Examination of the Relationship between Primary School Students' Math Anxiety and Their Teachers and Parents: A Systematic Review[1]

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Abstract

The purpose of this study is a systematic review examining the causes of mathematics anxiety experienced by primary school pupils and their interactions with diverse variables. In the study, a total of 20 investigations, including four theses and 16 articles, were conducted between 2010 and 2022. The works carried out, the themes of publication year, purpose, method or design, sample level, number of samples, data collection tools, analysis methodologies, findings, and suggestions are covered. According to the reviews, it was discovered that the research conducted with the quantitative method was prominent. In the studies studied, the association between the mathematical self-efficacy of students, instructors, and parents and the mathematics anxiety they experienced was observed. In the research investigated, it was discovered that various variables were examined, and similarly, many findings were produced. In general, there is a commonality in the findings of investigations on the same subject. In the findings, most problems deriving from the student-teacher connection were discovered. In addition, it was noted that teachers and their parents suffered from math anxiety, and their anxiety levels differed according to numerous variables. According to the results of the research studied, various proposals were provided. Since the causes of anxiety are complex, suggestions are provided for the school system and teacher training institutions.

Keywords: math anxiety, student math anxiety, parent math anxiety, teacher math anxiety

İlkokul Öğrencilerinin Matematik Kaygılarının Öğretmen ve Veliler ile İlişkisinin Sistematik Derleme Yöntemiyle İncelenmesi

Özet

Bu çalışmanın amacı, İlkokul öğrencilerinin yaşadığı matematik kaygılarının nedenlerini ve farklı değişkenlerle ilişkilerinin ele alındığı çalışmaların incelendiği sistematik derleme çalışmasıdır. Çalışmada 2010-2022 yılları arasında yapılan dört tez ve 16 makale olmak üzere toplam 20 çalışmaya yer verilmiştir. Yapılan çalışmaların; yayın yılı, amaç, yöntem/desen, örneklem düzeyi, örneklem sayısı, veri toplama araçları, analiz teknikleri, bulgular ve öneriler temalarına yer verilmiştir. İncelemelere göre çalışmaların nicel yöntemle yapılan çalışmaların ağırlıkta olduğu görülmüştür. İncelenen çalışmalarda yoğun olarak öğrenci, öğretmen ve velilerin matematik öz yeterlikleri ile yaşadıkları matematik kaygılarının ilişkisi gözlemlenmiştir. İncelenen çalışmalarda çok sayıda değişken incelendiği ve buna bağlı olarak çok sayıda bulgu elde edildiği görülmüştür. Genel olarak aynı konuda yapılan çalışmaların bulgularında benzerlik görülmektedir. Bulgularda ağırlık olarak öğrenci-öğretmen ilişkisinden kaynaklı oluşan kaygılar bulunmuştur. Ayrıca öğretmenlerin ve velilerinde matematik kaygısı yaşadıkları ve farklı değişkenlere göre kaygı düzeylerinin de değiştiği belirtilmiştir. İncelenen araştırmaların sonuçlarına göre çok sayıda öneri sunulmuştur. Kaygıların nedenleri çok boyutlu olduğu için eğitim sistemine ve öğretmen yetiştiren kurumlara yönelik önerilerde bulunmaktadır.

Anahtar Kelimeler: matematik kaygısı, öğrenci matematik kaygısı, veli matematik kaygısı, öğretmen matematik kaygısı

Introduction

Anxiety for students starts at an early age and develops over time (Sakal, 2015). Mathematics anxiety also starts in the primary school years and turns into a nightmare for students over time. This is the case not only in our country but also all over the world (Türkmenoğlu & Yurtal, 2020). Anxiety in the primary school years is not only student-centered but also thought to arise from the interactions of students with their teachers and parents (Ertem Akbaş, 2018). In this interaction, things such as the pressure applied to the student, teaching methods, parent support, curriculum, and social environment play a role. These variables can create math anxiety in children and affect the level of anxiety (Ertem Akbaş, 2018).

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Teachers and parents not only affect the anxiety of the student, but they can also develop math anxiety. This situation consists of and is affected by variables such as teaching competencies, teaching methods, and self-confidence in teachers in general (Tatar et al., 2016). This anxiety experienced by teachers can also negatively affect their students. This interaction may continue as a vicious circle and cause the level of anxiety to increase even more (Çınar & Merç, 2022).

