

A MODEL TO EXPLAIN TEACHERS' STRESS DURING THE
IMPLEMENTATION OF THE NEW MATHEMATICS CURRICULUM

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Thesis Abstract

Zahid Kısa, “A Model to Explain Teachers’ Stress during the Implementation of the New Mathematics Curriculum”

In 2005 a new curriculum reform effort was started in Turkey. This reform was intended to change educational programs of all courses at all levels from elementary school to high school. With the implementation of the new curriculum, teachers were required to adapt to certain changes. Teachers are the key factors of reforms in education. Teachers’ concerns about reform and their reactions determine their attitudes and, in the long run their performance. One of the reactions to the reform is teacher stress. During the reform, change exacerbates stressful conditions already associated with teachers’ work and may introduce new sources of strain. Teachers feel stress during the implementation of new curricula.

This study aimed to describe teachers’ levels of anxiety and their attitudes towards the new math curriculum and to explain stress during the implementation of the new curriculum within a framework developed mostly based on a test anxiety model. The proposed model was tested with the data gathered from 395 elementary school and mathematics teachers by using Structural Equation Modeling. Results indicated that the anxiety model mostly explained teachers’ stress and their attitudes towards the new curriculum. It was found that teachers’ readiness, efficacy, appraisal, anxiety, perceived pressure, perceived resources and attitude which were entered to the hypothesized model, were found to be related to each other. Coping, which was initially assumed to form a buffer for anxiety was not present in the final model. The results indicated implications for pre-service and in-service teacher education.

Tez Özeti

Zahid Kısa, “Yeni Matematik Müfredatının Uygulanmasında Öğretmenlerin Stresini Açıklayan Bir Model”

Türkiye’de 2005 yılında eğitim alanında yeni bir yenileştirme hareketi uygulanmaya başlamıştır. Bu yenileştirme hareketi ilköğretimden liseye tüm seviyelerdeki derslerin müfredat programını değiştirmeyi amaçlamıştır. Eğitim alanında yapılan yenileştirme hareketlerinin getirdiği değişikliklerin uygulanması, öğretmenlerin yeni öğretim ve değerlendirme yöntemlerini kullanmalarını gerektirmektedir. Bu durum öğretmenlerin yeniliklikleri başarı ile uygulanmasındaki önemini göstermektedir. Öğretmenlerin yenilikler hakkındaki düşünceleri ve yeniliklere karşı tepkileri onların yenilikleri uygulamaya karşı tutumlarını belirlemektedir. Reform süreçlerinde öğretmenlerin verdiği kişisel tepkilerinden birisi de stres/gerginliktir. Yapılan araştırmalar, eğitim alanındaki değişimin stresli bir mesleği icra etmekte olan öğretmenlerin üzerinde yeni bir baskı oluşturacağını ve bu baskıyla birlikte öğretmenlerin daha fazla kaygı hissedebileceklerini belirtmektedir.

Bu çalışma 2005 yılında uygulanmaya başlanan yeni matematik eğitim programının sınıf ve matematik öğretmenleri tarafından nasıl algılandığı, öğretmenlerin stres düzeyleri, stresle baş etme stratejileri, öz-yeterlilikleri, programı uygulama sırasında algıladıkları baskı, programı uygulamaya yönelik hazır bulunuşlukları ve algıladıkları kaynaklar gibi değişkenleri ve bu değişkenler arasında ilişkileri sınav kaygısını açıklayan bir modeli temel alarak ortaya koymayı amaçlamıştır. 359 ilkokul ve matematik öğretmeninden toplanan verilerle yapılandırılmış eşitlik modeli kullanılarak geliştirilen model test edilmiştir. Bulgular geliştirilen modelin öğretmenlerin yeni müfredatın uygulanmasındaki streslerini ve yeni müfredata karşı tutumlarını büyük bir oranda açıkladığını ortaya koymuştur. Kaygı üzerinde bir tampon etkisi yapması beklenen baş etme yaklaşımlarının modelde yer almadığı görülmektedir. Sonuçlar hizmet öncesi ve hizmet-içi öğretmen eğitimine yararlı ipuçları içermektedir.

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CONTENTS

CHAPTER 1	1
INTRODUCTION	1
CHAPTER 2	6
LITERATURE REVIEW	6
Curriculum Reforms in Turkey	6
Current Curriculum Reform in Turkey	10
Basic Characteristics of the New Mathematics Curriculum	12
Educational Reforms and Teachers.....	14
Teacher Stress: Conceptualization of Teacher Stress	15
Prevalence of a Teacher Stress.....	20
Sources of Teacher Stress	22
Educational Reforms and Teacher Stress.....	26
Test Anxiety as an Indicator of Stress in Evaluative Situations	28
CHAPTER 3	31
METHOD.....	31
Research Questions	31
Subjects	32
Instruments.....	33
Procedure	54
Statistical Analyses	55
CHAPTER 4	57
RESULTS	57
Descriptive Statistics.....	57
Correlation Analyses.....	76
Model Testing	80
CHAPTER 5	95
DISCUSSIONS	95
CHAPTER 6	100
CONCLUSION.....	100
Limitations of the Study.....	101
Suggestions for Further Research	102
APPENDICES	120
REFERENCES.....	149

APPENDICES

A. Test Anxiety Model.....	103
B. Implementing New Mathematics Curriculum Anxiety Scale	105
C. Initial Psychometric Properties of the Implementing New Mathematics Curriculum Anxiety Scale.....	107
D. Psychometric Properties of the Implementing New Mathematics Curriculum Anxiety Scale.	110
E. Attitudes Towards the New Curriculum Scale.....	113
F. Initial Psychometric Properties of the Attitude Towards the New Curriculum Scale	115
G. Psychometric Properties of the Attitude Towards the New Curriculum Scale	118
H. Coping with the New Curriculum Scale.....	121
I. Initial Psychometric Properties of the Coping with the New Curriculum Scale	123
J. Psychometric Properties of the Coping with the New Curriculum Scale	125
K. Teachers' Efficacy Beliefs in the Implementation of the New Mathematics Curriculum Scale.	127
L. Psychometric Properties of the Teachers' Efficacy Beliefs in the Implementation of the New Mathematics Curriculum Scale.....	129
M. Pressure During the Implementation of the New Curriculum Scale.....	131
N. Initial Psychometric Properties of the Pressure During the Implementation of the New Curriculum Scale.....	133
O. Psychometric Properties of the Pressure During the Implementation of the New Curriculum Scale.....	135
P. Readiness to Implement the New Curriculum Scale.....	137
Q. Psychometric Properties of the Readiness to Implement the New Curriculum Scale	139
R. Appraisal of Implementation of the New Curriculum Scale.....	141
S. Psychometric Properties of the Appraisal of Implementation of the New Curriculum Scale	143
T. Perceived Resources During the Implementation of the New Curriculum Scale	145
U. Psychometric Properties of the Perceived Resources During the Implementation of the New Curriculum Scale.....	147

TABLES

1. Initial Factor Loadings of Coping With the New Curriculum Scale.....	43
2. Factor Loadings of Coping With the New Curriculum Scale.	45
3. Demographical Data of Teachers	59
4. Descriptive Statistics	60
5. Correlational Analyses	77
6. Regression Weights for Hypothesized Model.....	84
7. Regression Weights for Second Model	87
8. Modification Indices from Second Model.....	88
9. GFI and AGFI	90
10. Baseline Comparisons	91
11. RMSEA	91
12. Standardized Direct Effects.....	92
13. Standardized Indirect Effects	93
14. Standardized total effects	94
15. Squared Multiple Correlations	94

FIGURES

1. Histogram of readiness	61
2. Histogram of inservice training	62
3. Histogram of knowledge of constructivism	63
4. Histogram of of knowledge of application	63
5. Histogram of knowledge of mathematics as a subjects	63
6. Histogram of efficacy	64
7. Histogram of perceived resources	65
8. Histogram of appraisal	66
9. Histogram of pressure	67
10. Histogram of pressure from administers not to implement the new curriculum..	68
11. Histogram of pressure from administers to implement the new curriculum	68
12. Histogram of pressure from parents not to implement the new curriculum	69
13. Histogram of pressure from parents to implement the new curriculum	69
14. Histogram of pressure from students not to implement the new curriculum	70
15. Histogram of pressure from students to implement the new curriculum	70
16. Histogram of pressure from students to implement the new curriculum	71
17. Histogram of pressure from colleagues to implement the new curriculum	71
18. Histogram of anxiety	73
19. Histogram of emotion-focused coping	74
20. Histogram of problem-focused coping	74
21. Histogram of attitude	75
22. The hypothesized model of teachers stress during the implementation of the new curriculum	82
23. The second model	86
24. The final model	89

CHAPTER 1

INTRODUCTION

In Turkey, several educational reform movements were implemented to accomplish educational improvements. A recent curriculum reform started in 2005. This reform was intended to change educational programs of all courses at all levels from through elementary school to high school.

It was stated that the new curriculum had the implications of the constructivist approach and was more student centered when compared to previous general educational practices in Turkey. The former approaches were claimed to be teacher centered and were based on behaviorism (Board of Education [TTKB], 2005). With the implications of the new mathematics curriculum, teachers, who were mostly trained with and used to teach by using traditional ways of instruction, were expected to use new teaching and assessment strategies in order to adapt to and accommodate these changes. Changing education inevitably means changing teachers. Therefore, without teachers, strategies and solutions can not be implemented (Brown, Ralph & Brember, 2002; Thompson, 2005). Teachers are the ones who carry reforms and changes into their classes. This makes them key factors of the reforms. Hall and Hord (1987) stated that when faced with change school teachers are initially concerned about themselves and with how the new practices will affect them personally and professionally. In educational reform movements one of the personal reactions to the reform is teacher stress (Gibbons, 2002).

There are certain work-related factors that cause teacher stress. Educational innovations are among one of the factors. Several research studies conducted on

teachers' stress indicated that during the educational reforms teachers experience high level of stress. (Kyriacou, 2001; Brown, et al., 2002; Travers and Cooper, 2006). It was stated that "change can exacerbate stressful conditions already associated with teachers' work and it may introduce new sources of strain" (Smylie, 2006).

The aim of this study was to develop a model to explain teachers' stress during the implementation of the new mathematics curriculum. The framework to explain teacher stress during the implementation of the new curriculum was mostly based on a transactional test anxiety model (Zeidner, 1998). The stress experienced by mathematics and elementary school teachers during the implementation of the new mathematics curriculum, their coping strategies, appraisals, attitudes toward the new curriculum, efficacy beliefs for the implementation of the new curriculum, readiness to implement the new curriculum, perceived resources during the implementation of the new curriculum, perceived pressure, and the relationship between these variables were examined in this study.

In the transactional test anxiety model an evaluative situation is defined as a situation in which a person is judged or assessed with respect to some standard of performance. The transactional model conceptualizes the phenomenon as a dynamic process that involves the reciprocal interactions among the evaluative situation, individual differences, and appraisals of evaluation situation, coping patterns, and adaptive outcomes. Appraisal is the process whereby a person perceives the evaluative situation as threatening, harmful, or challenging. Coping has been claimed to moderate the effects of evaluative stress on adaptation outcomes. The degree of stress experienced by an individual depends on objective, personal and subjective factors of an evaluative situation (Zeidner, 1998).

The model used in this study to explain teachers' stress during the implementation of new curriculum was developed mainly by using the test anxiety model (Zeidner, 1998) as a basis. In the model, appraisal was regressed upon three predictor variables. They were personal variables, including readiness and efficacy, and situational variables, including perceived resources. Teachers' stress was operationalized as anxiety during the implementation of the new curriculum which was regressed upon appraisal and perceived pressure. Outcome of the implementation of the new curriculum was thought to be teachers' attitudes towards the new curriculum. Coping was hypothesized to be a mediator variable between attitude and anxiety.

In this study, teaching mathematics according to the requirements of the new curriculum was identified as an evaluative situation. Teachers are evaluated or judged with respect to their prior teaching experience by students, principals and families. Teachers also evaluate themselves with respect to their previous teaching experiences. An evaluative situation in implementing the new curriculum implies chances for either success in or failure of effective teaching mathematics for teachers. Consequences are relevant and meaningful to teachers' goals and values.

Complexity, novelty, ambiguity, and difficulty of the new curriculum were taken into consideration. Physical conditions of the schools and time period that teachers must teach were also regarded among objective properties of the implementation of the new curriculum. Since the same mathematics curriculum has been applied in all schools, teachers experienced the same characteristics of the curriculum. So characteristics of the curriculum were accepted as a constant in this study. Time pressure was also accepted as a constant because the teaching period is the same for all schools so teachers should cover topics of the new curriculum in a

defined time period. Teachers' perceived resources, such as number of the students in class, parents' socio-economic levels have been thought to cause stress in the implementation of the new curriculum. Since these properties may change among schools, they were taken to be relevant variables in this study within the model.

Personal variables which effect teachers' experiencing stress in the evaluative situation of implementation of the new curriculum were taken to be readiness to implement the new curriculum and teaching efficacy beliefs for the implementation of the new mathematics curriculum.

During the implementation of the new curriculum, teachers may perceive this evaluative situation as threatening, harmful or challenging. Teachers who are used to teaching in traditional ways have to change their way of teaching and use new materials and text books different from the ones to which they have been accustomed. So teachers can perceive these changes and also the reforms as threatening and even harmful. On the other hand, some teachers can perceive these changes as a challenge or advantage which will improve their teaching skills by learning new methods and materials.

When teachers perceive the implementation of the reform as a challenge, they may feel less stress during the implementation of the new curriculum. On the other hand, teachers who appraise implementation of the new curriculum as a threat may feel more stress during the implementation of the new curriculum.

Coping can be a mediator between attitude and stress. If teachers perceive the implementation of the new curriculum as a threat and can cope with the problems of implementation, they may have positive attitudes towards the new curriculum. If teachers, perceive the implementation of the new curriculum as a threat and cannot

cope with the problems of implementation, they may have negative attitudes towards the new curriculum.

The recent curriculum reform effort in Turkey, was intended to change educational programs of all courses in all levels from elementary school to high school. Approximately 450,000 primary school teachers have been affected by the reform efforts. Therefore, a highly significant but at the same time rare educational phenomenon was examined in this study.

Although there are many studies conducted to examine the implementation of the new curriculum in Turkey, no research has been found that investigates stress experienced by teachers during implementation of the reforms. The results of this research may have implications for teacher education, inservice training and research.

In this study teachers' levels of efficacy beliefs for the implementation of the new mathematics curriculum, attitudes towards the new curriculum, readiness to implement the new curriculum, perceived pressures during the implementation of the new curriculum, anxiety during the implementation of the new curriculum, attitudes towards the new curriculum were tapped. In addition to this, how teachers appraised the situation and what coping strategies they used when faced with the problems of implementation were investigated. Lastly, a hypothesized model of teachers' stress during the implementation was examined

CHAPTER 2

LITERATURE REVIEW

Curriculum Reforms in Turkey

In Turkey, educational development has been regarded as the most important factor to reach the level of civilized societies since the foundation of the Turkish Republic in 1923 (Grossman, Önkol & Sands, 2007). Therefore, several educational reform movements took place which were implemented to accomplish educational improvements. Dramatic increases in literacy among young people, increases in the number of schools and increases in the enrolment rate of students were accomplished through many reform movements (Okçabol, 2005; Rankin & Aytaç, 2006; Grossman, Önkol & Sands, 2007). In the 1923-1924 academic year there were 4.894 elementary schools, 72 junior high schools, 23 high schools, 64 vocational and technical junior high schools and high schools. In 2007-2008 academic year, there are 34.93 primary schools, 3.830 general high schools, 4.450 vocational and technical high schools (Turkish Statistical Institute [TÜİK], 2007). Literacy rates that were 30% for men and 10% for women in 1935 increased to 90% for men and 71% for women (State Institute of Statistics [DİE], 1985, as cited in Rankin & Aytaç, 2006).

Many of the educational reforms that were implemented included curriculum reforms. Until 1968, there was no complete reform effort in the primary school curriculum, but several curriculum studies were conducted specifically for some courses such as mathematics, Turkish language, etc. (Tazebay et al., 2000, as cited in Akbaba, 2004).

