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The Relationship Between Math Anxiety And Algebraic Thinking Skills Among Middle School Students

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Abstract

The aim of the current research is to identify the level of mathematics anxiety among third-grade intermediate students in the General Directorates of Education in Baghdad, Rusafa and Al-Karkh, and the relationship of this feature to forced thinking skills. The research sample consisted of (400) students from the third intermediate grade during the first semester of the school year 2019/2020: (200) male and (200) female students. For the purposes of this study, the researcher used the Mathematics Anxiety Scale (MARS) after it was modified and reclassified on the Iraqi environment, and a test was prepared in the algebraic thinking skills for third-grade intermediate students consisting of (20) objective items, and the apparent validity and constructive validity of the two research tools were verified and used. Coder Richardson's equation (20) and Kronbach alpha for calculating stability reached (0.87) and (0.81), respectively. The results revealed that male and female students of the research sample have very high scores in the test anxiety scale, and math anxiety is high among female students compared to males, and male and female students of the research sample have scores less than the hypothetical average in the test of algebraic thinking skills, which is a function of the average. The hypothesis, and girls are better than males in algebraic thinking skills. The results indicate the existence of an inverse statistically significant correlation between mathematics anxiety and algebraic thinking skills, that is, the more mathematics anxiety increases, the less algebraic thinking skills. The researcher recommended that mathematics teacher preparation programs should include topics on algebraic thinking skills, as well as holding training courses and workshops on algebraic thinking skills and their educational applications for mathematics teachers at all stages.

Introduction

Mathematics represents a universal symbolic language that is universal for all cultures and civilizations of all their diversity and diversity, and the different levels of progress and development, and as a result of the scientific and technological development that the world has witnessed. What mathematics was not in isolation from, the school curricula witnessed rapid developments and changes in all countries of the world, and mathematics had a large share of those changes and developments to come in line with the needs of their societies and their aspirations to move towards advancement and progress during the third millennium, and the educational literature indicates that there are factors that affect achievement, Including physical, mental, emotional, social, school and other factors.

One of those emotional factors is anxiety, as it is one of the phenomena observed in the current era among individuals, as a result of different life circumstances, and its degree differs from one person to another according to his goals, his private and public situations and the circumstances surrounding him. “The learner who is afraid of mathematics will obtain weak grades, and the learner Whoever exerts himself in this subject will also be afraid of it ”(Al-Sadhan, 2004). And since mathematics is one of the most abstract subjects, and therefore it is one of the subjects of an alarming nature, therefore, mathematical anxiety is one of the most serious problems that students face while learning mathematics, and thus leads to not benefiting from the efforts that education institutions may make to improve mathematics learning (Baltiya and Metwally, 1999), and since “mathematics requires the student to perform some mental operations such as remembering, thinking, relating, imagining and intuition, anxiety in it afflicts the student with a state of tension that affects these processes and limits their activity, and thus their achievement is affected” (Sawalha and Aqsa, 2008, 333). Algebra is considered an abstraction and a generalization of arithmetic, as it examines the properties of numbers after their abstraction, and the related operations. The characteristics of generalization and abstraction have contributed to the detection of some important mathematical structures such as the group, the ring, the field and others, which led to linking branches of mathematics that were not previously connected (the Mufti), and this is confirmed by literature and previous studies and the opinions of many educators with specialization that there is Students have a clear weakness in algebraic thinking skills, which may negatively affect their learning levels in mathematics and the rest of the

school subjects, as mathematics is characterized as a network of intellectual construction in which ideas are based on one another, and are linked together by relationships and laws, and the most important element in mathematical thinking is The ability to see relationships between ideas and concepts, and to recognize and discover patterns. (Al-Harthi, 1999: 234) The researcher believes that it is necessary to study the relationship between math anxiety and algebraic thinking skills among middle school students, placing the following question at the center of his research problem: "What is the relationship between math anxiety and algebraic thinking skills among middle school students?"