Math anxiety, which develops in parents during the primary school years, progresses to an advanced level after having a child. Families must now deal with not only their own math anxiety but also the stress of their children. In this case, the parent may start to worry more, thinking that he or she cannot provide enough support for their child. Similarly, if the student detects anxiety in his mother or father, his own anxiety may increase (Öztop & Toptaş, 2019).

The studies examined were handled in line with these variables. In this way, it was desired to observe not only the causes of their anxiety but also the variables that affect it. It was aimed at comparing the change in anxiety level by examining the studies of students at different educational levels. Similarly, it was intended to determine which periods of anxiety were more effective by determining studies that included teacher candidates rather than only working teachers. On the other hand, it was desired to observe the history of the parents' concerns and how the levels of these concerns changed.

Therefore, in this study, the relationship between students, parents, and teachers and their mathematics anxiety was examined. It is aimed to eliminate the anxieties experienced and make mathematics education more efficient. For this purpose, answers to the following questions were sought:

1. What are the causes of the math anxiety experienced by students?
2. What are the variables that affect the level of math anxiety experienced by students?
3. What are the reasons for teachers' anxiety in teaching mathematics?
4. Can teachers influence their students' anxiety?
5. What are the variables that affect teachers' anxiety?
6. What are the causes of math anxiety experienced by parents?
7. Can parents influence their children's math anxiety?
8. What are the variables that affect parents' anxiety?

Method

A systematic review study was used to examine and evaluate studies on mathematics anxiety experienced by students, teachers, and parents in order to determine their types, purposes, methods, results, and recommendations. A systematic review is a scientific review in which the original versions of the studies on a particular subject are examined in detail and the findings are synthesized (Aslan, 2018).

Data Collection Tools

In this study, the digital library of Necmettin Erbakan University was used for the studies on the mathematics anxiety experienced by students, teachers, and parents between 2010 and 2022. Web of Science, ProQuest, Dergipark, EBSCO, and YOK thesis databases were accessed through this library. Keywords such as "math anxiety," "student math anxiety,"

"primary school," "parent math anxiety," and "teacher math anxiety" were used in the survey. In this way, 20 studies were completed.

Analysis of Data

The literature search started in September 2022. The literature review was completed in November 2022, and the studies were begun to be examined. The examined studies were coded by creating a themes table in Microsoft's Excel program. The themes were formed in the form of publication year, purpose, method, sample, data collection tools, analysis techniques, findings, and suggestions. The coding done in December 2022 was transferred to the study. The generated codes were synthesized and converted into frequency tables, and the tables were explained.

Results

The goal of this study is to present studies on primary school students, their parents, and teachers who have math anxiety under specific themes. For this purpose, the aims of the studies carried out are primarily classified and presented in Table 1.

Table 1. *The Codes and Frequencies of Studies for Mathematics Anxiety of Primary School Students, Parents and Teachers*

Themes	Categories	Codes	*f*
Purposes	Anxiety Level	Anxiety level towards teaching (3)	4
		Anxiety level change (1)	
	Relationships between anxiety and other variables	Self-efficacy – anxiety relationship (5)	13
		Family opportunities - anxiety relationship (1)	
		Teacher-Student Anxiety Relationship (2)	
		The relationship between teaching styles and anxiety (1)	
		Problem solving belief - anxiety relationship (2)	
		Student-parent anxiety relationship (2)	
	Causes of anxiety	Reasons for math anxiety of primary school students (2)	3
		Causes of anxiety according to teachers (1)	
Total			20

According to the coding result in Table 1, four studies were found on the level of anxiety. Three of these studies are related to the level of anxiety toward teaching, and one of them is about the change in anxiety levels. A total of 13 studies on the anxiety relationship were completed. Five of these studies were related to self-efficacy and anxiety; one to family opportunities and anxiety; one to teacher and student anxiety; one to teaching styles; two to problem-solving beliefs; two to the relationship between the student and the parent; and one to the relationship between success grade and anxiety. Regarding the causes of anxiety,

two of them started in primary school, and one of them was the cause of anxiety according to the opinions of the teachers.

The distribution of the studies examined in this study by publication year and type is presented in Table 2.

Table 2. *Distribution of Studies on Mathematics Anxiety by Years*

Category	Codes	*f*
Publication years	2010	1
	2011	1
	2015	2
	2016	3
	2017	1
	2018	4
	2019	3
	2020	3
	2021	1
	2022	1
Total		20

According to the distributions in Table 2, one was reached in each of the years 2010, 2011, 2017, 2021, and 2022; two in 2015; three in 2016, 2019, and 2020; and four in 2018.