In 1924, after the foundation of the Turkish Republic, curricula were revised. Many courses were replaced with topics and methods which were in line with the contemporary ideals of the Republic (Wilson & Başgöz, 1968). In 1924, American educator and philosopher John Dewey was invited to the Republic of Turkey to share his ideas for reforms and recommendations to improve the Turkish education system (Wolf-Gazo, 1996; Okçabol, 2005). In 1926, the elementary school curriculum was changed according to Dewey's philosophy. New courses which were formed by combining several courses were added. (Okçabol, 2005; Wilson & Başgöz, 1968). After it was revised according to the results of the pilot study, implementation started nationwide in 1927(Wilson & Başgöz, 1968). However, according to Wilson and Başgöz (1968) the changes in 1926 were not implemented effectively because school buildings were not suitable for the implementation. There were no laboratories and adequate materials in the schools. In addition to this, teachers were not ready to implement the new curriculum. As a result of these factors, changes in the curriculum could not go beyond the teaching of the same content with the same methods but under the name of the new courses which were formed according to Dewey's philosophy (Wilson & Başgöz, 1968).

In 1936, objectives of the courses and directions for teachers to guide them how to teach were added to the programs (Ergin, 1977). According to Ergin (1977), the reform movement in educational programs in 1936 was very important. Contemporary and dynamic instructional methods were initiated. Schools became social and national activity centers. The new approach encouraged students to make analyses and discussions in their courses rather than memorize the facts (Ergin, 1977). On the other hand, some educators criticized the reform in 1936 for not

making big changes. According to them only the additions of the objectives of the courses and directions for the teachers were changed (Wilson & Başgöz, 1968).

In 1948, as a product of the studies to improve the 1936 curriculum, a new curriculum with more democratic ideas was began to be implemented. The 1948 curriculum was criticized for not being flexible. It is stated that it did not support individual differences and did not allow students to gain basic skills. Since it aimed to teach a lot of courses including a lot of topics, there was not enough time for teachers to cover all the topics and there were also no connections among the topics (Akbaba, 2004).

During the 1960s, the drawbacks in the implementation of the 1948's curriculum and the need for a better curriculum set the stage for making improvements in the curriculum. In 1962, a draft form of the new curriculum was prepared by a committee which was formed by representatives of different parties, such as parents, teachers, etc. (Erdogan, 2007). After being tried for five years, in 1968 implementation started nationwide in primary schools (Akbaba, 2004). Teachers were provided with inservice training (Erdogan, 2007). According to Gözütok (2003) the changes made in 1968 were important because they provided an opportunity for the students to make inquiry, observation, discussion and evaluation and they also encouraged students' self-learning.

In 1982, in order to maintain continuity and standardization in the curriculum development studies, The Ministry of Education developed a program model in collaboration with academicians from different universities. The model was accepted in 1983 (Yüksel, 2003; Baki & Gökçek, 2005; Erdoğan, 2007). However, since there was no obligation for using this model in program development studies, many curriculum programs were developed with different content, process, and

assessment techniques (Yüksel, 2003; Baki & Gökçek, 2005). So attempts to maintain standardization resulted in confusion. To overcome this situation, in 1990, a new committee for program development was formed for 12 courses. However, this attempt also did not accomplish standardization in program development studies (Yüksel, 2003).

Between 1990 and 1999 another attempt was made by the Center of Educational Research and Development (CERS) to develop a new model within the scope of the National Education Development Project, which was supported by The World Bank (Yüksel, 2003). Compared to the model accepted in 1983, in this model, every step of the curriculum development process was stated more clearly (Büyükkaragöz, 1997, as cited in Baki & Gökçek, 2005). Moreover, owing to this project Curriculum Laboratory Schools were established in 1994 in order to try new curriculum. According to Yüksel (2003) before the establishment of these schools, the new curricula had been implemented in all schools. The problems of the curriculum had been affecting all schools; hence overcoming those problems was very difficult. After the establishment of curriculum laboratory schools, trials of new curricula were started in each grade level in 208 curriculum laboratory schools from 23 cities in seven geographical regions before the nationwide implementation (Yüksel, 2003).

In 2003, in order to evaluate the mathematics curriculum the Mathematics Committee was formed. According to a survey that was administered to teachers, inspectors, and 3rd and 5th grade students, instructional methods, materials, and assessment component of the mathematics curriculum were found insufficient by the committee. Another drawback of the curriculum was that students attained the curriculum's goals and behaviors at the expectation level of 70 % in the first three

grades. It was lower for other grades (EARGED, 1997, as cited in Baki & Gökçek, 2005).

Current Curriculum Reform in Turkey

Recently in Turkey, new development and improvement efforts have been attempted to cover the scientific and technological developments in the curricula and to fulfill the need for a better response to higher social and economic expectations (TTKB, 2005; Grossman et al., 2007). Among recent reforms in Turkey are the development of the preschool curriculum for 36-72 months-old children in 2002; extension secondary school education from 3 to 4 years in September 2005; and replacing central high school entrance exams at the end of the primary school with three central high school entrance exams at the end of the 6th, 7th, and 8th grades in 2007 (Bulut, 2007).

In addition to these reform acts, the need to prepare young citizens having the skills to live in the information age, the need to develop new approaches in teaching and learning area and the need to adapt national curriculum to European Union's norms, stimulated the need for changes in the focus and content of the whole national curriculum (Akbaba, 2004; TTKB, 2005; Akşit, 2007).

Another reason that indicated the need for development of the new curriculum was poor scores of Turkish students in international benchmarking studies which were conducted among Organization for Economic Co-operation and Development (OECD) countries (TTKB, 2005). Results of these studies indicated that scores of Turkish students were very low, below the means of OECD countries (OECD, 2004; Aksit, 2007). Progress in International Reading Literacy Study

(PIRLS) (2001) was designed to assess a wide range of reading skills and strategies of primary school students, concentrating on the fourth grade. In this study also, the Turkish students' average of 449 was significantly lower than the international average of 500 (PIRLS, 2001). What the Program for International Student Assessment (PISA)-2003 indicated about Turkey was not much different from the other assessment studies. PISA provided information about 15-year-olds' ability to use their knowledge and skills to meet the challenges of real-life. In PISA-2003, Turkish students performed below the international average in mathematics, reading, science and problem solving sections. Turkey's mean in the mathematics section was significantly lower than the average of OECD countries. According to their performance, students were grouped into six levels. In mathematics, 51% of the Turkish students were at the lowest level 1 or below, which meant that the students were only able to identify information and carry out routine procedures according to direct instructions in explicit contexts (OECD, 2004; Aksit, 2007).

In 2004, in order to meet the needs for changes and provide better learning for students, studies for the development of the new curricula were started. It was often stated that most programs in the Turkish education system used a teacher-centered traditional approach (TTKB, 2005). According to the Board of Education (TTKB) (2005), the transfer of teachers' knowledge to students does not allow students to develop higher level cognitive abilities such as critical thinking and reasoning. It is asserted that unlike traditional approaches, the constructivist approach values learners' own creation of meaning from their experiences; creating knowledge from the interaction between the existing knowledge or beliefs and the new ideas (Walsh & Airasian, 1997). With the reform efforts in 2004, in order to satisfy the needs of the education system in Turkey and also to be effective

developing students' cognitive skills, it was decided to move from a teacher-centered didactic model to a student-centered constructivist model (TTKB, 2005).

In addition to changing the educational view of curriculum, arranging the units thematically, developing nine core competencies across the curriculum, incorporating information communications technologies into instruction, monitoring student progress through formative assessment, moving away from traditional assessment of recall and introducing alternative assessment tools, enhancing citizenship education, introducing second language courses starting from primary school were the aims of this curriculum reform (TTKB, 2005; Bulut, 2007).

In 2004-2005, the new programs, which were developed for grades 1-5 in the areas of science, social science, mathematics and Turkish, were implemented in 120 schools in nine cities in a pilot study. After some revisions according to feedback from the students, teachers, families, administrators, academicians and non-governmental organizations, implementation started nation-wide in 2005-2006. The new curriculum for grades 6 to 8 have been developed and implemented gradually. After it was tried for a year and revised, the new curriculum for grade 6 was implemented nation-wide in 2006-2007. In 2007-2008 new curriculum for 7th grade has been implemented nation-wide after it was tried one year. The new curriculum for 8th grade has been tried in 2007-2008 to be implemented nation-wide in 2008-2009 (TTKB, 2005).

Basic Characteristics of the New Mathematics Curriculum

Reform of the mathematics curriculum in Turkey, aimed to create learning environments which make students physically and mentally active. In such an

environments students can develop individual skills and abilities such as self regulation, independent thinking, and decision making (Baki & Gökçek, 2005). The vision of the new mathematics curriculum has been stated as educating individuals who can use mathematics in their lives, who will be able to solve problems, who share solutions and ideas, and who enjoy learning mathematics. The main principle of the mathematics curriculum is “Every child can learn mathematics.” (TTKB, 2005; Baki & Gökçek, 2005; Bulut, 2007).

The previous mathematics curriculum was more teacher centered and was based on behaviorist theory. With the curriculum reform it is aimed to change the curriculum from teacher centered to student centered and to change the pedagogies from a behavioristic to a constructivistic approach. In the new mathematics curriculum conceptual learning was emphasized in addition to the procedural learning and concepts are provided to help students to reach abstraction by starting with concrete models (TTKB, 2005; Baki & Gökçek, 2005)

The new mathematics program consists of the learning areas of numbers and operations, geometry, measurement, statistics, and probability and algebra. There is spiral approach for each learning area. Connections are provided between the concept and skills related to the each area and the main subject. Connecting mathematics to other disciplines such as social science and science is another important point taken into consideration. To evaluate students’ performance, besides traditional assessment tools, alternative assessments such as observation forms and portfolios are suggested (TTKB, 2005; Baki & Gökçek, 2005; Bulut, 2007).

Educational Reforms and Teachers

In recent years, a lot of attention has been given to teachers' characteristics in the educational reform efforts. Teachers are the key factors of the reforms because they are the ones who are carrying reforms and changes into their classes. Changing education inevitably means changing teachers, therefore, without teachers, strategies and solutions can not be implemented (Brown, 2002; Thompson, 2005).

The purpose of the educational reforms, by replacing some structures, programs, and practices with better ones, is to help schools to accomplish their goals. There are at least three components in implementing any new program: new materials, new teaching approaches and alterations of beliefs. So in the curriculum reform efforts, teachers are required to use new materials including new course books and recent technology. They have to teach according to the new teaching approach and methods and they have to adopt new ideology of the reform (Fullan, 1991). In this framework, it can be stated that teachers have an important role in successfully putting the changes presented by the implementation of the new curriculum into practice.

Fullan (1991) claimed that the majority of the curriculum development studies during the last 25 years did not get implemented in practice even where implementation was desired. The curriculum development studies have concentrated on product development, legislation and other paper changes. However, the crucial factors of the reforms, i.e. people, were ignored. He argued that a lack of appreciation of how people actually experience change is at the heart of the general failure of many reforms.

There is a mass of literature showing that successful curriculum change should start from the professional concerns of teachers. It was declared that since 1988 as a result of curriculum arrangements, teachers increasingly felt deskilled and demoralized and no attempt was made to give them joint ownership of the curriculum reform. Instead of being imposed top down, curriculum reforms should be implemented by making use of teachers' knowledge and experiences (Cosgrove, 2000).

Evans (2001) defined the term "a duality" to refer to the gap between what change means to its authors and what it means to its targets. He claimed, "A duality of change begins as an interior, personal issue. The different meaning of changes has for its advocates and its targets mirrors a fundamental division within each of us, between our overt embrace of change and our conservative inner impulse to resist it. Though the significance of a particular innovation will depend in part on the unique characteristics of person, institution and situation."

Hall & Hord (1987) stated that when faced with change school teachers are initially concerned about themselves and with how the new practices affect them personally and professionally. In educational reform movements one of the personal reactions to the reform which should be examined is teacher stress (Gibbons, 2002).

Teacher Stress: Conceptualization of Teacher Stress

When we look at the literature on teacher stress, we see that the term "stress" has been used in a number of different ways, which are sometimes contradictory and confusing (Kyriacou, 1989; Travers & Cooper, 2006). The term stress lacks precise

definition; it is used in a variety of settings with different meanings (Travers & Cooper, 2006; Troma & Woods, 2001).

Stress is an ambiguous word that is used on different occasions to denote positive or negative strain in a physical or emotional context (Royal College of General Practitioners [RCGP], 2005). It can be used in biological or social sciences, extensively discussed in the health care fields, and it is found also in economics, political science and business (Lazarus and Folkman, 1984).

According to Kyriacou (1998) there are four major issues concerning the development of a definition of a stress. The first issue is whether to use the term “teacher stress” to mean the level of demand made on a teacher or to mean the emotional state of a teacher while he is attempting to meet such demands. Second issue is whether stress should refer to both positive and negative demands/emotions or only to negative demands/emotions. The third issue concerns teachers’ emotional responses to their situation that depends on their perception of the situation and on their perception of coping ability with the situation. The fourth issue concerns how best to take account of the balance between the levels of demands made on a teacher and teachers ability to meet such demands.

Kyriacou (1989) defined teacher stress as “teacher’s experience of unpleasant, negative emotions, such as anger, anxiety, tension, frustration or depression, resulting from some aspect of their work.” Woods (1989) criticized Kyriacou’s definition and claimed that frustration was a cost of living in the society and sometimes feelings of tension, anxiety and even anger could be quite productive. He claimed that tension and anxieties cause a problem if they exceed the limits of a teacher’s personal resources.

Brown and Ralph (1998) also agreed that there was no accepted definition of stress. According to them stress was generally seen as the consequences of a dynamic relationship between the person and the environment. It was often expressed as the response of the person to something which involved ambiguity, paradox and uncertainty.

Corsgrove (2000) stated that the term teacher stress had a positive meaning also. He stated that although stress was generally used as a negative word for a problem, it only became a problem when it exceeded one's ability to cope. According to him, stress was excitement, challenge and inspiration; it motivates people to do well in exams, to perform in the classroom, to stand up for his or her rights. It gives teachers the courage and strength to fight injustice. At the same time it is demoralizing, weakening and dispiriting, it makes people fearful, angry, frustrated and unable to relax. It can leave someone feeling helpless and hopeless or vulnerable to illness.

The Royal College of General Practitioners (RCGP), (2005) offered to define the term stress as “the physical, emotional and mental strain resulting from the mismatch between an individual and his/her environment which results from three-way relationship between demands on a person, those person feelings about those demands and their ability to cope with demands.”

In the light of the definitions of stress, the views about the nature of stress and the ways of conceptualizing stress can be grouped into three major approaches. In the first approach, stress is regarded as a dependent variable and described in terms of the person's response or reactions to some threatening or disturbing stimuli or pressure. Shift work or noxious environments can be given as an example of threatening or disturbing stimuli. Since stress is concerned as a response to stimuli,

manifestations of the stress are the focus of this approach. Manifestation of the stress or responses to the threatening or disturbing stimuli may occur in three levels: physiological, psychological or behavioral (Dunham, 1992; Travers & Cooper, 2006). According to Dunham (1992) strong medical orientation to understanding the manifestation of stress is one of the major weaknesses of this approach. He claimed that some important manifestations of stress were ignored by this approach since they were not emotional or psychosomatic. His concern is about teachers' awareness of their stress. He claimed that many people seem unable to recognize the signs of stress in themselves or feel that they are letting themselves down if they admit the stress.

In the second approach, stress is regarded as an independent variable. This approach considers stress as a stimulus, a pressure exerted on teachers or a disruptive environmental agent. It is suggested that various disturbing features in the environment or pressures affect teachers in a disruptive way. Teachers have their limits and up to a point pressure, which may be physical or emotional, can be tolerated. The observable strain level and type will depend upon the individual and the duration and severity of pressure exerted. When pressure becomes intolerable, damage may result, either psychological or physiological, or both (Dunham, 1992; Travers & Cooper, 2006).