Research importance:

1. The scarcity of Iraqi and Arab study researches (to the best of the researcher's knowledge), as there is no study dealing with the relationship between mathematics anxiety and algebraic thinking skills. Which makes the current research the first pioneering study in this area at the level of Iraq at the very least.
2. Knowing the relationship between mathematical anxiety and algebraic thinking skills contributes to increasing interest in teaching mathematics and focusing on mental processes of a mathematical nature, meaning that the student learns logic or mathematical reasoning instead of learning to solve specific algebraic problems or specific engineering problems, meaning that the goal is It is the learning of mental processes, not just mathematical content.
3. Providing objective procedural data for those concerned with the Ministry of Education, including planners, designers, implementers and developers, to identify mathematics anxiety and algebraic thinking skills for middle-grade third-grade students, to be taken into consideration in the mathematics curriculum development processes.
4. The educational process is affected by the student's cognitive experience and his personal qualities, and that the process of adaptation and adaptation of the student is affected by his experiences. Therefore, what the individual carries from these experiences affects in one way or another the adoption of his type of thinking (Al-Atabi, 2003: 4).
5. Developing methods and methods of teaching teachers by introducing them to math anxiety and forcing thinking skills, and showing cases in which these skills can be used, as this can help them to think using a variety of methods in teaching to avoid students' weaknesses and shortcomings, and to develop these skills better. They have.
6. Mathematics is a fundamental pillar of educational curricula, and an important subject for the development of mathematical thinking, which aims to prepare students who are able to analyze, interpret, predict, make decisions, solve problems, and link knowledge and life situations, thus helping to develop different styles of thinking and dimension On memorization, indoctrination and diversification of educational materials, and focusing on building appropriate content for the twenty-first century in educational curricula.
7. Thinking is considered the most complex and advanced cognitive activity, and it results from the ability of the human being to process symbols and concepts and use them in a variety of ways, enabling him to solve the problems he faces in different learning and life situations.

Research goal:

The current research targets the relationship between mathematics anxiety and algebraic thinking skills among middle school students, and in order to achieve this goal, the following hypotheses were formulated:

1- There is no statistically significant difference at the level of significance (0.05) between the theoretical average and the arithmetic mean of the grades of the third-grade average students in the scale of mathematics anxiety.
2- There is no statistically significant difference at the level of significance (0.05) between the theoretical average and the arithmetic mean of the grades of the middle third-grade students in the scale of mathematics anxiety.
3- There is no statistically significant difference at the level of significance (0.05) between the theoretical average and the arithmetic mean of the grades of the middle third grade students in the scale of mathematics anxiety.
4- There is no statistically significant difference at the level of significance (0.05) between the mean scores of the third grade average students in the mathematics anxiety scale according to the gender variable.
5- There is no statistically significant difference at the level of significance (0.05) between the theoretical average and the arithmetic mean of the third-grade average grades in the algebraic thinking skills test.
6- There is no statistically significant difference at the level of significance (0.05) between the theoretical average and the arithmetic mean of the grades of the third-grade intermediate students in the algebraic thinking skills test.
7- There is no statistically significant difference at the level of significance (0.05) between the theoretical average and the arithmetic mean of the grades of the middle third grade students in the algebraic thinking skills test.
8- There is no statistically significant difference at the level of significance (0.05) between the mean scores of the third-grade intermediate students, the test of algebraic thinking skills. Depending on the gender variable.
9- There is no statistically significant correlation at the level of significance (0.05) between the scores of the mathematics anxiety scale and the scores of the algebraic thinking skills test among the third-grade intermediate students.

Search limits:

1. Middle day schools for boys and girls of the General Directorate of Education in Baghdad / Rusafa (1, 2, 3) and Al-Karkh (1, 2, 3).

2. Students of the third intermediate grade for the academic year (2019-2020)
3. Algebraic thinking skills). The skill of induction and deduction, the skill of symbolizing and modeling, guessing and the skill of reflective thinking in algebra).
4. The first semester of the year (2019-2020).