The methods and designs of the studies examined within the scope of the study are presented in Table 3.

Table 3. *Distribution of Articles and Theses Related to Mathematics Anxiety by Research Methods and Designs*

Method	Pattern	*f*
Qualitative	Unspecified (1)	2
	Case Study (1)	
Quantitative	Relational Survey (11)	16
	Survey (5)	
Mixed	Unspecified (1)	2
	Survey – Phenomenology (1)	
Total		20

According to the distributions in Table 3, four qualitative, 16 quantitative, and two mixed methods were used. In the qualitative method, while a case study design was used in one study, the design was not specified in another study. In the quantitative method, a relational survey design was used in 11 studies, while a survey design was used in five studies. In the mixed method, while the pattern was not specified in a study, in another study, survey was used in the quantitative method and phenomenology was used in the qualitative method. Most of the studies have been done using the quantitative method.

The sample levels of the studies examined within the scope of the study are presented in Table 4.

Table 4. *Codes and Frequencies Related to the Sample Level Theme of Studies on Mathematics Anxiety*

Theme	Codes	*f*
Sample Level	Primary School Students	9
	Middle School Students	3
	Pre-service teachers	7
	Primary school teachers	4
	Math teachers	2
	Parents	3
Total		28*

*Some studies used more than one type of sample. Therefore, the frequency value is greater than the number of runs.

According to the distributions in Table 4, among the sample levels in 20 studies, the nine most used studies are for primary school students. Pre-service teachers were used in seven studies, primary schoolteachers in four studies, middle school students and parents in three studies, and mathematics teachers in two studies.

The sample numbers in the studies examined in the study are presented in Table 5.

Table 5. *The Codes and Frequencies of the Studies on Mathematics Anxiety Related to the Number of Samples Theme*

Theme	Codes	*f*
Number of Samples	0-200	8
	200-500	9
	500-1000	2
	1000+	1
Total		20

According to the distributions in Table 5, there are eight studies with sample size ranges of 0-200, nine studies between 200 and 500, two studies between 500 and 1000, and one study with a sample size of more than 1000.

The data collection tools used in the studies examined in the study are presented in Table 6.

Table 6. *Data Collection Tools Distribution of Studies on Mathematics Anxiety*

Theme	Code	*f*
Data Collection Tools	Mathematics Teaching Proficiency Scale	2
	Mathematics Teaching Anxiety Scale	7
	Mathematics Self-Efficacy Resource Scale	3
	Mathematics Anxiety Scale	12
	Teaching Styles Scale	1
	Beliefs About Teaching and Learning Mathematics Scale	3
	Semi-Structured Interview Form	4
	Family Participation in Secondary Schools: Parent, Teacher, Student Scale	1
Total		33*

*More than one data collection tool was used in some studies. Therefore, the frequency value is greater than the number of runs.

According to the distributions in Table 6, the most used data collection tool used in studies in the field of mathematics anxiety is the Mathematics Anxiety Scale, which is used 12 times. In addition, the Mathematics Teaching Efficiency Scale was used twice, the Mathematics Teaching Anxiety Scale was used seven times, the Mathematics Self-Efficacy Resource Scale was used three times, the Beliefs Related to Teaching and Learning Mathematics Scale was used once, the Teaching Styles Scale was used once, and the Family Participation in Secondary Schools: Parents, Teachers, the Student Scale, and the Semi-Structured Interview Form were used four times.

The data analysis techniques used in the studies examined in the study are presented in Table 7.

Table 7. *Data Analysis Techniques Distribution of Studies on Mathematics Anxiety*

Theme	Code	*f*
Data Analysis Techniques	t -tests	12
	Correlation analysis	8
	Regression analysis	2
	ANOVA	8
	Mann Whitney U test	8
	Kruskal Wallis H test	7
	Content analysis	3
	Descriptive Statistical Analysis	3
	Path analysis	1
Total		52*

* Some studies used more than one data analysis technique. Therefore, the frequency value is greater than the number of runs.

Considering the distributions given in Table 7, a total of 52 analyses were used in 20 studies. The most common of these tests is the t-test, which is used 12 times. In addition, correlation analysis, ANOVA, and the Mann-Whitney U test were used eight times, the

Kruskal-Wallis H test seven times, content analysis and descriptive statistical analysis three times, regression analysis twice, and path analysis once.

The distribution of the results found in the studies examined in the study is given in Table 8.