According to Travers and Cooper (2006) in this approach researchers were mostly interested in the identification of potentially stressful stimuli and their negative affects on individuals. Occupational stress research and attempts to isolate stressors in the working environments were also emphasized in this approach. Moreover, it benefited from a scientific approach which allowed researchers in psychology to measure stress in a more mechanistic way. In this approach stress was

regarded as a phenomenon that was extraneous to the individual and while examining stress, the perceptions and experiences of individuals were not taken into account. However, according to Dunham (1992) there were wide individual differences among teachers in their reactions to the stimulus. In addition to the pressures from sources external to teaching, there were other numbers of factors like personality, previous experience of similar demands, which were important in determining the extent to which the work demands made upon a teacher result in stress.

In the third approach, stress is regarded as the intervening variable. It is conceptualized as an interaction or transaction between the person and the environment. In this approach it is claimed that, people both influence and respond to their environments, so the environment itself does not causes stress, but it is the relationship between the person and the environment that may cause stress. So the way individuals perceive and react to situations is emphasized in this approach. Stress from this perspective occurs when the magnitude of the stress stimuli or pressure exceeds the individual's coping resources. So while examining teacher stress this approach is concerned with both pressures and reactions and also with the coping resources which teachers use as they attempt to cope with the difficulties. This view proposes that the extent to which teachers experience stress in any situation in school depends upon a number of factors, which include appraisal of demands and strategies of teachers to deal with those demands; anticipation of likely future demanding experiences and the teacher's readiness to tackle them; the extent of preparation and rehearsal of the skills necessary for the teacher to handle work pressures effectively (Dunham, 1992; Travers & Cooper, 2006).

Prevalence of a Teacher Stress

During the last 30 years there has been an increasing professional and public interest in the topic of occupational stress (Hanif & Pervez, 2003). Especially people working in the service sectors like health, education and welfare attracted attention because of the stress that they experienced. In the service sector, one of the most stressful professions has been found to be teaching (Travers & Cooper, 2006).

Teachers have been popular targets for occupational research studies since 1970's. In the mid-1970's some of the teaching unions began to be concerned about the level of stress experienced by teachers. In 1976, the first major report on teachers' occupational stress, "*Stress in Schools*" was published by American National Association of School Masters/Union of Women Teachers (Kyriacou, 1998). By 1980, the issue of teacher stress was well and truly on the research agenda. Then, at the beginning of the 1990s, teacher stress had become a major topic throughout the world with a huge array of published literature. People had become more aware of teacher stress, and in-service workshops for managing teacher stress started to appear (Kyriacou, 1998).

Occupational stress is still reported as a considerable problem within today's working professions because of the introduction of new technology. The emphasis on efficiency, downsizing and increasing numbers of short-term contracts make the working place an insecure and rapidly changing environment. (Jones & Bright, 2001). In addition to this, teaching is still reported among the most stressful occupations. Lepkowska, Smith, and Stewart (2003) claimed that teaching is more stressful than any other public-sector job, including those in health service. Surveys

indicate that teachers experience more stress at work than the majority of other professions which are typically reported as having high occupational stress, like social workers, managers, junior hospital doctors, nurses, journalists, police (Kyriacou, 1989).

In a research conducted by Smith, Desimone and Ueno (2000) for Health and Safety Executives with 17,000 randomly selected people from different occupations, teachers were reported at higher levels of stress. Other most stressful occupations were nurses, workers in managerial jobs, workers in professional and support management jobs. In this study, 41.5 % of teachers, 31,8 % of nurses, 27.6 % of workers in managerial jobs, 26.7 % of workers in professional and support management job reported high levels of stress. Moreover, Johnson et al. (2005) conducted research in which 26 occupations were compared according to their occupational stress. Of the 26 occupations, six of them were reported as being most stressful jobs and teaching was among them. The other five most stressful workers were in ambulance services, social services, customer services, call centers, prison officers and police. Another study in which female nurses and school teachers were compared in terms of their physiological stress indicated that physiological stress responses of women teachers were significantly greater than nurses (Brown, James & Mills, 2006).

Studies examining teachers' stress verify that teaching is one of the most stressful occupations. According to research conducted with 343 trainee secondary school teachers, almost half of the sample (46%) considered teaching as a very or extremely stressful profession (Chaplain, 2008). Similarly, in other research conducted with more than 500 teachers from all types of schools across Scotland, almost half reported that they found their jobs very or extremely stressful, with nine

out of ten teachers believing that teaching has become a more stressful occupation. (Finlayson, 2005). In Minnesota, according to the research conducted in 1998, 44 percent of educators endured high stress levels (Richer, 2003). In Malta, of 710 teachers, 32.6% indicated that they found their job either very stressful or extremely stressful (Borg, Riding & Falzon, 1991). In research conducted with 493 Greek primary and secondary school teachers it was reported that teachers experience moderate to high levels of stress (Antoniou, Polychroni & Vlachakis, 2006)

There are also some studies where teachers reported moderate or low levels of stress. In research conducted in the U.K. with 95 teachers, most reported moderate levels of stress (Jepson & Forrest, 2006). In another study in the U.K., a stress inventory was used to measure stress among 403 teachers and yielded an average score of 1.74 out of 5. This indicated that teachers experienced low levels of stress (Griffith, Steptoe & Cropley, 1999). Research conducted with the teachers at the Scottish Higher Education Institute indicated that few teacher found their job extremely stressful (11.3 %). They mostly reported that teaching was considerably stressful (47.7%) (Stevenson & Harper, 2006).

Research published on teacher stress over the last 20 years has indicated that a fifth or quarter of teachers experience a great deal of stress fairly frequently and most teachers experience some stress from time to time (Kyriacou, 1998).

Sources of Teacher Stress

Identification of the sources of teacher stress is one aspect that has been extremely well researched (Kyriacou, 1998). However, there are debates among researchers about the way the sources of teachers' stress should be studied.

According to Chakravorty (1989), identifying the sources of stress is difficult because of the nature of the stress. People's behavior patterns, social relations, reactions to the environment, and capacity to cope with stress are different from one another. Since experiencing stress depends on these variables identifying the sources of stress is difficult.

Cox, Boot and Cox, (1989) criticized the studies on the sources of teachers' stress because they examine teachers' experiences in isolation from their organizational context. In research conducted by Cox et al. (1989), in which the sources of stress within the school organization were examined, teachers reported five different domains as sources of stress. In that study teachers reported that stress was stemmed from training and career development; it was inherent in the job; it was because of the personal characteristics of certain teachers; it was related with the school organization, management and culture; and it was because of political and community expectations.

Troman and Woods (2001) criticized the studies on the sources of teachers' stress in which teaching was considered as an inevitable stressful job. Stress in teaching was regarded as an educationally productive matter and stress was regarded as a matter which depends on personal and situational factors related to the individual teacher. They claimed that because of these studies' approaches to the sources of stress, the problem was individualized and teachers were blamed for experiencing stress. According to them, stress is a multi-dimensional and multi-level phenomenon. Personal, situational and structural factors are involved in its production. It is experienced individually and produced socially. So while examining stress, Woods (2006) suggested that stress should be conceptualized within the interchange among micro, meso and macro levels. The micro refers to social factors

within the teacher's biography and person; the meso is related to institutional factors; the macro deals with wider forces deriving from global trends and government policy. So while examining teacher stress, personal factors like personality, commitment, career, role and values; situational factors like school organization, school culture, teacher-pupil relationships; and structural factors like restructuring of the schools and teaching should be examined as sources of stress. Moreover, for the reasons for teachers' stress, it was suggested that, teachers are likely to experience stress when their personal interests, commitment, and resources do not go with or pull against key aspects of their social, economic, and institutional environments.

Farber (2006) did not agree with Wood's claim that stress is largely a social issue. According to Farber, the experience of stress is psychological. He stated that although stressors may be construed as social in nature, one's individual make up, in other words, the way one constructs the world, mediates these stressors. In addition to one's appraisal, one's experience of stress varies considerably from individual to individual even encountering similar stressors.

However, main sources of stress experienced by a particular teacher are unique and depend on the precise complex interaction between personality, values, skills and circumstances. Numerous studies indicated that there were common objective sources of stress for teachers in general (Kyriacou, 2001; Troman & Woods, 2001; Brown, et al., 2002).

Kyriacou (1998) claimed that taken as a whole there were six categories reported as the most commonly identified sources of stress across a wide range of studies. These were poor pupil behavior, ranging from low levels of pupil motivation to overt indiscipline; poor working conditions, including a lack of resources and poor physical features of the building used; time pressure and work overload; poor

prospects concerning pay, promotion and career development; poor school ethos, including poor relationships with the head teacher and with colleagues; and change. According to the study conducted by Kyriacou and Sutcliffe (1978), the four major groups that were identified as sources of teacher stress were: pupil misbehavior, poor working conditions, time pressures, and poor school ethos.

Montgomery and Rupp (2005) carried out a study which provided correlational meta-analyses of 65 independently written or published studies on teacher stress between 1998 and 2003. In this study the relationship between teacher stress and coping, burn-out, emotional responses, personality mediators, personal support, environmental structure and background characteristics were measured. Results indicated that the strongest association of a teachers' stress coincided with negatively oriented emotional responses. Also central to the manner in which teachers respond to external stressor were the teacher's coping mechanism, personality mediators and burnout. In other words, emotions had a more central role for understanding complex relationships between stress, burnout, personality, and support variables.

According to research conducted with primary and secondary teachers in Manchester, teacher-pupil relationships, relationship with colleagues, relationship with parents and wider community, school management and administration; time factors; school environments; personal perception and feelings; innovation and change were stated as sources for teachers' stress (Brown et. al., 2002).

While there are common factors that have emerged as the identified sources of stress, it is important to keep in mind the following cautions. First, each teacher has his/her own unique stress profile. In discussing sources of stress in general, it is important not to miss the concerns of an individual teacher. Secondly, there are many

changes taking place in schools, so that our understanding of the current major sources of stress needs to be based on up-to-date information. Third, there are particular groups of teachers which may have different sources of stress. Therefore, in order to gain additional insights into their sources of stress, they should be looked at separately. Fourth, based on the precise characteristics of national educational systems, the precise circumstances of teachers and schools in diverse countries, and prevailing social attitudes and values regarding teachers and schools, there are differences in the main sources of teacher stress (Kyriacou, 1989).

In Turkey, according to the results of studies examining the sources of teachers' stress, it was found that some sources of stress for Turkish teachers are also sources of stress for teachers in other countries. According to research conducted with 200 teachers in primary public schools in Turkey, relations with pupils, relations with administrators, crowded classrooms, and socio-economic status of teachers were reported as the sources of teacher stress (Yavuz, 2007). Another study conducted by Kızıltepe (2007) with 152 teachers revealed that Turkish teachers experience stress because of the work load, the inadequate salary, and the indifference and laziness of students.

Educational Reforms and Teacher Stress

The nature and organization of the job make teaching inherently difficult. Although teaching is always a stressful job, there are particular times and circumstances when teachers experience more stress. Several research studies conducted on the topic of teachers' stress indicated that during educational reforms teachers experience high level of stress.

In a study conducted by Chakravorty (1989), with 1552 teachers between 1974 and 1983, teachers' incidence of mental illness was observed. In 1979, the peak incidence of mental illness among teachers was noticed. There were also considerable increases in the number of mental illnesses among teachers in 1980-1981 and 1982-1983. What made these dates different from the others was the implementation of two educational reforms in these years. Considering the fact that stress plays a significant part in contributing to mental problems, it can be concluded that this study indicated curriculum change as a cause for increases in the level of teacher stress.

Cosgrove (1982) also examined the possible reasons for increase in teachers' stress in the 1980s. He investigated whether there were any changes among the traditional sources of teacher stress. Results of his study indicated that poor pupil motivation, indiscipline, working conditions, time pressure, low status and conflicts with colleagues all continued to play a role in teachers' stress. However, these were joined by another factor, which was change. Therefore, it was stated that change in 1980s increased the stress that teachers felt.

In major curriculum reforms that occurred in England and Wales in 1998 with reform implementation, a rapid rise in the level of teacher stress was observed. In that reform, some teachers actively opposed the changes; some implemented aspects of the changes that they thought acceptable, and some went along with the changes but were not engaged with them (Woods, 2006). According to McCormick, Ayres and Beechey (2006) during the curriculum reform in New South Wales, Australia, Australian teachers felt high levels of stress during the implementation of the new curriculum.

In 1998, there were reform acts which provided packages of initiatives in the U.K. That reform act package included Open Enrollment, the Local Management of Schools, the Institute Development Plan and the National Curriculum. It was reported that reform initiatives in 1991 especially the National Curriculum initiative proved to be the biggest sources of teacher stress (Dunham, 1992).

The literature about change and teacher stress suggests that change can exacerbate stressful conditions already associated with teachers occupation and may create new stressful conditions for teachers (Smylie, 2006). Change causes teachers stress because it reduces teachers' scope of control (Hinton & Rotheiler, 1998); it diminishes respect for teachers and increases amount of paper work (Travers & Cooper, 2006). Change imposes extra pressures upon teachers, with greater levels of uncertainty, job insecurity, and the restructuring of teaching itself (Travers & Cooper, 2006). Change almost always means loss; it threatens teachers' sense of competence and frustrates their wish to feel effective and valuable. It creates confusion, unpredictability and it causes conflicts (Evans, 2001). Lack of rationale behind the constant demands for change, lack of sources and information to facilitate the change, lack of role and goal clarity and feelings of powerlessness and failure are the factors that lead teachers to feel stress during reform movements (Brown et al., 2002).

Test Anxiety as an Indicator of Stress in Evaluative Situations

Anxiety has been considered as an indicator of stress. Test anxiety has been considered a proper subset of the broader domain of stress and anxiety research (Özerman, 2007). In recent years test anxiety was conceptualized as a self-control

process or as a form of self handicapping employed to preserve one's merit in the face of potential failure (Zeidner, 1998). A number of theoretical models have been developed to explain test anxiety. One of the models to explain test anxiety was developed by Zeidner (1998).

In the transactional test anxiety model of Zeidner, "test" is explained as a special case of an evaluative situation. An evaluative situation is defined as a situation in which a person is judged or assessed with respect to some standard of performance. An evaluative situation implies chances for either success or failure. Consequences of the evaluation are relevant and meaningful to a person's life goals and values (Zeidner, 1998).

The theoretical framework of the transactional test anxiety model conceptualizes the phenomenon as a dynamic process that involves the reciprocal interactions among the evaluative situation, individual differences, and perceptions of evaluation situation, coping patterns, and adaptive outcomes. In this model individuals not only react to situations, but they also effect the situations which they interact with (Zeidner, 1998).

The degree of stress experienced by an individual depends on objective, personal and subjective factors of an evaluative situation. Objective properties of the evaluative situation are the test related variables like test characteristics (task content, complexity, ambiguity, novelty, difficulty) evaluative atmosphere, nature of feedback cues, time pressures and physical conditions in the test anxiety model. Personal variables form another factor that affects the degree of stress experienced by an individual. Trait test anxiety, need for achievement, self-efficacy, scholastics ability, information processing capacities, and study skills are personal variables of test anxiety (Zeidner, 1998).

In addition to the objective properties and personal variables of the evaluative situation, in the test anxiety model, subjective determinants of test anxiety like appraisals and interpretations of the evaluative situation are also assumed to evoke anxiety (Lazarus & Folkman, 1984). Cognitive appraisals are claimed to mediate between persons and situations, so that meaning or interpretation that an individual assigns to an evaluative situation may be a decisive factor affecting one's emotions and behaviors (Lazarus & Folkman, 1984). Appraisal is the process whereby a person perceives the evaluative situation as threatening, harmful, or challenging (Jones & Bright, 2001).