Defining terms:

Mathematical anxiety:

"The learner's feeling of tension and anxiety when dealing with numbers or solving mathematical problems related to aspects of daily or academic life." (Sawalha&Asfaa, 2008: 343)

The researcher defines it procedurally as: a state of tension, distress and a sense of fear of failure felt by middle-grade third-grade students during any situation that requires dealing with mathematics, and it is measured by the degree that the student gets by applying the anxiety scale used in this study, and the researcher considered that the average score Math anxiety less than 142, meaning less than 50%, expresses low anxiety, but if the average is confined to (213-142), meaning a percentage between (75-50%), then this reflects a moderate degree of anxiety. If the average is greater than 213, i.e. a percentage greater than 75%, this indicates high concern.

Algebraic thinking:

one of the patterns of mathematical reasoning or inference, it is related to mental operations carried out by the learner to understand and describe patterns and mathematical relationships, and to deduce new mathematical relationships about numbers, operations and geometric shapes. Algebraic thinking is related to the development of a set of skills among students, including: inference about mathematical patterns (in graphs, geometric shapes, numbers and arithmetic operations), deducing and employing mathematical generalizations, developing mental performance in relation to operations on algebraic expressions, using algebraic symbols and using mathematical representations in describing Sports relations (Will, 2010,665)

The researcher knows it procedurally: one of the thinking patterns includes: (the skill of induction and deduction, the skill of expressing symbols and modeling, guessing and the skill of reflective thinking in algebra) measured by the degrees that the third-grade intermediate students get as a result of their response to the algebraic thinking test prepared by the researcher.

Theoretical background:

Characteristics of individuals with math anxiety:

1. Low achievement and indifference in school.
2. Fear of failing mathematics exams.
3. Think about the performance of others and blame themselves greatly
4. Expect punishment and loss of self-esteem.
5. Various physiological reactions and disturbances (feelings of helplessness, fear, and inadequacy)

(Nuseirat, 1983)

Ways to face math anxiety:

1. That the teacher discusses the topics that the student likes and the topics that he does not like, including mathematics, and that the student's teacher feels that he loves and respects him.
2. That the teacher develops a kind of self-confidence in the student by educating him about the sources of his self-strength and strengthening his belief with his sufficiency, which leads to protecting him from unreliability, skepticism and fear of failure, and he must help the student to succeed in a test.
3. That the teacher uses a variety of learning styles.
4. That the teacher is not limited to the traditional method of testing.
5. That the teacher imparts to the students experiences that enhance their self-esteem, and form elevated concepts about themselves.
6. That the teacher deviates from the ego style while explaining the topics to students.
7. For the teacher to make the mathematics that students study linked to their lives.
8. That the teacher motivates the students to adopt original qualitative thinking by affirming that mathematics is a human effort.
9. The teacher makes the students feel that they are able to perform in mathematics lessons by addressing the wrong responses given by the students in a positive way, and providing them with feedback in a way that helps them participate in the classroom.
10. Teachers should rely on teaching methods that focus on active learning and active participation, making students more able to think, intuition and investigate.
11. The teacher should have a sense of humor, as moderating the classroom atmosphere would reduce students 'affection levels and raise self-confidence degrees.
12. That the teacher resort to using games that depend on mathematical concepts, to help them raise their motivation towards learning.

Algebraic thinking:

Algebra is one of the major branches of mathematics. Whereas mastery of mathematics depends on a sound understanding of algebra, of computation; Because it searches in the properties of numbers after their abstraction