Table 8. *The Distribution of the Results of the Studies on Mathematics Anxiety and the Anxiety Levels*

Theme	Category	Relationship direction	Codes	*f*
Results	Student Anxiety	Negative	self-efficacy	3
			Rewarding success	1
			Confidence	2
			Perception of success	3
			Mother's education status	2
			Relationship between grade level and self-efficacy perception	1
			Love of math	1
			Success grade	2
		Positive	Father's education status	1
			Family pressure	1
			Having math anxiety in the family	1
			Grade level – anxiety relationship	2
		Neutral	Gender	5
			Mother's profession	1
			Father's profession	1
			Socio -economic level	2
			Number of siblings	1
			Private lessons status	1
			Grade level – anxiety relationship	1
			Parent's support	1
			Have a private room	1
	Teacher Anxiety	Negative	Being comprehensible in narration	2
			Motivating students	1
			Teacher self-efficacy	1
			Seniority	1
			Choosing a teacher-centered teaching style	1
Results	Parent Anxiety	Negative	Monthly income	1
			Education level	2
			Mathematics achievement status	1
		Positive	Those with daughters have higher anxiety	1
			Number of children	1
			Mothers have higher math anxiety	1

		Neutral	Age	1
			Children's grade level	1
	Pre-service Teachers Anxiety	Negative	Attribution competence	3
			Belief in teaching mathematics	4
			Choosing the department voluntarily	1
			Grade level	4
			Subject information	3
			Internships during the undergraduate period	1
			Application of micro teaching technique	1
			Confidence	4
		Neutral	Academic GPAs	1
			Gender	2
			Graduated secondary education institution	2
Total				77*

* Some studies found more than one result. Therefore, the frequency value is greater than the number of runs.

The distributions in Table 8 show that the students' self-efficacy and success perceptions varied across three studies, as did their self-confidence, their mother's education status, and their success grade in two studies, their rewarding success in one study, the relationship between grade level and self-efficacy, and their love of mathematics. It was found that there is a negative relationship between anxiety and depression. In two studies, it was found that there was a relationship between grade level and anxiety, and in one study, there was a positive relationship between the father's education status, family pressure, and the presence of math anxiety in the family. It was found that gender in five studies, socio-economic level in two studies, parents' occupation in one study, number of siblings, taking private lessons, the class level-anxiety relationship, parent support, and having a child's private room did not affect anxiety.

Teachers' results revealed a negative relationship between anxiety and being clear in expression in two studies and motivating students in one study, teacher self-efficacy, seniority, and selecting teacher-centered teaching styles.

According to the results related to the parents, it was found that education level in two studies and monthly income and mathematics achievement in one study were negatively related to anxiety. In one study, it was found that those who have daughters, the number of children, and being a mother are positively related to math anxiety. In one study, it was found that age and grade level did not affect anxiety in children.

According to the results found about the pre-service teachers, in each study, belief, grade level, and self-confidence in teaching mathematics were determined in 4 studies; association proficiency and content knowledge in 3 studies; choosing a department at their own will; internship practices in the undergraduate period; and microteaching technique in 1 study. It has been found that the use of anxiety medications is negatively related to anxiety. Gender and the graduated secondary education institution were found to have no effect on anxiety in two studies, and academic grade averages in one study.

The recommendations presented in the studies reviewed in the study are summarized in Table 9.

Table 9. *Distribution of Suggestions Given in Studies on Mathematics Anxiety*

Theme	categories	Codes	ƒ
Suggestions	Suggestions for Students	Efforts should be made to increase students' self-confidence.	1
		Children's self-efficacy should be increased	1
		Children should have high interest and motivation.	1
	Suggestions for Teachers	In-class applications should be made to increase children's mathematical self-efficacy.	1
		Attention should be paid to the individual differences of children	1
		Student progress should be closely monitored.	1
		Necessary training should be taken to cope with anxiety	2
		Additional studies should be done for anxious students.	1
		Mathematics lesson should be more fun	1
		Students should be well motivated	3
	Suggestions For Parents	Make more associations with everyday life	1
		Students must be convinced that mathematics is not a difficult subject	3
		Must be in constant communication with the teacher	2
		Children should not be pressured	2
		Children should be constantly motivated in a good way	2
	Suggestions for Researchers	More comprehensive studies can be done on math anxiety.	5
		More studies can be done on teachers' mathematics teaching proficiency.	2
		More studies can be conducted on the relationship between parent and student math anxiety.	2
		More studies should be conducted on female teacher candidates.	1
		Deeper studies can be conducted on the dislike of mathematics.	3
		Different studies can be conducted on which styles reduce anxiety in mathematics teaching.	1
		Anxiety can be prevented early by doing more studies for primary school age	4
		Studies can be done to reduce the anxiety of classroom teachers	3
		Mathematics activities can be researched	1
Suggestions	Suggestions for Ministry of National Education	Curriculum should be arranged in a way to increase children's self-efficacy.	1
		Efforts should be made to reduce teachers' anxiety.	1
		Teachers should be given training to reduce parents' math anxiety	2
		Public announcements that reduce math anxiety, etc. Public awareness should be raised by publishing advertisements.	3
		Anxiety-reducing training should be given to parents	2
	Suggestions for Teacher Training	Positive attitude studies based on teaching mathematics should be conducted with prospective teachers.	3
		Efforts should be made to increase the self-confidence of female candidates.	1