Coping has been claimed to moderate the effects of evaluative stress on adaptation outcomes that are stress related emotions surrounding the exam and test performance in the test anxiety model. In the process of coping itself, Lazarus (1984) identifies two crucial distinctions. These are distinctions between coping which is aimed at actually managing or dealing with the stressor and coping which is aimed at dealing with the emotion caused by the stressor. He labels the former as "problem-focused coping" and tells that it is most likely to be used when the individual appraises the situation as amenable to change. He calls the latter "emotion-focused coping" and argues that this is likely to be used when appraisals indicate that nothing can be done to modify the stressor. Problem-focused coping includes problem solving strategies such as learning new skills. And emotion-focused strategies include expressing emotion, trying to view the situation differently, or taking one's mind off the stressors by exercising, shopping, or drinking alcohol (Lazarus & Folkman, 1984; Jones & Bright, 2001).

CHAPTER 3

METHOD

Research Questions

- 1- What were the levels of readiness of teachers to implement the new curriculum?
- 2- What were the teachers' efficacy beliefs for the implementation of the new mathematics curriculum?
- 3- How did the teachers perceive the resources during the implementation of the new curriculum?
- 4- What were the teachers' appraisals of the implementation of the new curriculum? Was it threat, challenge or indifference?
- 5- What was the level of pressure perceived by teachers during the implementation of the new curriculum?
- 6- What were the teachers' levels of stress during the implementation of the new curriculum?
- 7- What coping strategies did the teachers use when they faced the problems caused by the implementation of the new curriculum?
- 8- What were the teachers' attitudes towards the new curriculum?
- 9- Was the hypothesized model of teachers' stress during the implementation of the new curriculum confirmed by data from a sample of elementary school teachers and mathematics teachers?

Subjects

Three different samples were used during the course of the study. The first sample was used for the development of the instruments needed for the study. The second sample was used to assess the psychometric qualities of the new instruments. The third sample was the main sample used to investigate the research questions and to test a model to explain mathematics and elementary school teachers stress during the implementation of the new mathematics program.

Sample For the Development of the Instruments

A total of 44 elementary school teachers and math teachers from Istanbul took part in the sample to measure the initial psychometric characteristics of the eight instruments as they were developed for this study. The sample of the study was selected conveniently.

Sample For the Assessment of the Psychometric Qualities of the Instruments

A total of 157 elementary school teachers and math teachers from Kütahya, Keşan and Istanbul took part in the study to assess the psychometric characteristics of the eight instruments that were developed for this study. The sample of this study was selected conveniently.

Sample of the Main Study

In order to investigate teachers' characteristics and test a model to explain mathematics and elementary school teachers' stress during the implementation of the new mathematics program, data were collected from 395 elementary school and math teachers from 32 primary schools in Istanbul.

Instruments

In this study besides the demographic information form, eight instruments were used as operational definitions of the variables: Implementing New Curriculum Anxiety Scale, Attitude Towards the New Curriculum Scale, Teachers' Efficacy Beliefs for the Implementation of the New Mathematics Curriculum Scale, Coping With the New Curriculum Scale, Teachers' Appraisal of Implementation of the New Curriculum Scale, Readiness to Implement the New Curriculum Scale, Pressure During the Implementation of the New Curriculum Scale, Perceived Resources During the Implementation of the New Curriculum scale. The scales were developed for this study by the researcher.

Before starting to develop instruments, in-depth interviews were carried out with two math teachers in order to grasp an understanding of their experiences during the implementation of the new curriculum. Information about the problems that they faced while implementing the new curriculum, advantages of the new curriculum, their attitudes, perceived resources of school, perceived pressure during the

implementation of the new curriculum and their coping strategies were obtained through these interviews.

Demographic Form

The form was developed to collect demographic information about the teachers. Questions pertaining to the teachers' gender, years of experience, subject taught (elementary level and primary level), type of school (private and public school).

Implementing New Mathematics Curriculum Anxiety Scale

Implementing New Mathematics Curriculum Anxiety Scale was developed for this study by the researcher to measure the anxiety level of mathematics and elementary school teachers during the implementation of the new mathematics curriculum as an operational definition for teacher stress.

The scale comprised of 22 items which were all four-point Likert type. Each item in the scale was written to reflect the anxiety felt during the implementation of the new mathematics curriculum. There were five reverse items in the scale. To obtain a total score, first, items were scored as 4 points for "always," 3 points for "often," 2 points for "sometimes" and 1 point for "never," except the reverse items for which the scores were reversed as well. Consequently, the scores from all items were summed and a total score for an individual teacher was obtained. Total scores should vary between 22 and 88. Higher scores indicate higher levels of anxiety felt during the implementation of the new mathematics curriculum (Appendix B).

Development of the Implementing New Mathematics Curriculum Anxiety Scale

Items of the Implementing New Mathematics Curriculum Anxiety Scale were constructed by using two sources. One of them was Modified Teachers' Attribution of Responsibility for Stress Questionnaire (TARSQ) (McCormick et al., 2006). The other was the information from the interviews conducted with two teachers.

McCormick et al. (2006) conducted a research study to investigate the relationships among teachers' occupational stress, coping, teacher self efficacy and relevant teachers' perception of curriculum changes in an educational reform in New South Wales, Australia. In that study, since researchers wanted to measure teachers' stress in a special case during the curriculum reform, they added seven items specifically designed to tap into stress related to new curriculum to Teachers' Attribution of Responsibility for Stress Questionnaire. Those seven items in Modified Teachers' Attribution of Responsibility for Stress Questionnaire (McCormick et al., 2006), which were especially designed to assess teachers' stress during the implementation of the new curriculum, were reviewed and studied while developing items of the Implementing New Mathematics Curriculum Anxiety Scale.

The second source used during the development of the scale items was interviews with two teachers. In the in-depth interviews, teachers told about their opinions related with the new mathematics curriculum, their feelings during implementation of the new curriculum, and their ways of coping with difficulties during the implementation of the new curriculum. The information given by teachers was studied and considering while developing the items of the Implementing New Mathematics Curriculum Anxiety Scale.

After the sample items developed by McCormick et al. (2006) were reviewed and studied, and data gathered from the interviews was used and studied, 22 items of the Implementing New Mathematics Curriculum Anxiety Scale were generated. In order to assess initial psychometric properties of the instrument a pilot study was conducted with 44 teachers. The α reliability value for the scale was 0.86. The item total correlations varied between 0.28 and 0.77 except for item 16, which had an item total correlation value of 0.01 (Appendix C).

For the initial construct validity of the scale the correlation between the teachers' scores from The Attitude towards the New Curriculum Scale and Implementing New Mathematics Curriculum Anxiety Scale was investigated. The Pearson correlation coefficient was calculated to be -0.43 ($p < .001$) from the data obtained from 44 teachers who took part in the pilot study. This was accepted as initial evidence for the construct validity of the Implementing New Mathematics Curriculum Anxiety Scale.

After the items of the Implementing New Mathematics Curriculum Anxiety Scale were developed and psychometric properties of the scale were assessed in a pilot study with 44 teachers, items of the scale were checked according to their accuracy and appropriateness for Turkish language by an expert who was the editor of an art journal. Small changes were made according to recommendations of the expert.

Then in order to assess the psychometric quality of the instrument another pilot study was conducted with 157 elementary school teachers and math teachers. Twenty-six forms which had a high number of missing values were extracted from the data. Finally in order to assess the psychometric quality of the instrument, data

gathered from 131 teachers were used. The α reliability value for the scale was 0.90, and the item total correlations varied between 0.30 and 0.72 (Appendix D).

For the construct validity of the scale the correlation between the teachers' scores from The Attitude towards the New Curriculum Scale and Implementing New Mathematics Curriculum Anxiety Scale was investigated. The Pearson correlation coefficient was calculated to be -0.63 ($p < .001$) from the data obtained from 157 teachers involved in a pilot study to assess the psychometric quality of the instruments. This was accepted as evidence for the construct validity of the Implementing New Mathematics Curriculum Anxiety Scale.

Attitudes towards the New Curriculum Scale

In order to measure mathematics and elementary teachers' attitudes towards the new curriculum Attitude towards the New Mathematics Curriculum Scale was developed by the researcher for this study.

The questionnaire was made up of 28 items which were generated with the aim of collecting data about the personal views of teachers about the new mathematics curriculum. Responses were scored on a Likert-type scale ranging from 1- "strongly disagree" to 5- "strongly agree." There were 13 reverse items in the scale. A total score was obtained by adding up the scores from each item after reversing the score obtained from reverse items The maximum score was therefore 140 and minimum score was 28. The higher scores indicated more positive attitudes towards the new curriculum (Appendix E).

Development of the Attitude towards the New Mathematics Curriculum Scale

Most of the items of the Attitude towards the New Mathematics Curriculum Scale were generated by reviewing and translating the “A Study of Intermediate School-Teachers and their Attitudes toward the California Mathematics Content Standards Questionnaire” (Jones, 2005), which was developed to assess intermediate teachers’ attitudes and perceptions regarding the California Mathematics Standards.

Some items of the scale were generated by using the data collected in the interviews. In the in-depth interviews, information about teachers’ opinions related with new mathematics curriculum, their feelings during implementation of the new curriculum, their ways to cope with difficulties during the implementation of the new curriculum was gathered.

A pilot study was run with 44 elementary school teachers and primary mathematics teachers in order to check the preliminary reliability of the 28-item Attitude towards the New Curriculum Scale. The α reliability value for the scale was 0.88. The item total correlations varied between 0.17 and 0.75 except for item 19, which had an item total correlation coefficient of 0.13 (Appendix F).

For the construct validity of the scale the correlation between the teachers’ scores from The Attitude towards the New Curriculum Scale and Implementing New Mathematics Curriculum Anxiety Scale was investigated. The Pearson correlation coefficient was calculated to be -0.43 ($p < .001$) from the data obtained from 44 teachers involved in the pilot study. This was accepted as initial evidence for the construct validity of the Implementing New Mathematics Curriculum Anxiety Scale.

After the items of the Attitude towards the New Curriculum Scale were formed and the initial psychometric properties of the scale were assessed in the pilot study with 44 teachers, items of the scale were corrected by an expert who checked their accuracy, and appropriateness for Turkish language. Small changes were made according to recommendation of the expert.

Then in order to assess the psychometric quality of the instrument another pilot study was conducted with 157 elementary school teachers and math teachers. Five forms which had a high number of missing values were extracted from the data. Finally in order to assess the psychometric quality of the instrument data gathered from 152 teachers were used. The α reliability value for the scale was 0.90, and the item total correlations varied between 0.42 and 0.71 (Appendix G).

For the construct validity of the scale the correlation between the teachers' scores from The Attitude towards the New Curriculum Scale and Implementing New Mathematics Curriculum Anxiety Scale was investigated. The Pearson correlation coefficient was calculated to be -0.63 ($p < .001$) from the data obtained from 157 teachers involved in a pilot study for assessing the psychometric quality of the instruments. This was accepted as evidence for the construct validity of the Implementing New Mathematics Curriculum Anxiety Scale.

Coping With the New Curriculum Scale

The mathematics and elementary school teachers coping strategies during the implementation of the new mathematics curriculum were assessed by Coping with the New Curriculum Scale developed by the researcher for this study.

The scale included 11 items. Each item in the scale described a coping strategy that could be used when faced with difficulties in implementation of the new curriculum. The participant teacher was expected to respond by stating how often s/he employed the stated strategy. Responses were scored on a Likert-type scale ranging from 1-“always” to 4-“never.” Therefore, according to their responses, teachers’ frequency of using each strategy to cope with the problems that were aroused because of the implementation the new mathematics curriculum was obtained by the use of this scale (Appendix H).

There were two factors in the Coping with the New Curriculum Scale: problem-focused coping and emotion-focused coping. Problem-focused coping was about actively dealing with the problems which arose during the implementation of the new curriculum. From 11 items, 6 items corresponded to the problem-focused factor and 5 corresponded to emotion-focused coping factor. Problem-focused coping factor consisted of items 1, 2, 3, 4, 5, and 6. Emotion-focused coping consisted of items 7, 8, 9, 10, and 11.

Development of the Coping With the New Curriculum Scale

Three different sources were used while generating the Coping with the New Curriculum Scale. One of them was a theory of Lazarus and Folkman (1984) about coping. The second source was “Pullis Inventory of Teacher Stress” questionnaire (Pullis, 1983, as cited in Pack, 2000). The third source was the information obtained from the interviews conducted with two teachers.

Coping with the New Curriculum Scale was prepared to evaluate the mathematics and elementary school teachers coping strategies during the

implementation of the new mathematics curriculum based on Lazarus's and Folkman's approach to coping. According to Lazarus and Folkman (1984) mainly there are two kinds of coping strategies, problem-focused and emotion-focused coping. Problem-focused coping strategies are aimed at actually managing or dealing with the stressor, while the emotion-focused strategies are directed at dealing with the emotion caused by the stressor. Problem-focused coping includes problem solving strategies like learning new skills, developing action plans, gathering information, deriving specific goals, etc. On the other hand, emotion-focused coping includes strategies like engaging activities to take one's mind off the stressors, like shopping and exercising, increasing smoking, eating and alcohol consumption, trying to view the situation differently, seeking emotional support.

While generating the items of the Coping With the New Curriculum Scale, items of the "Pullis Inventory of Teacher Stress" questionnaire (Pullis, 1983, as cited in Pack, 2000) was also used. Pullis Inventory of Teacher Stress Questionnaire was designed to assess effects and sources of special education teachers' occupational stress and their coping strategies with occupational stress. This questionnaire had three parts, which were "Sources of Stress," "Effects of Stress" and "Coping with Stress." Items of the Coping with the New Curriculum Scale were generated by reviewing and studying "The Coping with Stress" part of the Pullis Scale of Teacher Stress Questionnaire.

Moreover, data collected in the interviews with two teachers were used while developing the scale. Information about teachers' opinions related with new mathematics curriculum, their feelings during implementation of the new curriculum, and their ways to cope with difficulties during the implementation of the new curriculum was gathered through interviews.

After all the items of the scale were developed, in order to assess initial psychometric properties of the instrument, a pilot study was conducted with 44 elementary school teachers and primary mathematics teachers. The internal consistency was assessed for the scale and for subscales. The α reliability value for the scale was 0.64. The item total correlations varied between -0.16 and 0.55, except for item 12 which had an item total correlation coefficient of 0.051 (Appendix I).

A factor analysis was carried out in order to investigate the initial construct validity of the scale. When factor analysis was run based on eigenvalues over one and varimax rotation, the scale was found to consist of five factors. When the five factors were examined, apart from three exceptional items and one item in the fifth factor, each factor was found to consist of items representing the same coping strategy which was either problem-focused or emotion-focused. Consequently, the items in the first and fourth factors in the factor analysis belonged to problem-focused coping strategies; the items in the second and third factors belonged to emotion-focused coping strategies. According to the factor analysis, items 7 and 5 were grouped in a different category than initially conceptualized and item 2 in the fifth factor was not loaded on any of the subscales. Initial factor loadings are given in Table 1.

Table 1:Initial Factor Loadings of Coping With the New Curriculum Scale.

Item Number	FACTOR				
	1	2	3	4	5
8	0.78				
1	0.76				
7	0.71				
6	0.63				
13		0.86			
12		0.67			
10		0.63			
5		0.53			
4			0.85		
11			0.78		
3				-0.83	
9				0.64	
2					0.89

After psychometric properties of the Coping with the New Curriculum Scale were assessed with the data gathered from 44 elementary school teachers and primary mathematics teachers, item 3 was deleted because its item total correlation value was negative. Considering the result of the factor analysis, item 2 which originally belonged to problem-focused subscale, was deleted because it was not loaded on any of the subscales. The final form of the Coping with the New Curriculum Scale was reached after deleting items 2 and 3. The Cronbach alpha coefficient for the final form of the scale was .697. For the problem-focused and emotion-focused subscales, alpha coefficients were 0.686 and 0.638 respectively.

After deleting item 3 considering reliability analyses and item 2 considering factor analysis, which were conducted with the data gathered from 44 teachers, items of the scale were controlled by an expert in terms of their accuracy and appropriateness for the Turkish language. Small changes were made according to recommendations of the expert. Moreover, after deleting three items, alignments of the items were examined and changed.

In order to assess the psychometric quality of the instrument, another pilot study was conducted with 157 elementary school teachers and math teachers. Twenty forms which had a high number of missing values were extracted from the data. Finally, in order to assess psychometric quality of the instrument, data gathered from 122 teachers were used. The α reliability value for the scale was 0.75, and the item total correlations varied between 0.30 and 0.49 (Appendix J).