and generalization, as it is considered an abstraction, and the processes associated with that, and the characteristics of abstraction and generalization have contributed to revealing some important mathematical structures, which led to linking branches of mathematics that were not previously related. The International Council for Mathematics Education] [ICMI (International Congress of Mathematical Education) recommended at the Twelfth Research Conference on the topic of "The Future of Teaching and Learning Algebra", to focus on algebra, and that it is a basic ability to think. It includes from many aspects of the types of thinking, such as geometric thinking, probabilistic thinking, and logical thinking, and it has great importance that makes the interest in developing its fields and skills an important matter, and algebraic thinking is considered an abstract and generalization of computation, it examines the properties of numbers after their abstraction and the related processes. The American National Council of Teachers of Mathematics [[NCTM] and the National Research Council [NRC] [NRC] the National Council of Teachers of Mathematics [[NCTM] emphasized the importance of algebra, And that algebraic thinking is considered one of the most important types of mathematical thinking, because it includes many aspects of thinking, and its skills are found in many areas of life due to the development of algebraic knowledge (conceptual and Procedural (and this is what supports mathematical power or the so-called "mathematical prowess. Mathematics is a ruling factor in what is currently going on and what is expected in the future of scientific and technological innovations. Therefore, mathematics curricula and their pedagogy must respond to the data of development and strip them of their traditional robe." A need for more useful mathematics to meet the challenges of the future ((Obaid, 1998).

Previous Studies:

Study (Morris, Kellaway & Smith, 1978) The study aimed to identify the factors that may contribute to mathematics anxiety and the extent of their association with it, in a sample of university students consisting of (52) students from the major of mathematics and (54) students from the major of psychology. From the study results, test anxiety has a significant relationship with specialization.

A study (Depreeuw, 1984). - The study aimed to find out the relationship between personality traits and test anxiety, as the researcher tried to determine the characteristic profile of students with high test anxiety, as the researcher compared (47) university students who had joined the test anxiety reduction program with a random sample that was selected based on its degree. In the anxiety scale as a condition and a trait, the results showed that the subjects with high test anxiety are characterized by high general anxiety, and they have instability, and this study concluded that the vast majority of students with high test anxiety have personality traits that distinguish them, such as, the emotional instability trait. , And depression high. (Ali, 1987: 302).

He conducted (Fikri, 1990) a study aimed at studying mathematical anxiety among students of the second grade of scientific high school in terms of its level and relationship to achievement in engineering. The sample of the study included (395) male and female students from the second scientific secondary class, of whom (180) were male and (215) female students, distributed into 7 classes: 3 classes for boys and 4 classes for girls. The results of the study found that there are statistically significant differences at the level (0.01) between mathematical anxiety and achievement in conversion engineering.

In a study conducted by (Al-Hanini, 2009) to reveal the levels of algebraic mathematical thinking among the eighth grade students, and to identify the relationship of algebraic thinking and its skills with algebraic achievement, and the researcher used two tests, one for algebraic achievement and the other for algebraic mathematical thinking, and it was applied to a sample of 514 students. And a female student of the eighth grade basic, and the results showed a correlation between students 'level of algebraic achievement and their ability and skills in algebraic mathematical thinking.

Study procedures:

The study methodology The descriptive approach was used in the current study, in view of its relevance to the objectives and nature of the study.

Study population: The current study population represents third-grade students (boys and girls) who are studying in intermediate and secondary schools in Baghdad. As shown in Table (1):

Table (1) Distribution of middle and high schools in the city of Baghdad for the academic year (2019-2020)

Directorate	Number of middle schools				Number of secondary schools				Number of students		
	Males	Female	mixed	Total	Males	Female	mixed	Total	Males	Female	mixed
Rusafa1	45	30	2	77	17	27	33	77	9279	9077	18356
Rusafa2	63	22	4	89	24	51	4	79	15698	12596	28294
Rusafa3	42	25	-	67	4	8	-	12	8617	6918	15535
Karkh1	36	15	1	52	16	30	8	54	6833	5037	11870
Karkh2	51	31	32	114	24	42	9	75	10645	8945	19590
Karkh3	32	20	6	58	26	27	12	65	8397	7159	15556
Total	296	143	45	457	111	185	66	362	59469	49732	109201

percentage	**58.86 %**	**31,3%**	**9.84 %**	**100 %**	**30.6 %**	**51.1%**	**18.2 %**	**100 %**	**54.46 %**	**45.54 %**	**100%**

The basic sample of the study:

Two schools were chosen from each education directorate in Baghdad, one for boys and the other for girls, by random method, so we had (12) selected schools, and one division was chosen by the simple random method from the middle third grades and from each school of the basic sample, so the number of classes was (12) classes, and it was The total number of students who have been selected is (400) male and female, by (200) male and (200) female students, to represent the study sample, Table (2):