Institutions	Internships should be made more effective	1
	Primary school students should be brought to the classroom and applied lessons should be given and the number of such applied courses should be increased.	2
	Studies can be done to reduce teaching anxiety	2
Total		63*

* Some studies presented more than one recommendation. Therefore, the frequency value is greater than the number of runs.

A total of 34 different suggestions were presented according to the distributions given in Table 9. Some suggestions are given in more than one study. Three different suggestions were presented to the students. These suggestions are: in one study, it was stated that students' self-confidence should be increased; in another study, students' self-efficacy should be increased; and in another study, students' interest and motivation should be high.

Nine different suggestions were presented to teachers. In one study, students should engage in in-class practices that increase their self-efficacy; in another study, it is necessary to pay attention to the individual differences of the students; in one study, the development of the student should be closely monitored; in two studies, necessary training to cope with anxiety should be undertaken; and in another study, additional studies for anxious students should be undertaken. In one study, it was suggested that the mathematics lesson should be taught with more fun; in another, the students should be well motivated; in a third, more associations should be made with daily life; and in all three studies, students should be convinced that the mathematics lesson is not a difficult one.

Three different suggestions were presented to the parents, and each suggestion is included in two studies. These recommendations are: to be in constant communication with the teacher, not to put pressure on the children, and to motivate the children in a good way.

Nine different suggestions were presented to researchers. In five studies, more research should be done on mathematics anxiety; in four studies, more studies can be conducted on primary school children so that anxiety can be prevented at an early age; in three studies, deeper studies can be conducted on the dislike of mathematics; and in two studies, studies can be conducted to reduce the anxiety of classroom teachers. More studies can be conducted on teachers' mathematics teaching proficiency and the relationship between parents and students' mathematics anxiety. In one study, it was stated that more studies could be conducted on female teacher candidates and more studies could be conducted on which styles of mathematics teaching reduce anxiety and activities that endear mathematics.

Five different suggestions were presented to the Ministry of National Education. In three studies, it was stated that advertisements in the style of public service that reduce math anxiety should be published. Teachers were told in two studies that parents should be trained to reduce math anxiety and that parents should be trained to reduce math anxiety. In one study, it was suggested that the curriculum should be arranged in a way that would increase the child's self-efficacy and that studies should be conducted to reduce teachers' anxiety.

Finally, five different suggestions were presented for teacher training institutions. In three studies, studies should be carried out to positively improve the attitudes of teacher candidates towards teaching mathematics; in two studies, primary school students should be brought into the classrooms, and practice-oriented training should be carried out; such practices should be increased, and studies should be carried out to reduce teaching anxiety; and in one study, studies should be carried out to increase the self-confidence of female

candidates. It is among the suggestions that it is necessary to make the internships more productive.

Conclusion and Discussion

This study examined 20 studies on mathematics anxiety in students, teachers, pre-service teachers, and parents. Most of the studies were conducted in one study (Deringöl, 2018). Math anxiety research focuses on middle and high school. Math anxiety is thought to be worse in middle and high school.

The purpose category of this study mostly examined anxiety-variable relationships. These variables include students' and teachers' self-efficacy (Adal & Yavuz, 2017; Deringöl, 2018; Medikoğlu, 2020; Türkmenoğlu & Yurtal, 2020; Uysal, 2019), family opportunities (Sakal, 2015), relationship between teacher and student anxiety (Yavuz & Özkaya, 2021); Özdemir & Sezginsoy Şeker, 2018), teachers' teaching styles (Sarı & Aksoy, 2016), and problem solving belief (Başpın, 2022; Çınar & Merç, 2022). These findings suggest that students' anxiety fluctuates due to various factors. Most studies examine teacher and pre-service teachers anxiety. Researchers may have easier access to teachers and pre-service teachers. Our anxieties start early and grow, but primary school studies are insufficient (16 studies used quantitative methods) (Sakal, 2015). Quantitative studies on math anxiety may explain its popularity. Quantitative research compares experimental results. Anxiety studies may have preferred quantitative methods.