A factor analysis was carried out in order to investigate the construct validity of the scale. When exploratory factor analysis was run based on eigenvalues over one and varimax rotation, the scale was found to consist of three factors. When the three factors were examined, apart from one item, each factor was found to consist of items representing the same coping strategy which was either problem-focused or emotion-focused. The items in the second and third factors in the factor analysis belonged to problem-focused coping strategies; the items in the first factor belonged to emotion-focused coping strategies. According to the factor analysis, five observed factors were interpreted as overlapping with the two categories conceptualized while the scale was formed, except only item 5 which was grouped in a different category than initially conceptualized. This was accepted as evidence for construct validity. Factor loadings are given in Table 2.

Table 2: Factor Loadings of Coping With the New Curriculum Scale.

Item Number	FACTOR		
	1	2	3
11	0.79		
8	0.78		
9	0.72		
7	0.70		
10	0.70		
5		0.72	
1		0.69	
6		0.67	
3		0.63	
4			0.76
2			0.75

Considering the results of the factor analysis item 5 was examined again and changed from its initial category. After this change, Coping with the New Curriculum Scale reached its final form. The final form of the scale's alpha reliability value was 0.75.

Problem-focused coping strategy category contained items 1, 2, 3, 4, 5, 6 and emotion-focused coping strategy category contained items 7, 8, 9, 10 and 11. When the reliability analyses was run for each sub-scale separately, alpha reliability value for problem- focused coping sub-scale was 0.76, and the item total correlations varied between 0.41 and 0.59. Alpha reliability value for emotion-focused sub-scale was obtained as 0.80, and the item total correlations varied between 0.53 and 0.61.

Teachers' Efficacy Beliefs for the Implementation of the New Mathematics Curriculum Scale.

The mathematics and elementary school teachers' efficacy beliefs for the implementation of the new curriculum were assessed by Mathematics Teachers Efficacy Beliefs for the Implementation of the New Curriculum Scale. The scale was developed for this study by the researcher.

The scale was composed of 12 items. Participant teachers were asked to respond to how strongly they agreed with each of the statements in the items, which were about efficacy related with teaching mathematics according to the new methods and techniques. All teachers' responses were scored on a five-point Likert-type scale with response options ranging from 1- "totally disagree" to 5- "totally agree." A total score which should vary between 12 and 60 was obtained by adding up the scores from each item. The higher the score, the higher the efficacy beliefs of teachers teaching mathematics according to the new curriculum (Appendix K).

Development of the Teachers' Efficacy Beliefs for the Implementation of the New Mathematics Curriculum Scale

Items of Mathematics Teachers' Efficacy Beliefs for the Implementation of the New Curriculum Scale were developed by using three sources. One of them was sample instruments used in a similar study conducted by McCormick et al. (2006), and the other was the introductory book about new curriculum which was prepared by a commission for the Board of Education (TTKB) (2005), and other source was the information from in-depth interviews conducted with two teachers.

McCormick et al. (2006) conducted research to investigate the relationships among teachers' occupational stress, coping, teacher self-efficacy and relevant teachers' perception of curriculum changes in an educational reform in New South Wales, Australia. In that study, two self-efficacy domains were identified by factor analyses. One of them was technology self-efficacy and other was new teaching self-efficacy. Under the new teaching self-efficacy domain there were six items related to new teaching activities which resulted from the implementation of the new curriculum for example "teach the new topics in the syllabus" and "communicate the outcomes to students." Those six items in new teaching self-efficacy domain (McCormick et al., 2006) were reviewed and studied while developing items of the Implementing New Mathematics Curriculum Anxiety Scale.

In order to present and explain the changes in the curriculum, an introductory book was prepared by the Board of Education (2005). One sub-topic of the book was about the changes in the mathematics curriculum. In that part, new teaching activities which teachers have to use with the new curriculum were explained in detail. This information was used to help generate items for the scale.

Moreover, data collected in the interviews with two teachers were used while developing the scale. Information about teachers' opinions about the new mathematics curriculum, their feelings during implementation of the new curriculum, and their ways of coping with difficulties during the implementation of the new curriculum was gathered through interviews.

In order to assess the psychometric quality of the instrument, a pilot study was conducted with 157 elementary school teachers and math teachers. Four forms which had a high number of missing values were extracted from the data. Finally in order to assess the psychometric quality of the instrument, data gathered from 153

teachers were used. The α reliability value for the scale was 0.96, and the item total correlations varied between 0.56 and 0.79 (Appendix L).

Pressure During the Implementation of the New Curriculum Scale

Parents, administrators, students, colleagues and inspectors are taught to have an influence on teachers. To determine the level of pressure that mathematics and elementary school teachers perceived coming from parents, administrators, colleagues, students and inspectors during the implementation of the new curriculum, Pressure During the Implementation of the New Curriculum Scale was developed for this study.

The scale comprised 8 items. Each item in the scale reflected the pressure that teachers perceived during the implementation of the new mathematics curriculum. Responses were scored on a five-point Likert-scale with response options ranging from 1- “I do not feel any pressure” to 5-“I feel high pressure.” The total score was obtained by adding up the scores from each item. Total scores obtained from the scale should vary between 8 and 40. Higher scores indicate higher pressure perceived by teachers during the implementation of the new mathematics curriculum (Appendix M).

Development of the Pressure During the Implementation of the New Curriculum Scale

Items of Pressure During the Implementation of the New Curriculum Scale were developed by using the information from the in-depth interviews conducted with two teachers. In light of this information, possible sources of pressure on teachers were included in the scale. The pressure was either to implement the program or not to implement the program. Sometimes students (Özerman, 2007) and parents are concerned about a high stakes test that the students take in 8th grade. They want a teacher to teach towards this test. So some items were developed to reflect the pressure from this wish.

In order to assess the psychometric properties of the instrument, a pilot study was conducted with 44 elementary school teachers and math teachers. The alpha reliability value for the scale was 0.87. The item total correlations varied between 0.35 and 0.77 (Appendix N).

In order to assess the psychometric quality of the instrument, another pilot study was conducted with 157 elementary school teachers and mathematics teachers. Twenty-one forms which had a large number of missing values were extracted from the data. Finally, in order to assess psychometric quality of the instrument, data gathered from 146 teachers were used. The α reliability value for the scale was 0.89, and the item total correlations varied between 0.34 and 0.78 (Appendix O).

Readiness to Implement the New Curriculum Scale

Readiness of the mathematics and elementary school teachers for implementing the new curriculum was assessed by using Readiness to Implement the New Curriculum Scale.

In this scale teachers' level of perceived knowledge of constructivism, perceived knowledge of mathematics as a subject, perceived knowledge about implementation of the new curriculum and the level of effectiveness of in-service training perceived by teachers were measured by asking one question for each perception.

The scale included 4 items. For knowledge-focused questions, the participant teachers rated items on a 5-point Likert scale that ranges between 1= "I feel I have inadequate knowledge" to 5= "I know well." For effectiveness of the in-service training-focused questions participant teachers were asked to rate items on a 5-point Likert scale that ranges between 1= "Insufficient" to 5= "Very sufficient." "I did not get in in-service training" was also an option for teachers who had not attended any in-service training about implementation of the new curriculum. The total score was obtained by adding up the scores from each item. The maximum score was therefore 20 and the minimum was 3. High scores indicated that teachers felt ready to implement the new curriculum (Appendix P).

Development of the Readiness to Implement the New Curriculum Scale

Items of readiness to Implement the New Curriculum Scale were developed by using the information from the interviews conducted with two teachers as a source.

In order to assess the psychometric quality of the instrument, a pilot study was conducted with 157 elementary school teachers and math teachers. Five forms which had a large number of missing values were extracted from the sample. Finally, in order to assess the psychometric quality of the instrument, data gathered from 133 teachers were used. The alpha reliability value for the scale was 0.72, and the item total correlations varied between 0.27 and 0.60 (Appendix Q).

Appraisal of Implementation of the New Curriculum Scale

How teachers perceive the implementation of the new curriculum was measured by Appraisal of Implementation of the New Curriculum Scale.

The scale comprised 5 items. Each item in the instrument included a statement about the implementation of the new curriculum. These statements reflect the teachers' appraisals of the implementation of the new curriculum. Responses were scored on a Likert-type scale ranging from 1-“I don't agree” to 5- “I agree.” There were 3 reverse items in the scale. A total score was obtained by adding up the scores from each item after reversing the score obtained from reverse items. Scores ranged between 5 and 25. For an individual teacher, a higher score indicated that s/he perceived the implementation of the new curriculum as a challenge. Moderate scores indicated that s/he perceived implementation of the new curriculum with

indifference. Lower scores indicated that s/he perceived the implementation of the new curriculum as a threat (Appendix R).

Development of the Appraisal of Implementation of the New Curriculum Scale.

Appraisal of Implementation of the New Curriculum Scale was prepared to evaluate the mathematics and elementary school teachers' perceptions of the implementation of the new mathematics curriculum based on Zeidner's model of test anxiety (1998). According to Zeidner's model, evaluative situations that are personally relevant or meaningful to the individual can be appraised as threat, challenge, or indifference (1998). Since implementation of the new curriculum was an evaluative situation which is relevant and meaningful to the teachers, items of the Appraisal of Implementation of the New Curriculum Scale were formed in order to learn if teachers perceive implementation of the new curriculum as a threat, challenge or indifference.

After the items of the Appraisal of Implementation of the New Curriculum Scale were developed, items of the scale were controlled by an expert in terms of their accuracy and appropriateness for Turkish Language.

Then in order to assess the psychometric quality of the instrument, a pilot study was conducted with 157 elementary school teachers and math teachers. Two forms which had a large number of missing values were extracted from the sample. Finally, in order to assess the psychometric quality of the instrument, data gathered from 149 teachers were used. The α reliability value for the scale was 0.56, and the item total correlations varied between 0.18 and 0.53 (Appendix S).

Perceived Resources During the Implementation of the New Curriculum Scale

Perceived resources of mathematics and elementary school teachers during the implementation of the new curriculum was assessed by using Perceived Resources During the Implementation of the New Curriculum Scale

In this scale, the average number of students present in a teacher's classroom, education level of the students' families, economic level of the students' families and adequacy of the school for maintaining materials that teachers were needed were assessed by asking one question for each category.

The item related to the average number of students in the classroom presented the options "below 15," "15-25," "25-35," "35-45," and "over 45." For the item related to the educational level of families, participant teachers selected from "low educational level," "primary school level," "secondary school level," and "high educational level". For the item related to economic level of families they selected from options between "low" and "high economic levels." For the item related to adequacy of the school for maintaining materials that they need, they selected from options between "Insufficient" to "Very sufficient." Total scores of participant teachers were obtained by adding up the scores from each item after reversing the score from the item about the average number of students in the classroom. Total scores obtained from the scale varied between 4 and 18. High scores indicated higher teacher's perception of available resources during the implementation of the new curriculum (Appendix T).

Development of the Perceived Resources During the Implementation of the New Curriculum Scale

After the items of the Perceived Resources During the Implementation of the New Curriculum Scale were developed, items of the scale were controlled by an expert in terms of their accuracy and appropriateness for the Turkish language. Small changes were made according to the recommendation of the expert.

Then in order to assess the psychometric quality of the instrument, a pilot study was conducted with 157 elementary school teachers and math teachers. Two forms which had a large number of missing values were extracted from the data. Finally in order to assess the psychometric quality of the instrument, data gathered from 155 teachers were used. The α reliability value for the scale was 0.69, and the item total correlations varied between 0.61 and 0.70, except item 1 which had a value of 0.05 (Appendix U).

Procedure

First, a demographic information form and the other instruments needed in this study were developed. Before generating items for the instruments, in-depth interviews were conducted with two math teachers. After the items were developed, the instruments were administered to 44 elementary school teachers and mathematics teachers. Resulting data were used for feedback to improve the instruments. Then, considering the results of the psychometric analyses, problematic items were studied, changed or removed. As a next step, items of the scales were checked by an expert in terms of their accuracy and appropriateness for the Turkish language. Then a pilot

study was conducted with 157 elementary teachers and mathematics teachers from Kütahya ,Keşan and Istanbul to evaluate the psychometric quality of the instruments.

After the instruments were developed, appropriateness' to Turkish language was controlled and psychometric qualities' were evaluated, permission to conduct the study in schools was requested from the Ministry of Education, and from principals of private schools, as appropriate.

After approval was received, Implementing New Mathematics Curriculum Anxiety Scale, Attitude Towards the New Curriculum Scale, Teaching Mathematics Self-efficacy in the Implementation of the New Curriculum Scale, Coping With the New Curriculum Scale, Teachers' Appraisal of Implementation of the New Curriculum Scale, Readiness to Implement the New Curriculum Scale, Pressure During the Implementation of the New Curriculum Scale, Perceived Resources During the Implementation of the New Curriculum Scale were given to teachers.

Responses were kept completely anonymous to protect the identities of the teachers, and the schools involved in the study. Teachers were asked to return the questionnaires to the principle or secretary of their schools. After the completed questionnaires were collected, they were coded and entered into SPSS version 16.

In order to test a hypothesized model of teachers' stress during the implementation of the new curriculum, the data were analyzed using AMOS version 16 (Analyses of Moment Structures) a structural equation modeling program.

Statistical Analyses

The modeling analysis of the study was conducted by AMOS version 16 a software package designed for structural equation modeling. Structural equation modeling is

not a single statistical technique. Since it is aimed to provide estimates of the magnitude and significance of hypothesized casual connections between sets of variables, structural equation modeling can be viewed as a straightforward extension of multiple regression. But according to Elitharp (2005), it goes beyond the multiple regression goal of determining the multiple correlations (R) between predictor variables and a criterion variable along with the corresponding regression coefficients based on data from a sample.

In structural equation modeling independent variables which are not influenced by another variable are called exogenous variables. Dependent variables which are influenced by another variable called are endogenous variable. There are also mediating variables, which are both dependent and independent variables and mediate the relationship between one variable to another (Byrne, 2001).

Through structural equation modeling the hypothesized model representing the relationships among all the variables can be tested by checking how well the data from a particular sample fits that model. Therefore, it is regarded as confirmatory technique. However, if the data are not consistent with the model, the model is modified and tested again with the same data. This is regarded as exploratory analyses. Moreover, SEM allows the researcher to specify and examine relationships among the independent variables to determine both the direct and indirect effects on the dependent variables (Elitharp, 2005).

The degree of relation between two variables in the model is indicated by a path coefficient which can be expressed in standardized form or unstandardized form. Path coefficients are shown by (β) with subscripts where the first subscript is the dependent variable and second subscript is the variable which was influenced by that variable.

CHAPTER 4

RESULTS

The aim of this study was to explain teachers' stress during the implementation of the new mathematics curriculum using a framework based mainly on a model of test anxiety (Zeidner, 1998). The variables of this study were efficacy beliefs for the implementation of the new mathematics curriculum; readiness to implement the new curriculum; perceived resources required for the implementation of the new curriculum; stress related with the implementation of the new mathematics curriculum; coping strategies; appraisal; perceived pressure, and attitude toward the new curriculum. The variables were measured by using eight different instruments.

In this part of the study, firstly, demographical data of the sample is presented. Secondly, the distributions of the scores obtained on all variables are presented. Then the correlation coefficients between the variables are calculated. After the descriptive statistics, histograms and correlation coefficients, the results for testing of the hypothesized model through structural equation modeling are presented

Descriptive Statistics

Demographical Data of the Teachers

The sample for the development of the instruments consisted of 44 elementary school teachers and math teachers from Istanbul. Of these teachers, 97.7% were female and 2.3% were male; 68.2 % were elementary school teachers; and 31.8% were mathematics teachers; 72.7% taught in public schools; and 27.3% taught in

private schools. The mean professional experience of teachers was 14 years (standard deviation: 7 years, Min: 1, Max: 35).