Table (2) Directorates of Education, schools and students, sample of the study in the city of Baghdad

Directorate of Education	School name	Number of students		total summation
		Males	Female	
Rusafa1	Kairouan Boys High School	34	--	34
	Al-Rasheed High School for Girls	--	34	34
Rusafa2	Eastern High School for Boys	34	--	34
	Hateen High School for Girls	-	34	34
Rusafa3	Medium justice for boys	32	-	32
	Al Amani medium for girls	--	32	32
Karkh1	Omar Al-Mukhtar Secondary School for Boys	34	--	34
	Al-Fadila High School for Girls	--	34	34
Karkh2	Al-Mu'tasim medium for boys	34	--	34
	Gaza Intermediate School for Girls	--	34	34
Karkh3	Al-Kadhimiya Intermediate School for Boys	32	--	32
	Khadija Grand Intermediate School for Girls	--	32	32
Total		200	200	400

Search tools:

Mathematics Anxiety Scale:

The researcher used the Mathematics Anxiety Scale (MARS in its Arabized and modified form, which is the scale that he developed and modified for the Arab environment) Abed and Yaqoub (1990) for the commonly used scale called "The Mathematics Anxiety Rating Scale". The scale included In its Arabized and modified form of 76 paragraphs, each of which represents a behavioral position that may raise a person's level of anxiety and express it by responding to one of the points of this graded scale that begins with the first level "does not bother me" followed by "bothering me a little" and "bothering me a lot" and finally "bothering me Very much ("Abed and Jacob, 1990: 148). For the purposes of applying the scale to the Iraqi environment, the researcher re-legalized it through the following procedures: "The paragraphs of the scale were presented to a group of experts in the field of education and psychology and experts in mathematics and methods of teaching it in order to determine the suitability of its paragraphs to the local environment and the clarity of its instructions and the purpose of it for the sample of the study, And based on their opinions, some words were modified to fit the culture of the local community, and thus the scale was adopted with its 71 villages. The reliability of the scale was calculated by applying it to a survey sample of 100 male and female students, and according to the reliability coefficient using the Cronbach alpha equation. The reliability coefficient reached (0.89), which is a high coefficient of stability. In measuring the characteristic for which this scale was designed, and the modifications made in light of the

professors 'observations are also considered an indication of the validity of the scale. And by amending the scale and verifying its validity and reliability, the scale has become In its final form.

Algebraic thinking test:

Determining the goal of the test:

The aim of the test is to measure the algebraic thinking skills of third-grade intermediate students, and in the light of the review of research and studies that focused on algebraic thinking skills, the skills were identified in: (the skill of induction and deduction, the skill of expressing symbols and modeling, guesswork and the skill of reflective thinking in algebra).

Preparing the initial paragraphs for the construction of the two tests:

The researcher prepared (20) objective paragraphs appropriate to the mathematics content that is taught to students of the study sample, which he took into consideration in formulating and developing them to be appropriate to the current study level, consistent with the study objectives, and to be diverse, in order to mitigate the respondent's tendency Automatically so as not to cause boredom and boredom.

Validity of test items:

The test was presented to a group of arbitrators with competence in mathematics and the methods of its teaching, to judge: the validity of each of the test items to measure the required characteristic, the clarity of the instructions and the extent to which the test vocabulary is appropriate for the algebraic thinking skills for the required purpose. As the researcher conducted direct interviews with them, through which some opinions were listened to and benefited from, and in light of this I considered some paragraphs appropriate in terms of validity and in terms of the goal for which they were prepared, and some paragraphs were also modified, and thus they became valid in measuring what they were set for. After having obtained an agreement of 80% or more from the opinions of the experts. Based on their opinions, the required adjustments were made and the test is ready for exploratory testing. The test was applied to an exploratory sample of (30) students in the third grade of the intermediate school (Al-Idrisi Intermediate School for Boys) on Tuesday 10/16/2019 to calculate the average time required to answer, and it was found after calculating the general average of the time taken to answer the first (5) individuals And another time (5) individuals from that sample divided by their number, as it was found that the required time (50) minutes, and the paragraphs are clear and understandable, as well as the instructions for the answer. The same test was applied in a preliminary way, on (Wednesday) 10/17/2019 on the exploratory sample consisting of (100) students of the third intermediate grade, for the purpose of conducting the statistical analysis of the test items, and the difficulty factor was calculated for each paragraph of the test. It ranges between (0.24 - 0.70). The strength of discrimination equation was also applied for each paragraph, and it was found that it ranges between (22.0 - 0.67). In order to ensure the effectiveness of the alternatives, the researcher used the equation of the effectiveness of the wrong alternatives for all the paragraphs, and found that all the values were negative, so that all the alternatives were considered effective for the items of the prepared algebraic thinking skills test. The reliability coefficient was found using the Alpha Cronbach equation and it reached (0.86) and it is considered a good reliability coefficient. . As for the consistency of the test's internal validity, it was found by calculating the Pearson correlation coefficient between the degree of each skill of algebraic thinking and the total score of the test, so it reached: the skill of exploring algebraic patterns and generalizations (0.88), the skill of exploring algebraic relationships and functions (0.86) and the skill of using representation and algebraic symbols (0.87)). Which is a positive indication of the internal consistency of the test

The final application of the two tests:

After the adjustments were made in light of the previous statistical analyzes, the Mathematics Anxiety Scale and the Algebraic Thinking Skills Test in their final form became ready for application to the main sample of the study. As the two tests were applied during the first semester of the academic year (2019/2020) in the basic sample schools, and the application of the two tests took a period of (21) days for the period from / 1/2020 until / 2020.

Statistical treatment:

Arithmetic means and standard deviations were calculated to find the correlation between math anxiety and algebraic thinking skills

Presentation and interpretation of research results:

The current research targets the relationship between mathematics anxiety and algebraic thinking skills among middle school students, in order to achieve this goal, the following hypotheses have been formulated:

1 There is no statistically significant difference at the level of significance (0.05) between the theoretical average and the arithmetic mean of the grades of the third-grade average students in the scale of mathematics anxiety.

2 There is no statistically significant difference at the level of significance (0.05) between the theoretical average and the arithmetic mean of the grades of the third-grade average students in the scale of mathematics anxiety.

3 There is no statistically significant difference at the level of significance (0.05) between the theoretical average and the arithmetic mean of the grades of the middle third grade students in the scale of mathematics anxiety.

4 There is no statistically significant difference at the level of significance (0.05) between the mean scores of the third grade average students in the mathematics anxiety scale according to the gender variable.
5 There is no statistically significant difference at the level of significance (0.05) between the theoretical average and the arithmetic average of the third-grade average grades in the algebraic thinking skills test.
6 There is no statistically significant difference at the level of significance (0.05) between the theoretical average and the arithmetic mean of the grades of the third-grade intermediate students in the algebraic thinking skills test.
7 There is no statistically significant difference at the level of significance (0.05) between the theoretical average and the arithmetic mean of the grades of intermediate third-grade students in the algebraic thinking skills test.
8 There is no statistically significant difference at the level of significance (0.05) between the mean scores of the third-grade intermediate students. The algebraic thinking skills test. Depending on the gender variable.
9 There is no statistically significant correlation at the level of significance (0.05) between the scores of the mathematics anxiety scale and the scores of the algebraic thinking skills test among the third-grade intermediate students.
By using the T-test for one sample to test the validity of these hypotheses, the result was as in Table (3).