Mathematics anxiety analysis included qualitative and mixed methods. One study used a case study (Ertem Akbaş, 2018), while another (Alkan, 2011) did not specify its design. Not specifying the design may reduce research reliability (Hoşşirin Elmas, 2010).

13 studies included primary school teachers, mathematics, and pre-service teachers (Alkan, 2011; Başpınar, 2015; Çınar & Merç, 2022; Deringöl, 2018; Ertem Akbaş, 2018; Hoşşirin Elmas, 2010; Küçük Demir et al., 2016; Özdemir & Sezginsoy Şeker, 2018; Sarı & Aksoy, 2016; Şevik & Masal, 2020 Tatar, 2016; Uysal, 2019; Yavuz & Özkaya, 2021;). One study asked teachers what causes math anxiety in children (Ertem Akbaş, 2018). These studies on teachers may explain their intense student interaction. Because some studies compare teacher-student relations.

The study examined studies with sample sizes between 0-200 and 200-500. Quantitative studies may explain this sample size. Two studies had sample sizes between 500 and 1000 (Öztop & Toptaş, 2019; Şevik & Masal, 2020), and one had more than 1000 (Yavuz & Özkaya, 2021). Articles with this large sample produce more reliable and versatile results.

This study includes the researches' data collection tools. "Mathematics Anxiety Scale" is most popular. "Mathematics Teaching Anxiety Scale" is another popular tool. This scale is widely used because most studies use teacher samples and teaching anxiety is high. The purpose determined all scales. Most studies used multiple data collection tools. The studies may have been designed to compare variables. Using a single data collection tool in studies on anxiety levels and causes supports this possibility (Alkan, 2011; Ertem Akbaş, 2018; Küçük Demir et al., 2016; Özdemir & Sezginsoy Şeker, 2018; Öztop & Toptaş, 2019; Şevik & Masal, 2020; Tatar et al., 2016).

Most study data analysis uses t-tests. This test compares dependent variable scores between groups. ANOVA was used when there were more than two groups, but the Kruskal-Wallis H test was used when the difference between groups was not significant. The Mann-Whitney U test to compare groups and correlation analysis to determine the size and direction of the relationship between two variables are other popular tests. Most studies compare, justifying their overuse. Other methods included regression analysis, content analysis, descriptive statistical analysis, and path analysis. High-quality data and multiple analysis methods in study analysis can help determine results reliability. 17 articles used multiple analysis methods. Three studies used one analysis method. One was an analysis technique and two were qualitative studies.

Comparative studies yielded different results for different groups. Categorizing shows results. Student anxiety results were listed first. Students' self-efficacy and success negatively affect anxiety. The student with a strong mathematical background and a positive self-image has less anxiety. The high self-confidence and success scores of their children also negatively affect anxiety. Rewarding students and liking math reduce anxiety. Negative results yielded two intriguing findings. One is that math anxiety decreases with mothers' education.In this case, mothers help children with their homework, and a well-educated mother inspires trust and reduces anxiety. Children's self-efficacy decreases with grade level. Math gets harder as students get older, so they may not feel ready.

Other student anxiety results are positive. These results show that as grade level increases, so does mathematics anxiety, family anxiety, and family pressure on the child. This result was intriguing. Math anxiety increased with fathers' education. The same study (Sakal, 2015) found that mothers' education reduces children's anxiety. Parental education affects children differently. Fathers' authoritarianism and children's anxiety may explain this difference. Authoritarian parents cause more anxiety in their children, even if tests showed the opposite. The child may also be worried about disappointing his favorite parent.

Apart from these, gender, parents' occupation, family socioeconomic status, and siblings did not affect mathematics anxiety. Also, interesting results. Taking private math lessons, having parent support, and having a private room for the child do not affect anxiety, which is interesting. Another interesting finding was that student self-efficacy decreased with grade level (Medikoğlu, 2020). Again, class level did not affect anxiety (Medikoğlu, 2020). Anxiety increased as children's self-efficacy decreased. Thus, grade level increases anxiety and decreases self-efficacy. Thus, these results conflict. As class level rises, family pressures may increase, causing this situation.

