or decrease with progress of students into another class level. In other words, it can be concluded that mathematics anxiety does not increase or decrease with the grade and class of students, there will be no effect on progress of grade/class of students on mathematics anxiety.

Whereas, it was tried to highlight the causes behind mathematics anxiety, it

can be predicted that students were unable to agree or come up with single statement as there was high ration of students' disagreement on approximately every statement. But yet the most agreed cause by the student was "burden of assignment and test create anxiety and fear of mathematics".

Recommendation

The following are the recommendations of the study:

- Teachers are advised to identify the symptoms of mathematics anxiety such as fear of anxiety, failed in development of confidence and failure in knowledge and understanding, bodily symptoms such as fast heartbeat, shivering in whole body, fainting etc.
- Teachers are advised to use Positive reinforcement and problem-based learning strategies are considered best strategies to control the negative behavior of the students towards mathematics.
- Positive reinforcement refers to giving them questions to solve question repeatedly from basic to specific area. Problem-based learning refers to word problems in order to involve them in to the situation for the purpose of better response and overcome the anxiety.
- It is further recommended that in teacher training program such M.Ed. and B.Ed., specifically teaching training program should include in order to polish the teaching skills of teachers. A well-trained teacher can play positive role to overcome the anxiety level of students.

REFERENCES

- Ahmad, N., Mankash, M. A., & Sewani, R. (2024). The Dynamic Link between Teacher Effectiveness and Student Success in Secondary Education in Karachi. *Journal of Social & Organizational Matters*, 3(2), 14–26. <https://doi.org/10.56976/jsom.v3i2.61>
- Ahmed, A., Batool, S., & Haq, A. U. (2025). To Measure the Effects of Omnichannel Management Capabilities on Positive WOM Engagement and Equity. *Wah Academia Journal of Social Sciences*, 4(1), 1265-1285.
- Akram, M., Ahmad, N., & Sewani, R. (2024). Comparing Special Education Teachers' Psychological Wellbeing Based on their Demographics. *International Journal of Social Science Archives*, 7(3), 23-32.
- Artemenko, C., Daroczy, G., & Nuerk, H.-C. (2015). Neural correlates of math anxiety – an overview and implications. *Frontiers in Psychology*, 6(September). <https://doi.org/10.3389/fpsyg.2015.01333>.
- Azhar, Z., & Imran, M. (2024). Ethical Considerations in the Adoption of Artificial Intelligence in Human Resource Management: A Comprehensive Review. *Journal of Emerging Technologies and Innovative Research (JETIR)*, 11(8).
- Azhar, Z., Iqbal, T., & Imran, M., (2025). The Role of Ethical Leadership in HRM-driven Corporate Social Responsibility (CSR). *Journal of Management & Social Science*, 2(1), 158–176.