Table (3) T-test to measure the difference between the average real performance and the average hypothetical performance of the students of the research sample for math anxiety and algebraic thinking skills

variable	Hypothesis	the group	Average	standard deviation	t-test	Indication
Math Anxiety	1	True mean	214.74	59,48	12.52	sig
		Hypothesized mean	177.5	-		
	2	True mean	231.57	56.89	13.43	sig
		Hypothesized mean	177.5	--		
	3	True mean	198.49	46.93	6.32	sig
		Hypothesized mean	177.5	--		
	4	Female	231.57	56.89	20,54	sig
		Males	198.4	46.93		
Algebraic thinking skills	5	True mean	8.16	2.79	13.18	sig
		Hypothesized mean	10	--		
	6	True mean	8.34	2.61	8.99	sig
		Hypothesized mean	10	--		
	7	True mean	7.98	2.83	10.09	sig
		Hypothesized mean	10	--		
	8	Female	8,34	2.61	6.57	sig
		Males	7,98	2.83		

Through the results obtained through the mathematics anxiety scale, it is clearly evident that the male and female students of the research sample have very high scores in the test anxiety scale, and it appears according to the results obtained for males and females that the difference between the degrees of anxiety from mathematics is statistically significant, which confirms that anxiety is related to the subject matter. Mathematics is higher among female students compared to males, and this indicates that girls are more prone to anxiety than this subjectThrough the results obtained through the algebraic thinking skills test, it is clear that the male and female students of the research sample have scores less than the hypothetical average, which is a function in favor of the hypothetical average, and it appears according to the results obtained for males and females that the difference between degrees of algebraic thinking skills is statistically significant and in favor of students This indicates that girls have better algebraic thinking skills than males

To find out the relationship between math anxiety and algebraic thinking skills, the Pearson correlation coefficient was used, and the correlation coefficient between math anxiety and algebraic thinking skills reached (-0.182) degree. When compared to the table value (0.098) score at a significant level. (0.05) and with a degree of freedom (398). The results indicate the existence of an inverse statistically significant correlation between mathematics anxiety and algebraic thinking skills, that is, the more mathematics anxiety increases, the less algebraic thinking skills.Table (4)

Table (4) Pearson correlation coefficient between math anxiety and algebraic thinking skills

Correlation coefficient between math anxiety and algebraic thinking skills	Correlation coefficient	Tabular value	Indication level
	- 0.182	0.098	0.05

In light of the current research results, the following can be concluded:
1- The male and female students of the research sample have very high scores in the scale of mathematics anxiety, meaning that they are at a high level of mathematics anxiety.
2- The difference between degrees of anxiety about mathematics is statistically significant between male and female students, which confirms that female students' anxiety about mathematics is higher compared to males, and this indicates that girls are more prone to anxiety than males
3- Intermediate third-grade students do not possess algebraic thinking skills.
4- There is a difference between male and female students in possessing algebraic thinking skills.
5- There is a negative correlation between mathematics anxiety and algebraic thinking skills among middle school students.

Recommendations:
1- Allow the student to express the emotions and feelings he carries.
2- Holding counseling meetings by specialists to address students' math anxiety
3- The necessity for mathematics professors and their teaching methods to take into account the individual differences between students and to present the material in a manner commensurate with the different abilities they have.
4- Forced thinking skills are an important educational outcome for students, and educational institutions should strengthen them as a means of developing them among students.
5- Presenting the curriculum content of the mathematics department in a way that includes developing the algebraic thinking skills of students during their training in various methods of receiving information (input) and converting it into different representations by coding and other and retaining it in order to facilitate the process of treating it to reach the required solutions to problems or to a deeper understanding of the content of the subject appears in a form. Improvement in achievement level (outputs).

The proposals:
1- Study the various factors causing math anxiety for students.
2- Conducting a study that shows the relationship between the level of anxiety and the classroom performance of newly appointed teachers.
3- Working on developing curricula in general and mathematics curricula in particular prescribed for middle third grade students and adopting various methods of teaching them, such as methods of teaching thinking skills, so that students can use mental cognitive skills without difficulty
4- The tendency to search for solutions to problems related to the methods used in teaching mathematics, because solving most or some of these problems may be a starting point for expanding students' perceptual field and using cognitive mental skills to a high degree.
5- Conducting a similar study to reveal the relationship between forced thinking skills and high-order thinking skills in other stages.

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