Teaching styles were studied (Sar & Aksoy, 2016). This research is remarkable. Teacher-centered teaching decreased teachers' anxiety and increased students' anxiety. Student anxiety decreased but teacher anxiety increased when they preferred student-centered teaching styles. Teacher-centered teaching styles may be preferred because teachers can express themselves better than students. Student-centered teaching styles may be preferred because students understand better but teachers have self-doubt or trouble preparing.

Children may worry families. Children and families affect this anxiety. According to parent studies, monthly income negatively impacts math anxiety (Toptaş & Öztop ,2019). Thus, low-income people had higher math anxiety. Due to financial difficulties, the family may not have enough time for math or their children. The family's education level and

parents' math skills also negatively affected their anxiety. Family members' math struggles began in childhood.

Math anxiety rises as childbirth rates rise. The family's inability to help all children may worsen as the number of children increases. Girl families have higher math anxiety(Toptaş & Öztop ,2019). Parents may trust boys more than girls. This result is meaningless for students because gender does not affect anxiety in children. Fathers have less math anxiety than mothers. This may be because mothers provide more for their children than fathers. Other results showed that family mathematics anxiety was unaffected by age and grade level.

Math worries pre-service teachers too. Included are anxiety-related studies. Candidates' ability to relate mathematics to daily life or concrete events (Çınar & Merç, 2022; Sar & Aksoy, 2016; Uysal, 2019), undergraduate internships, and micro-teaching techniques were seen as anxiety-reducing factors. As pre-service teachers' education increases, their field knowledge, self-confidence, and mathematics anxiety decrease(Başpnar, 2015; Çınar & Merç, 2022; Hoşşirin Elmas, 2010; Küçük Demir et al., 2016; Tatar, 2016; Uysal, 2019). These conditions are linked. It's a sequence. Candidates' field knowledge should increase with grade level. Field knowledge is thought to boost self-confidence. Thus, successive situations reduce math teaching anxiety.

Pre-service teachers results differed. First, pre-service teachers' math beliefs increase anxiety (Çınar & Merç, 2022). Self-confidence may be involved. Self-confidence may boost belief. One study examined whether pre-service teachers chose their department voluntarily. Candidates who chose the department voluntarily had lower anxiety than those who had to choose it for other reasons. This may be because those who chose the department voluntarily had high mathematics self-efficacy, but those who had to choose the department may not have felt comfortable with their math self-efficacy. Apart from these results, it was seen that the candidates' academic grade point averages, gender, and the secondary education institution they graduated from did not affect the anxiety.

It was observed in some results that differed from all the results determined. One of them is that those who graduated from different departments and worked as teachers are more anxious in terms of mathematics teaching anxiety compared to those who graduated from the teaching department. Yavuz and Özkaya (2021) It can be said that this situation is caused by the paid teaching system. University graduates who are unemployed can apply to teaching positions that are very different from their departments. The lack of academic competence of these graduates in teaching mathematics may be the reason for their increased anxiety.

Assuming that our anxiety begins and develops at an early age, a scale for mathematics anxiety can be developed and applied for primary school first and second graders.

Another different result is that female students have more math anxiety than male students. In five of the studies on students, the gender variable was examined, but it was found that it had no effect on mathematics anxiety (Adal & Yavuz ,(2017); Genç and Yazıcıoğlu (2019); Özdemir and Sezginsoy Şeker (2018); Sakal (2015); Türkmenolu and Yurtal (2020) (2020) On the other hand, in a study, it was concluded that female students were more anxious than male students. The reason for this difference may be that the study was conducted in a region where female students were more pressured. Inconsistent results like these suggest that the concept of gender may vary according to the selected samples, and it

will be difficult to reach the most definitive conclusion without a study with a much larger sample group.

In one of the studies, the causes of math anxiety according to teachers and students were investigated (Özdemir &d Sezginsoy Şeker ,2018). In this study, the students stated that they could not make sense of the complex structure of mathematics and therefore had great difficulty. It can be said that this situation is one of the most fundamental problems in mathematics. It can be demonstrated as one of the reasons why mathematics is a complex and abstract subject, as well as the source of all mathematics anxiety.

Apart from these, it was also concluded that female pre-service teachers were more anxious than male pre-service teachers (Uysal, 2019). The main reason for this situation may be due to the self-confidence of female pre-service teachers. Furthermore, one of the results is that the anxiety of teachers and teacher candidates increases as the level of the classes they will teach rises. It can be said that this is due to the fact that, as the grade levels of the students increase, mathematics becomes more complex and its teaching becomes more difficult.