- Carey, E., Hill, F., Devine, A., & Szűcs, D. (2016). The chicken or the egg? The direction of the relationship between mathematics anxiety and mathematics performance. *Frontiers in Psychology*, 6(JAN), 1–6. <https://doi.org/10.3389/fpsyg.2015.01987>.
- Cargnelutti, E., Tomasetto, C., & Passolunghi, M. C. (2017). How is anxiety related to math performance in young students? A longitudinal study of Grade 2 to Grade 3 children. *Cognition and Emotion*, 31(4), 755–764. <https://doi.org/10.1080/02699931.2016.1147421>.
- Chang, H., & Beilock, S. L. (2016). The math anxiety-math performance link and its relation to individual and environmental factors: A review of current behavioral and psychophysiological research. *Current Opinion in Behavioral Sciences*, 10, 33–38. <https://doi.org/10.1016/j.cobeha.2016.04.011>.
- Ching, B. H. H. (2017). Mathematics anxiety and working memory: Longitudinal associations with mathematical performance in Chinese children. *Contemporary Educational Psychology*, 51, 99–113. <https://doi.org/10.1016/j.cedpsych.2017.06.006>
- Dowker, A., Sarkar, A., & Looi, C. Y. (2016). Mathematics Anxiety: What Have We Learned in 60 Years? 7(April). <https://doi.org/10.3389/fpsyg.2016.00508>.
- Foley, A. E., Herts, J. B., Borgonovi, F., Guerriero, S., Levine, S. C., & Beilock, S. L. (2017). The Math Anxiety-Performance Link: A Global Phenomenon. *Current Directions in Psychological Science*, 26(1), 52–58. <https://doi.org/10.1177/0963721416672463>.
- Imran, M., & Akhtar, N. (2023). Impact of Ethical Leadership Practices on Teachers' Psychological Safety and Performance: A Case of Primary School Heads in Karachi-Pakistan. *Academy of Education and Social Sciences Review*, 3(2), 172-181. <https://doi.org/10.48112/aessr.v3i2.505>
- Imran, M., Ahmad, N., Al-Harthy, A. A. Q., & Jat, Z. G. (2023). Early Identification and Intervention: Amplifying the Voice of Slow Learners. *AITU Scientific Research Journal*, Volume. 1, Issue. 4,
- Klados, M. A., Simos, P., Micheloyannis, S., Margulies, D., & Bamidis, P. D. (2015). ERP measures of math anxiety: how math anxiety affects working memory and mental calculation tasks? *Frontiers in Behavioral Neuroscience*, 9(October), 1–9. <https://doi.org/10.3389/fnbeh.2015.00282>.
- Malanchini, M., Rimfeld, K., Shakeshaft, N. G., Rodic, M., Schofield, K., Selzam, S., ... Kovas, Y. (2017). The genetic and environmental aetiology of spatial, mathematics and general anxiety. *Scientific Reports*, 7, 1–11. <https://doi.org/10.1038/srep42218>.
- Morsanyi, K., Busdraghi, C., & Primi, C. (2014). Mathematical anxiety is linked to reduced cognitive reflection: a potential road from discomfort in the mathematics classroom to susceptibility to biases, 1–13.
- Mutodi, P. (2014). Exploring Mathematics Anxiety: Mathematics Students' Experiences, 5(1), 283–294. <https://doi.org/10.5901/mjss.2014.v5n1p283>.
- Núñez-peña, M. I., & Suárez-pellicioni, M. (2015). Processing of multi-digit

- additions in high math-anxious individuals: psychophysiological evidence, *6*(August), 1–11. <https://doi.org/10.3389/fpsyg.2015.01268>.
- Passolunghi, M. C., & Mammarella, I. C. (2016). Mathematics Anxiety, Working Memory, and Mathematics Performance in Secondary-School, *7*(February), 1–8. <https://doi.org/10.3389/fpsyg.2016.00042>.
- Pletzer, B., Kronbichler, M., & Nuerk, H. (2015). Mathematics anxiety reduces default mode network deactivation in response to numerical tasks, *9*(April), 1–12. <https://doi.org/10.3389/fnhum.2015.00202>.
- Shah, S. G. M., Ali, Z., & Ahmad, N. (2024). Analytical study of Awareness of Metacognitive Reading Strategies and Reading Comprehension among College Students. *Voyage Journal of Educational Studies*, *4*(1), 34–46. <https://doi.org/10.58622/vjes.v4i1.120>
- Shah, S. M. A., Ahmed, N., Haq, A. U., & Saba, S. (2025). Leadership for Innovation: Fostering the Culture of Creativity in Organization: A Systematic Literature Review. *Journal of Asian Development Studies*, *14*(2), 945–957.
- Shah, S. M. A., Qamar, M. R., Ahmed, S., & Imran, M. (2025). Nepotism and Favoritism in HR Practices: Implications for Organizational Politics in Pakistan. *Journal of Management & Social Science*, *2*(1), 177–194.
- Sorvo, R., Koponen, T., Viholainen, H., Aro, T., Räikkönen, E., Peura, P., ... Aro, M. (2017). Math anxiety and its relationship with basic arithmetic skills among primary school children. *British Journal of Educational Psychology*, *87*(3), 309–327. <https://doi.org/10.1111/bjep.12151>.
- Stoehr, K. J. (2017). Mathematics Anxiety: One Size Does Not Fit All. <https://doi.org/10.1177/0022487116676316>.
- Wang, Z., Lukowski, S. L., Hart, S. A., Lyons, I. M., Thompson, L. A., Kovas, Y., ... Petrill, S. A. (2015). Is Math Anxiety Always Bad for Math Learning? The Role of Math Motivation. *Psychological Science*, *26*(12), 1863–1876. <https://doi.org/10.1177/0956797615602471>
- Zakaria, E., & Nordin, N. M. (2008). The effects of mathematics anxiety on matriculation students as related to motivation and achievement. *Eurasia Journal of Mathematics, Science and Technology Education*, *4*(1), 27–30. <https://doi.org/10.12973/ejmste/75303>