The sample for the assessment of the psychometric qualities of the instruments consisted of 157 elementary school teachers and math teachers from Kütahya, Keşan and Istanbul. Of these, 59.6% were female; 40.4% were male; 82.5 % were elementary school teachers; and 17.5% were mathematics teachers; 81.3 % taught in public schools and 18.7 % taught in private schools. The mean professional experience of teachers was 17 years. (standard deviation: 10 years, Min: 1, Max: 41).

The sample of the main study consisted of 395 elementary school and math teachers from 32 primary schools in Istanbul. Of these, 68.6 % were female and 31.4% were male; 80.1 % were elementary school teachers; and 19.9% were mathematics teachers; 71.3 % taught in public schools and 28.7 % taught in private schools. The mean professional experience of teachers was 17 years with a standard deviation of 10 years. Demographical data of teachers are given in Table 3.

Table 3: Demographical Data of Teachers

	Instruments Development Sample		Pilot Study		Main Study	
	n	%	n	%	N	%
Gender						
Female	43	97.7	93	59.6	269	68.6
Male	1	2.3	63	40.4	123	31.4
Subject Taught						
Elementary school	30	68.2	127	82.5	313	80.1
Primary school math	14	31.8	27	17.5	78	19.9
Type of the school						
Public School	32	72.7	126	81.3	281	71.3
Private School	12	27.3	29	18.7	113	28.7
Teaching Experience						
1-10 years	18	41.7	43	29.3	115	30.5
11-20 years	19	44.3	52	35.4	129	34.4
21-30 years	5	11.6	38	25.9	82	21.7
31-41 years	1	2.3	14	9.7	50	13.5

Distributions of the scores obtained on all variables

In this part means, standard deviations and range of the scores from the scales used to measure the variables are presented. In order to crystallize the observation of the distribution, histograms were used. Descriptive statistics are presented in Table 4.

Table 4: Descriptive Statistics

	N	Possible Range	Mean	Standard Deviation
PERSONAL VARIABLES				
Readiness Score	395	3-20	13.61	3.21
Efficacy Score	395	12-60	47	9.10
SITUATIONAL VARIABLE				
Resources Score	395	4-18	11.49	3.53
APPRAISAL				
Appraisal Score	395	5-25	17.4	4.05
OUTSIDE PRESSURE				
Perceived pressure Score	395	8-40	18.06	7.21
STRESS				
Anxiety Related to New Curriculum Score	395	22-88	47.67	11.60
COPING				
Coping Strategy 1: Problem-focused	395	6-24	17.79	3.50
Coping Strategy 2: Emotion-focused	395	5-20	8.90	3.03
OUTCOME				
Attitude Toward the New Curriculum Score	395	28-140	91.03	19.32

Research Question 1: What were the levels of readiness of teachers to implement the new curriculum?

Readiness which was a personal variable was operationalized as scores on the Readiness to Implement the New Curriculum Scale. The range of possible scores obtained from the scale was between 3 and 20. Scale midpoint for this score was 12. The mean score was 13.61 with a standard deviation of 3.21. This value was slightly

higher than the scale midpoint for this measure. This indicated that, on average, the teachers in the sample reported that they felt ready to implement the new curriculum.

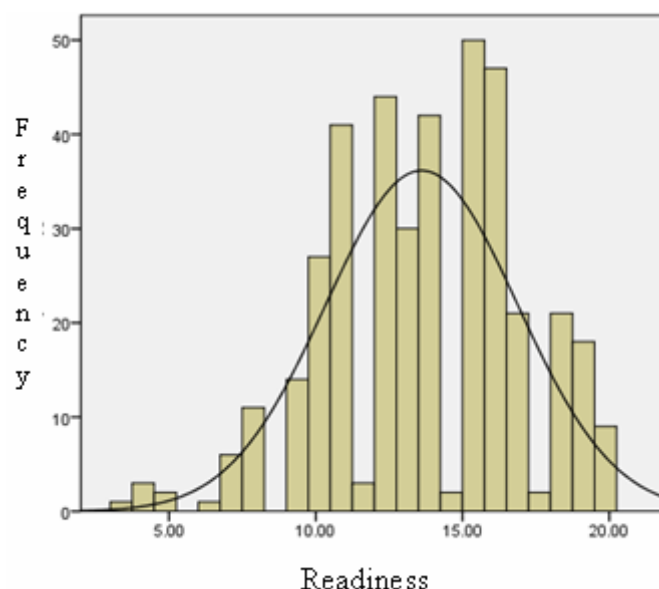


Fig. 1: Histogram of readiness

Frequencies indicated that scores were distributed almost normally (Figure 1). Among the teachers 18 % had a score higher than 17, which indicated that they felt strongly ready or ready to implement the new curriculum; 10 % had a score below 10 which indicated that they did not feel ready and remainder of 72 % felt moderately ready.

In addition to the overall readiness scores of teachers, response frequencies to each item in the scale were examined to get detailed information about the teachers' perceived knowledge of constructivism, perceived knowledge of mathematics as a subject, perceived knowledge about implementation of the new curriculum and perceived effectiveness of in-service training.

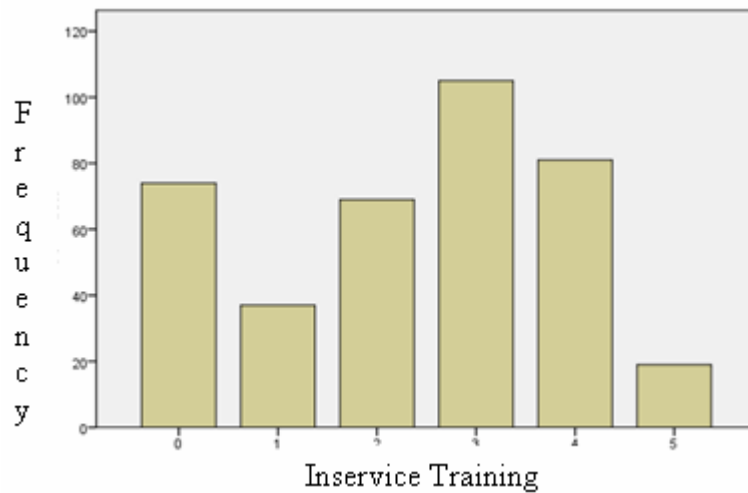


Fig. 2: Histogram of inservice training

In the readiness scale, for effectiveness of the in-service training-focused questions participant teachers were asked to rate items on a 5-point Likert scale that ranges between 1= “Insufficient” to 5= “Very sufficient.” There was also “I did not attend any in-service training” option, which was scored 0. Responses indicated that %19.2 of the teachers did not get in-service training during the implementation of the new curriculum. Scores related to perceived effectiveness of training were distributed normally (Figure 2). In other words, most of the teachers who received training thought that it was effective or very effective. However, there were also teachers who taught that it ineffective or very ineffective.

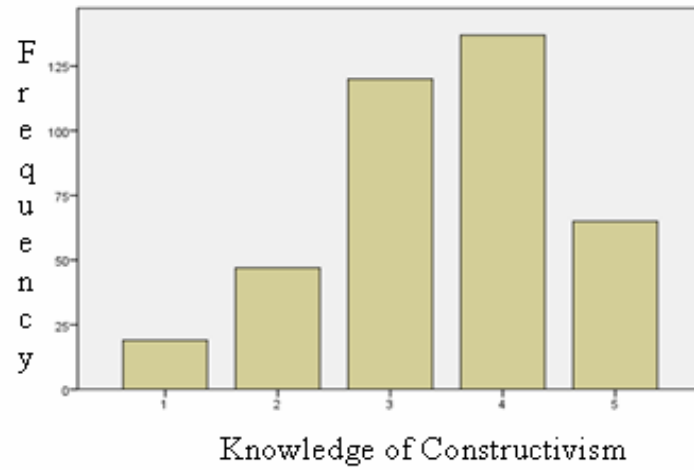


Fig. 3: Histogram of knowledge of constructivism

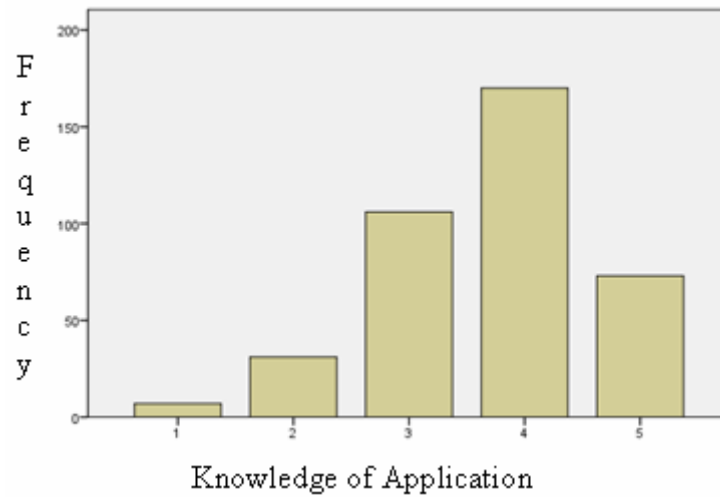


Fig. 4: Histogram of of knowledge of application

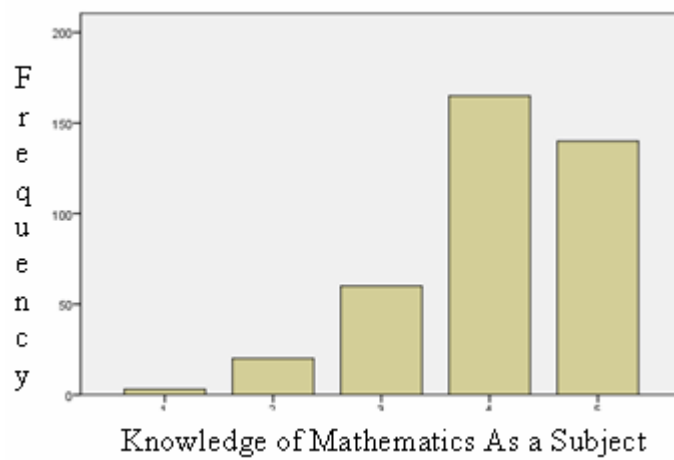


Fig. 5: Histogram of knowledge of mathematics as a subjects

For knowledge-focused questions, the participant teachers rated items on a 5-point Likert scale that ranged between 1= “I feel I have inadequate knowledge” to 5= “I know well.” Results indicated that teachers’ perceived knowledge of mathematics is very high (mean= 4.08), higher than their perceived knowledge of constructivism (mean= 3.47) and their perceived knowledge of about implementing the new curriculum (mean=3.70).

Research Question 2: What were the teachers’ efficacy beliefs for the implementation of the new mathematics curriculum?

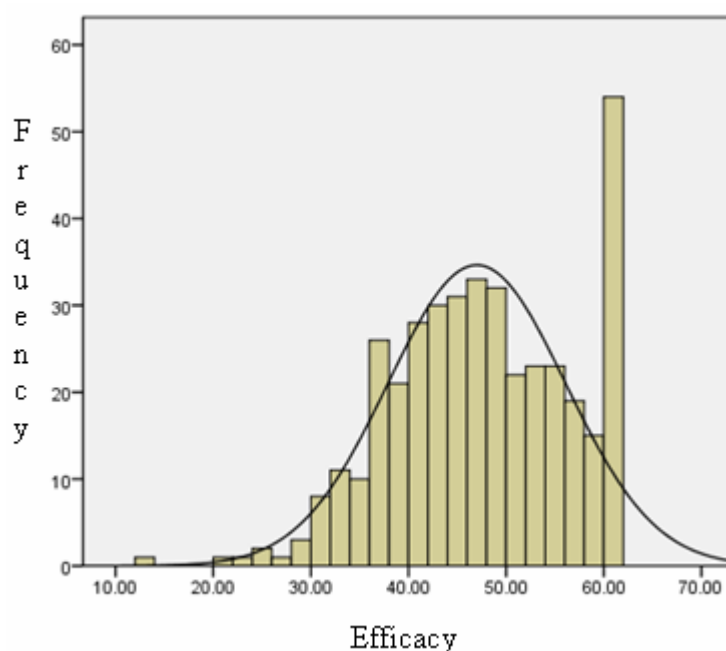


Fig. 6: Histogram of efficacy

The efficacy variable, another personal variable, was operationalized as a score obtained from the Teaching Mathematics Self-efficacy in the Implementation of the New Curriculum Scale. Higher scores indicated higher efficacy beliefs about teaching mathematics according to the new methods in the new curriculum. The teachers could get scores between 12 and 60. The mean score was 47 with a standard deviation 9.10. The mode, on the other hand, was 60. This result indicated that most

teachers had high levels of efficacy beliefs about teaching mathematics according to the new curriculum.

Research Question 3- How did the teachers perceive the resources during the implementation of the new curriculum?

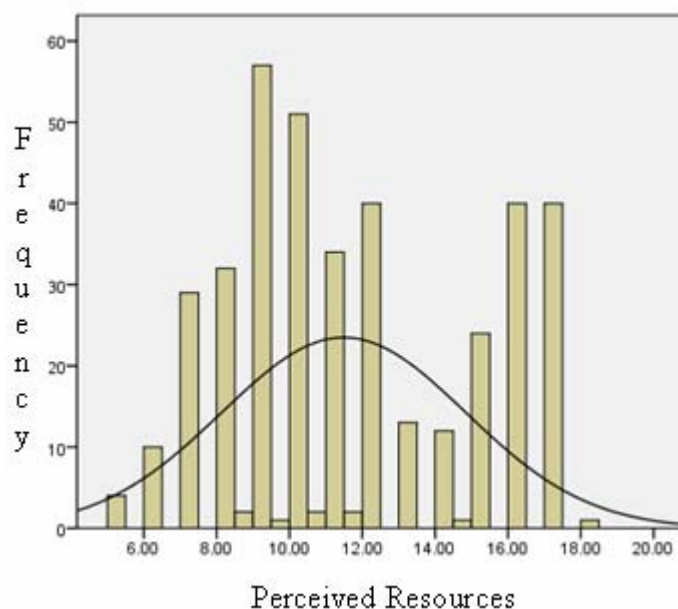


Fig. 7: Histogram of perceived resources

For the situational variable, teachers' perceptions of the adequacy of resources were measured. Higher scores indicated a higher appraisal of resources perceived by teachers during the implementation of the new curriculum. Scores obtained from the scale could range between 4 and 18. The mean score was 11.49 with a standard deviation of 3.53. These results indicated that teachers had a moderate appraisal of the adequacy of implementation of the new curriculum.

Research Question 4- What were the teachers' appraisals of the implementation of the new curriculum? Was it threat, challenge or indifference?

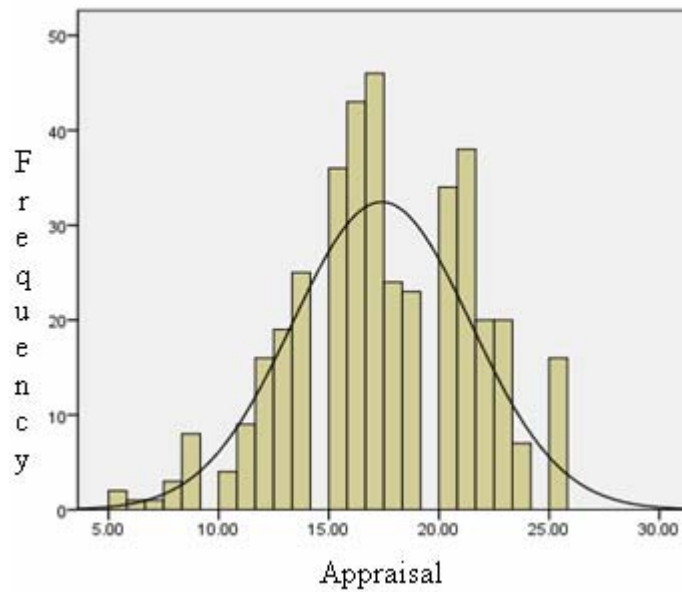


Fig. 8: Histogram of appraisal

How teachers perceive the implementation of the new curriculum was measured by the Appraisal of Implementation of the New Curriculum Scale. Appraisal scores for teachers could range between 5 and 25. The mean score of teachers was 11.40 with a standard deviation of 5.53. Scores of the Appraisal of the Implementation of the New Curriculum Scale were distributed almost normally (Figure 8). Therefore, it can be said that most teachers perceived the implementation of the new curriculum with indifference. There were also some teachers who perceived the implementation of the new curriculum as a challenge or a threat.