Suggestions from the studies examined in this study are also included. These recommendations are divided into categories for students, teachers, parents, researchers, the Ministry of National Education, and teacher training institutions.

Three different suggestions are presented for students. The first of these suggestions is that studies should be carried out to increase the self-confidence of students (Alkan, 2011) its suggestions are presented for students. Another is to increase the self-efficacy of children (Medikoğlu, 2020). The third suggestion is that children should have high interest and motivation.It can be thought that these suggestions are given to ensure that students get more efficiency from the lessons.

Nine different suggestions were presented for teachers in the studies examined. One of these suggestions is that studies to increase children's mathematical self-efficacy should be done (Türkmenoğlu & Yurtal, 2020). It can be thought that this suggestion is given so that children feel more ready for the lesson and learn more easily. Another suggestion is that teachers pay attention to the individual differences of children (Alkan, 2011). In this proposal, it may be important that each child's intelligence areas are different and that studies be done accordingly. In another study, it was stated that the teacher should follow the student's progress closely(Sakal, 2015). The teacher should not only teach the student but also monitor his or her progress to ensure that the student achieves the highest level possible. This recommendation supports this view. In two studies, it was stated that teachers should receive the necessary training to cope with math anxiety in students (Yavuz & Özkaya, 2021; Sakal, 2015) Anxiety is a psychological condition, and this suggestion may have emphasized the need to eliminate the deficiencies since teachers may not have enough psychology knowledge to solve this problem. In another study, it was stated that teachers should do additional work for anxious students (Sakal, 2015). This suggestion is thought to reduce the anxiety of anxious students by completing their incomplete learning and making them more successful in mathematics lessons. In the same study, it was suggested that teachers make mathematics lessons more fun. In another study, it was stated that teachers should make more associations with daily life while teaching mathematics lessons. It can be said that this situation shows that the concretization of mathematics is more instructive.

There are three different suggestions for parents. The first of these suggestions is that the parents be in constant communication with the teacher (Alkan, 2011; Sakal, 2015). The second is that children should not be pressured (Alkan, 2011; Sakal, 2015). The third is that children are well motivated by the family (Sakal, 2015). It can be said that these suggestions are generally for families to establish good communication with their children and teachers. Families are thought to reduce their children's and their own math anxiety through this communication.

Suggestions for other researchers were also made in the studies examined. The most widely discussed of these suggestions are those more comprehensive studies on mathematics anxiety be conducted and that more studies be conducted, particularly for primary school children. It is possible that the reasons for these suggestions were given because math anxiety has not yet been overcome, and since this anxiety started in the primary school years, it would be better to detect and eliminate it in the early stages. Apart from these, it was stated that more studies could be conducted on teachers' mathematics teaching proficiency, the relationship between parents and students' mathematics anxiety, and activities that endear mathematics.

Suggestions were also made in light of some interesting results. One of them said that as female pre-service teachers are more anxious, more studies should be done on the reasons for this (Uysal, 2019). It was stated that by examining how teaching styles affect teachers and students in terms of anxiety, it is possible to determine which teaching styles reduce anxiety. In addition, it was stated that more studies could be done to reduce the anxiety of primary school teachers.

Suggestions were also made to the Ministry of National Education for problems arising from the program and administration. It was stated that the program should be organized in a way to increase the mathematics self-efficacy of the students. It has been stated that public service announcements and advertisements that reduce anxiety can be given to the general public, and that education can be given to reduce math anxiety among parents. Finally, it was stated that teachers can organize trainings on how to reduce their own anxiety and their parents' anxiety(Öztop & Toptaş ,2019).

The last suggestions were directed to teacher training institutions. These suggestions were mostly included in the studies on pre-service teachers. In three studies, it was stated that teachers should have a positive attitude towards teaching mathematics. It can be said that this situation will have a calming effect on the fears and anxieties of pre-service teachers Accordingly, it was also stated that studies could be conducted to reduce the teaching anxiety of pre-service teachers.

Considering the aims, methods, and results of all the studies examined, the following suggestions are presented:

1. Instead of examining the variables with which students interact separately, multi-dimensional research can be designed and the variables affecting mathematics anxiety can be compared.
2. Activities that reduce math anxiety can be researched at every grade level.
3. It can be ensured that pre-service teachers are better equipped to address psychological concerns.

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