Research question 5- What was the level of pressure perceived by teachers during the implementation of the new curriculum?

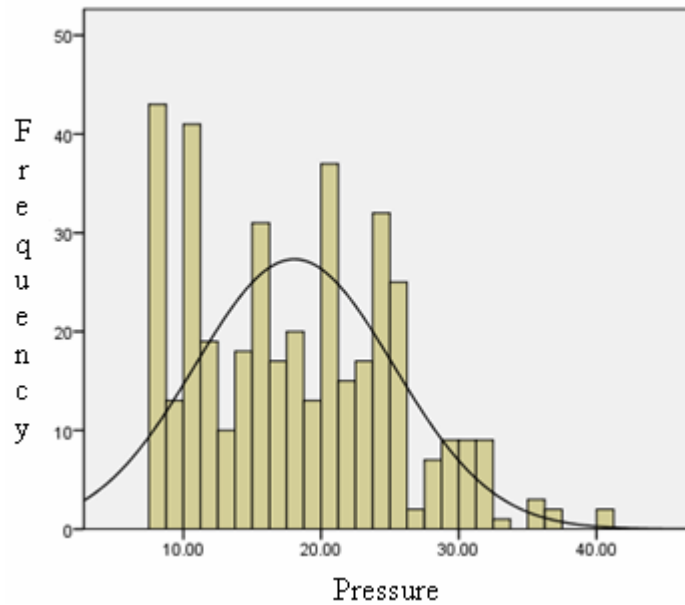


Fig. 9: Histogram of pressure

Pressure perceived by teachers during the implementation of the new curriculum was measured by Pressure During the Implementation of the New Curriculum Scale .Scores could range between 8-40. Teachers' mean score was 18.06 with a standard deviation of 7.21. A positively skewed distribution, suggests that teachers did not perceive much pressure during the implementation of the new curriculum (Figure 9).

In addition to overall pressure scores of teachers, response frequencies to each item in the scale were examined to get detailed information about the level of pressure that teachers perceived coming from parents, administrators, colleagues, students and inspectors during the implementation of the new curriculum,

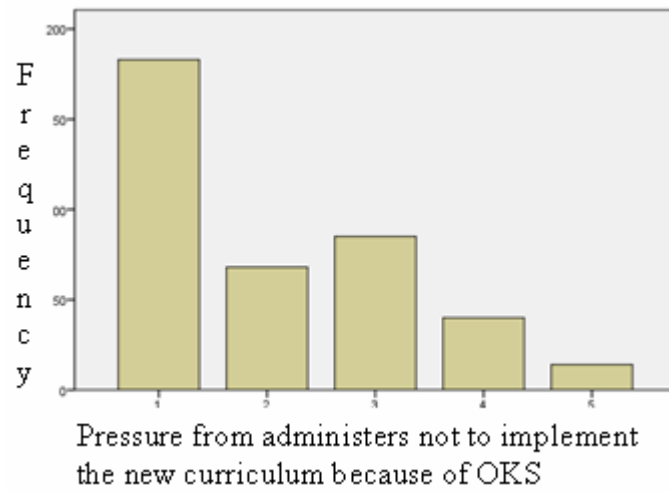


Fig. 10: Histogram of pressure from administrators not to implement the new curriculum

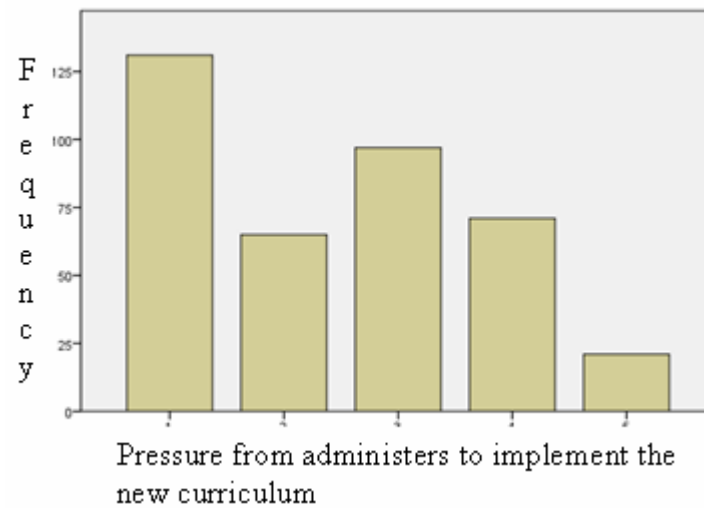


Fig. 11: Histogram of pressure from administrators to implement the new curriculum

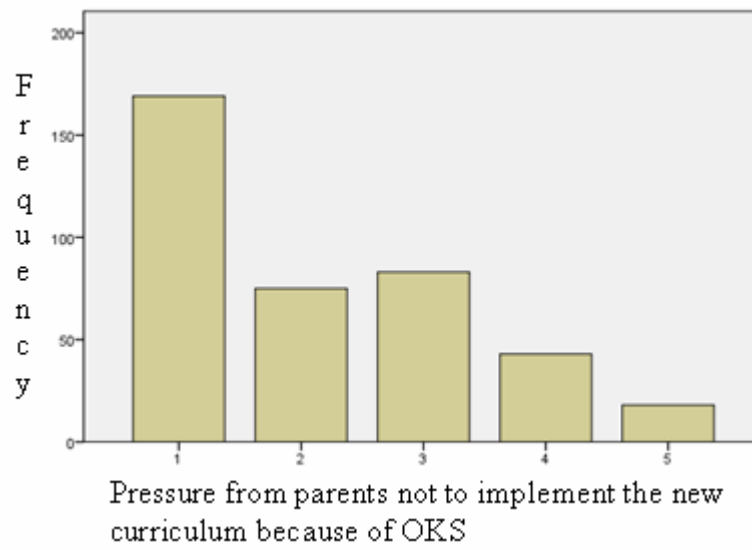


Fig. 12: Histogram of pressure from parents not to implement the new curriculum

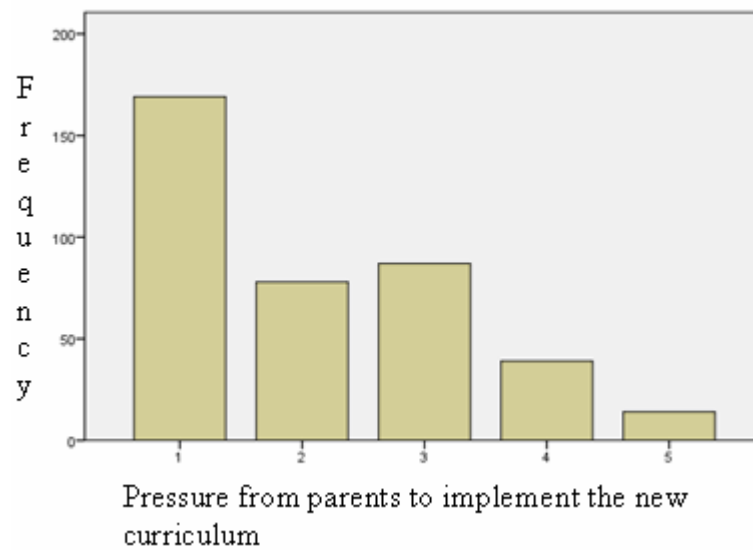


Fig. 13: Histogram of pressure from parents to implement the new curriculum

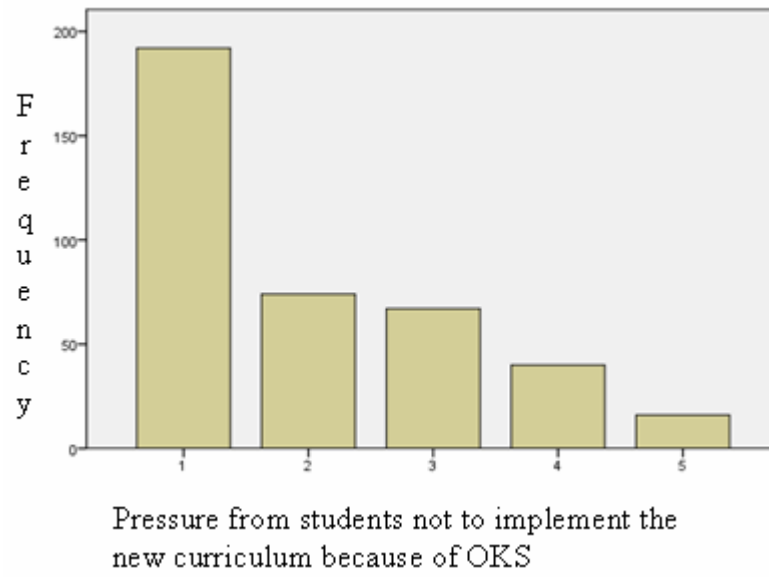


Fig. 14: Histogram of pressure from students not to implement the new curriculum

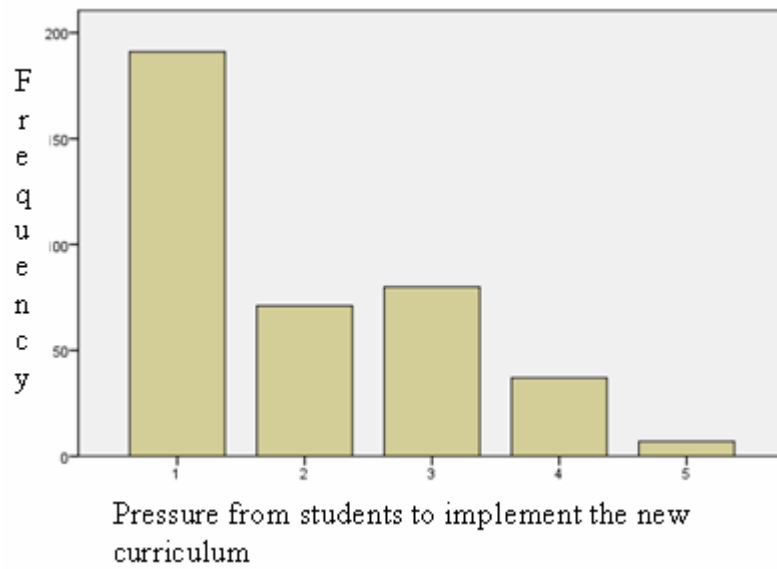


Fig. 15: Histogram of pressure from students to implement the new curriculum

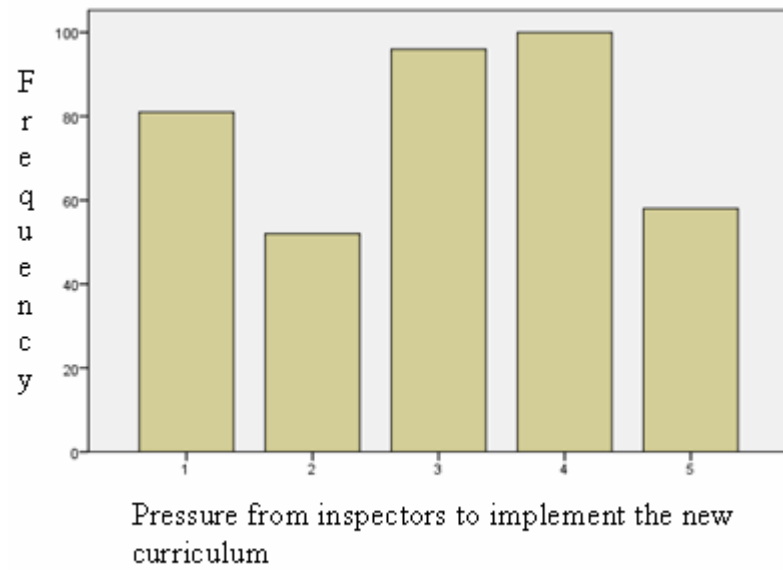


Fig. 16: Histogram of pressure from students to implement the new curriculum

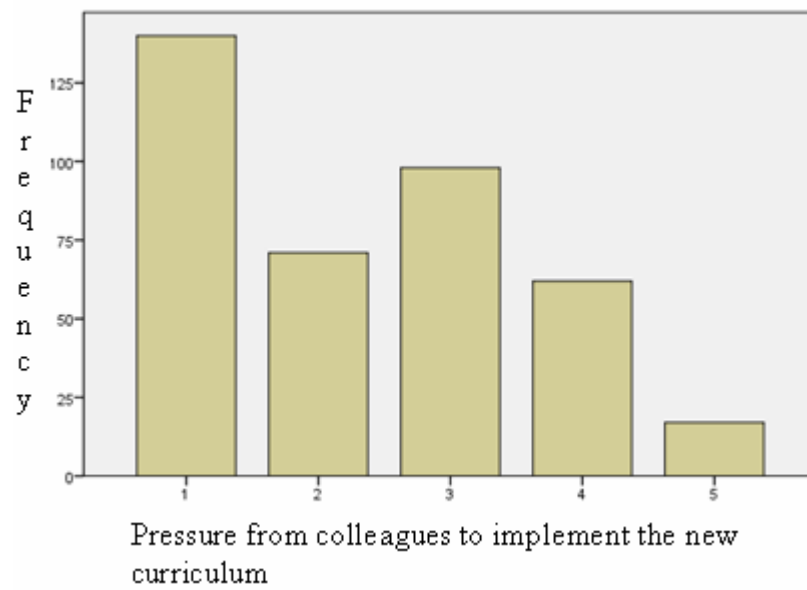


Fig. 17: Histogram of pressure from colleagues to implement the new curriculum

In the Pressure During the Implementation of the New Curriculum Scale responses were scored on a five-point Likert-scale with response options ranging from 1- "I do not feel any pressure" to 5-"I feel high pressure." Mean scores of the items for perceived pressure from administrators, students, parents, inspectors and colleagues to implement the new curriculum was 2.44, 2.10, 1.96, 3.01 and 2.34 respectively. Mean scores of items for perceived pressure from administrators, students and parents *not* to implement the new curriculum because of OKS which is a high stakes exam for 8th grade students, were 2.06, 2.14 and 2.01 respectively. In the light of these results one can say that, although teachers perceived a moderate level of pressure, they perceived more pressure from the inspectors, their colleagues and their principals to implement the new curriculum than from parents and students, *not* to implement it.

Research question 6- What were the teachers' levels of stress during the implementation of the new curriculum?

Stress was the main variable of focus in this study. Teachers' stress was operationalized as scores on the anxiety scale. To measure the anxiety level of teachers, Implementing New Mathematics Curriculum Anxiety Scale was used.

The range of possible scores obtained from the scale was between 22 and 88. Higher scores on the scale indicated that teachers experienced high levels of anxiety. The midpoint score was 55. The sample mean for anxiety during the implementation of the new curriculum was 47.67 with a standard deviation of 11.60.

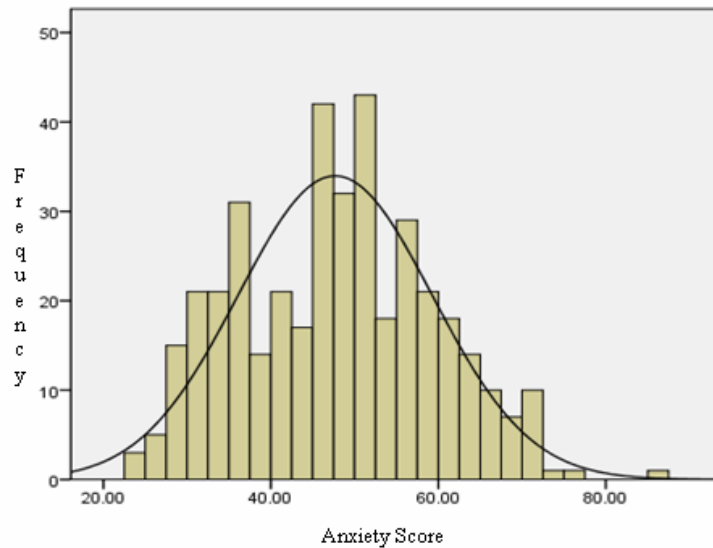


Fig. 18: Histogram of anxiety.

The anxiety scores of teachers were distributed almost normally (Figure 18). This result indicated that, on average, teachers experienced a moderate level of anxiety during the implementation of the new curriculum. Approximately 22 % of the teachers reported that they never or occasionally experienced anxiety; 16 % of the teachers reported that they experienced anxiety or high levels of anxiety; and 38 % of teachers experienced moderate level of anxiety during the implementation of the new curriculum.

Research question 7- What coping strategies did the teachers use when they faced the problems caused by the implementation of the new curriculum?

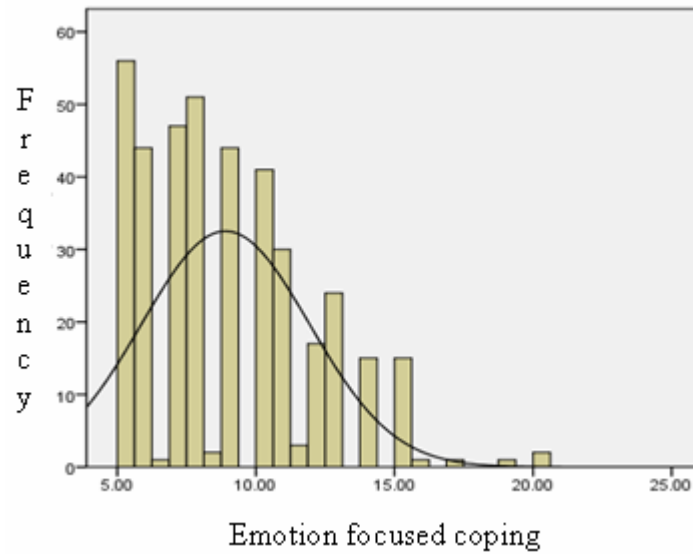


Fig. 19: Histogram of emotion-focused coping

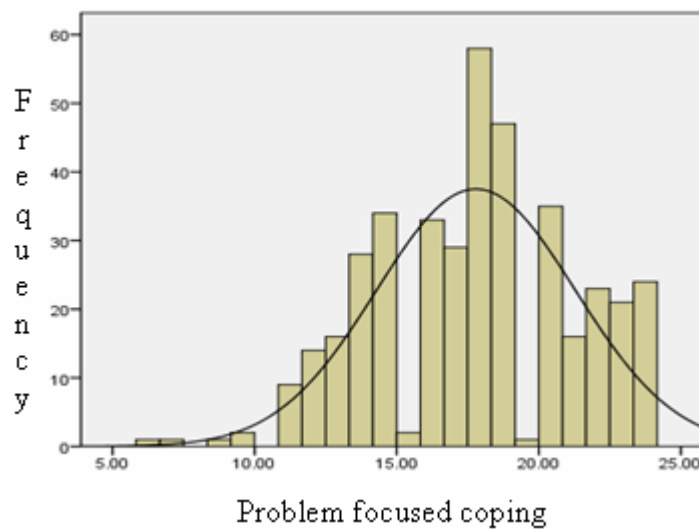


Fig. 20: Histogram of problem-focused coping

Two coping strategies were defined in the study. These were emotion-focused coping and problem-focused coping. Teachers could get scores between 6 and 24 for the problem-focused coping strategy and 5 and 20 for the emotion-focused coping strategies. For the problem-focused and emotion-focused strategies, the mean

score were 17.79 and 8.90 with 3.50 and 3.03 standard deviations respectively. Distributions of the scores indicated that most of the teachers preferred to use problem-focused coping strategies rather than emotion-focused coping strategies to cope with problems related to the implementation of the new curriculum ().

Research Question 8. What were the teachers' attitudes towards the new curriculum?

Teachers' attitudes were operationalized as the scores on the Attitude towards the New Curriculum Scale. The scores ranged between 28 and 140. Higher scores indicated more positive attitudes towards the new curriculum. The midpoint for this score was 84. Teachers' scores on the Attitudes towards the New Curriculum Scale had a mean of 91.3 with a standard deviation of 19.32.

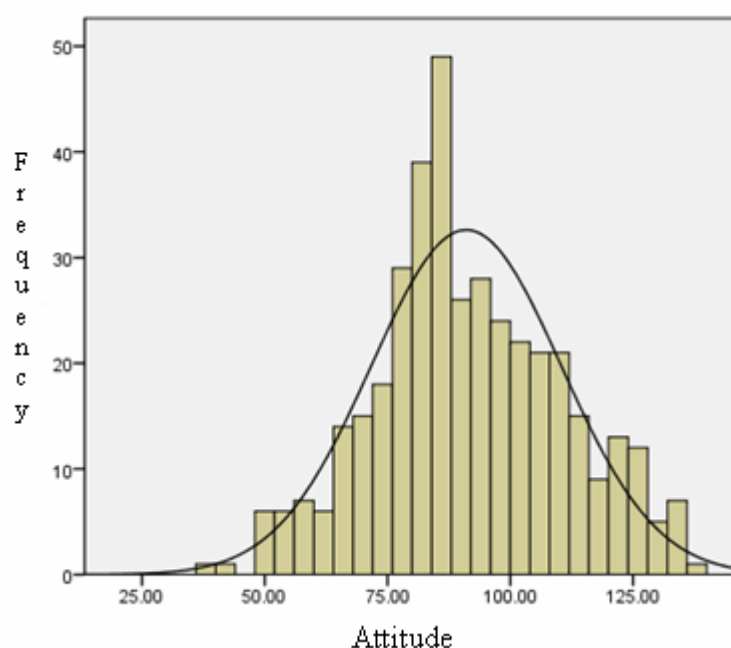


Fig. 21: Histogram of attitude.

Scores were distributed almost normally; 14 % of the teachers had scores below 72 which indicated that they had strongly positive or positive attitudes towards

the new curriculum; 18 % of teachers had scores higher than 110, which was indicated that they had negative and strongly negative attitudes towards the new curriculum; 68 % of teachers had scores higher than 72 and lower than 110, which indicated that they had a moderate attitudes towards the new curriculum (Figure 21).

Correlation Analyses

In this part of the research, the relationships between the variables, related to teachers' stress during the implementation of the new curriculum, were focused on. In order to see these relationships, the correlation coefficients between the variables were calculated and they are shown in Table 5.

Table 5: Correlational Analyses

	Attitude	Anxiety	Appraisal	Readiness	Resources	Efficacy	Emotion Focused Coping	Problem Focused Coping	Pressure
Attitude	1	-.629**	.614**	.398**	.315**	.472**	-.231**	.188**	-0.035
Anxiety		1	-.567**	-.522**	-.357**	-.599**	.329**	-.248**	.110*
Appraisal			1	.371**	.345**	.379**	-.249**	.199**	-0.09
Readiness				1	.429**	.534**	-.149**	.360**	.112*
Resources					1	.424**	-.181**	.183**	.178**
Efficacy						1	-.179**	.403**	0.02
Emotion-focused Coping							1	0.046	.140**
Problem-focused Coping								1	.138**
Pressure									1

It is important to keep in mind that these correlation findings only describe associations and not causal relationships between variables. To investigate model fit, structural equation modeling was used and the results are given in the next section.

In this section, firstly, the relationship between stress, as operationalized by anxiety, and other variables is presented. Then, the relationship between attitude, which is the outcome variable, and other variables is presented.

Teachers' anxiety levels during the implementation of the new curriculum were related significantly to all other variables that were investigated. For the relationship between teacher stress and readiness, a personal variable, the correlation coefficient was found to be $r = -.52$ ($p < .01$). Teaching efficacy beliefs for the implementation of the new mathematics curriculum, the other personal variable, was also highly correlated to anxiety in the implementation of the new curriculum ($r = -.60$, $p < .01$). This result indicated that as readiness and teaching efficacy beliefs increased, teacher stress during the implementation of the new curriculum decreased.

The correlation coefficient between teachers' anxiety levels and appraisal scores was negative ($r = -.57$, $p < .01$). This result showed that teachers who perceived the implementation of the new curriculum as a challenge had low levels of anxiety during the implementation. For the relationship between perceived pressure and anxiety levels, the correlation coefficient was found to be low but significant ($r = .11$, $p < .05$). This result indicated that teachers who perceived more pressure to implement the new curriculum had low levels of anxiety during the implementation. Finally, the relationship between teachers' anxiety levels and coping was calculated. Both coping strategies, namely problem-focused coping and emotion-focused coping were

significantly related to teacher stress during the implementation of the new curriculum ($r = -.25$ and $r = .33$ respectively for $p < .01$). These findings indicated that teachers who used problem-focused coping strategies had high levels of anxiety and teachers who used emotion-focused coping strategies had low levels of anxiety during the implementation of the new curriculum.

After the relationship between teachers' stress and other variables was revealed, the relationship between the outcome variable, attitude towards the new curriculum, and other variables was investigated. Attitudes towards the new curriculum were related significantly to all other variables that were investigated during the implementation, except the pressure perceived by teachers.

For the relationship between attitude towards the new curriculum and readiness, one of the personal variables, the correlation coefficient was found to be $r = .40$ ($p < .01$). The variable of teaching efficacy beliefs related to the implementation, which was the other personal variable, was also found to be related to attitude towards the new curriculum ($r = .47$, $p < .01$).

The correlation coefficient between the scores for attitude towards the new curriculum and the score for appraisal of the implementation was $r = .61$, ($p < .01$). The variable of perceived pressure was not significantly related with attitudes towards the new curriculum.

For the relationship between attitude towards the new curriculum and coping, both problem-focused coping and emotion-focused strategies were significantly related to attitude towards the new curriculum ($r = .10$ and $r = -.23$ respectively for $p < .01$). These findings indicated that teachers who used problem-focused coping strategies had more positive attitudes towards the new curriculum

and teachers who used emotion-focused coping strategies had more negative attitudes towards the new curriculum.

Lastly, the relationship between teachers' anxiety and attitude towards the new curriculum was calculated. The correlation coefficient between teachers' anxiety during the implementation and teachers' attitude towards the new curriculum was $r = -.63$ ($p < .01$). This result indicated that as teachers' stress increased, their attitudes towards the new curriculum became more negative.

Model Testing

Research Question 9: How did empirical findings fit the theoretical model of teachers' stress during the implementation of the new curriculum?

The hypothesized model of teachers' stress during the implementation of the new curriculum included relationships between readiness, efficacy, perceived resources, appraisal, perceived pressure, anxiety, coping and attitude. Data from a sample of elementary school teachers and mathematics teachers in Istanbul were analyzed for the purpose of evaluating the hypothesized model, which mostly based on a test anxiety model (Zeidner, 1998). It was thought that similar to a testing situation for students, teaching a new curriculum with new teaching methods would pose evaluative situations for teachers.

The hypothesized model to explain the teachers' stress is given in Figure 22. According to the model, relationships among the various components of the model are viewed to be dynamic and continuous. In this model, teachers were thought not

only to react to the implementation of the new curriculum but also have an effect on the implementation.

In the model, teachers' personal variables, readiness and efficacy, and the situational variable of perceived resources precede teachers' appraisal of the implementation as a challenge, threat or indifference, and their appraisal precedes anxiety. According to the model, perceived pressure may have a direct relation to anxiety. Coping is hypothesized to be a mediator variable between anxiety and the outcome, which is measured as attitude towards the new curriculum. To investigate the research question, a hypothesized model which was expected to explain teachers' stress during the implementation of the new curriculum was tested through structural equation modeling.

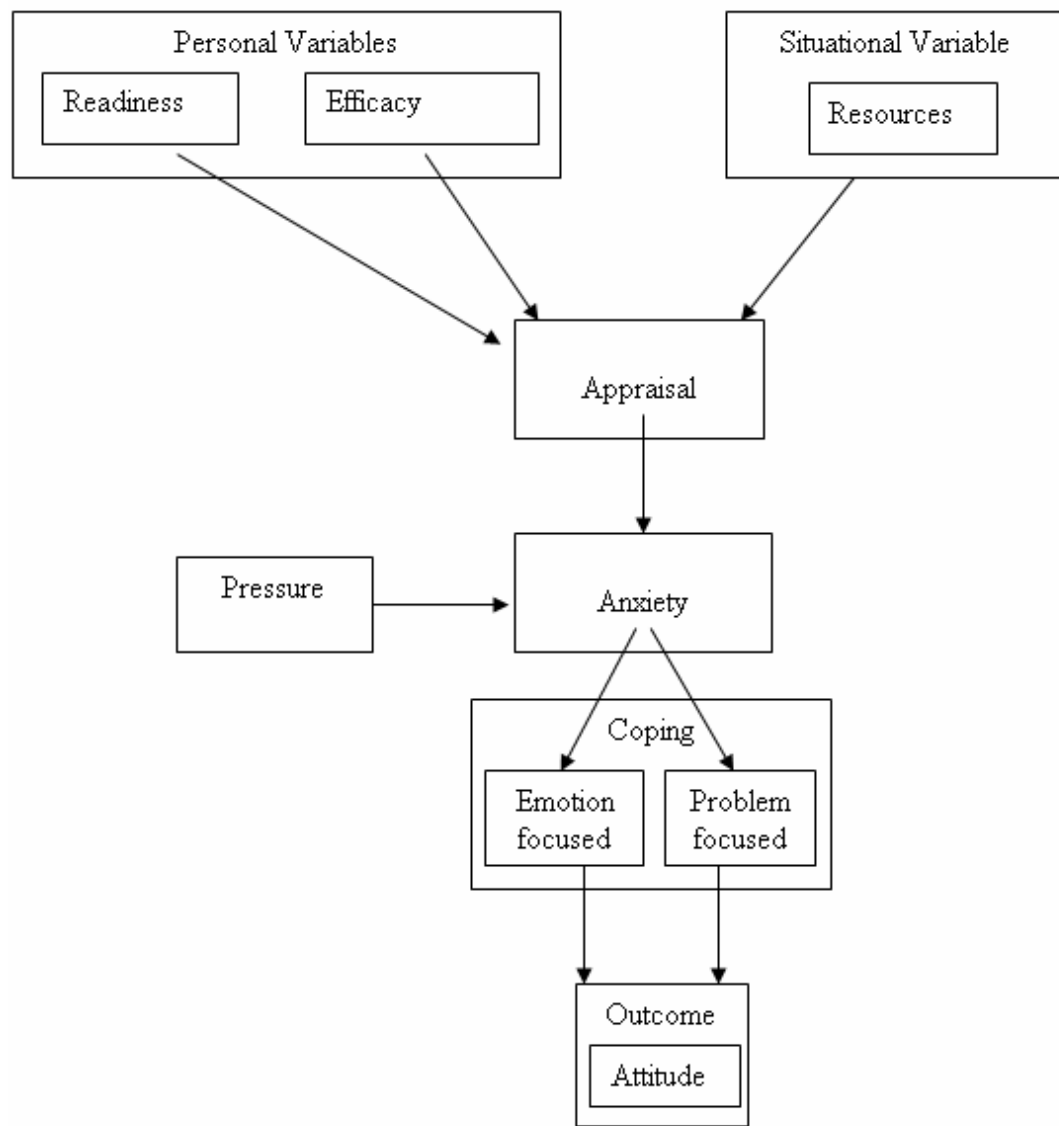


Fig. 22: The hypothesized model of teachers stress during the implementation of the new curriculum

According to Pedhazur (1982, as cited in Elitharp, 2005) explanations of causes do not come from structural equation modeling, they come from the theory which the model is based on. If the theory represented by the model is confirmed, that provides additional evidence for the causal relationships hypothesized by the theory. If the theory represented by the model is not confirmed, this indicates that theory may need revision. Therefore, firstly whether or not the data confirm the hypothesized model should be determined. If the theory represented by the model is

confirmed, then path coefficients, direct effects, indirect effects, and total effects of the variables within the model should be determined.

Testing the Hypothesized Model

In order to confirm the hypothesized model, firstly chi-square statistics should be used. Chi-square statistics focus on the discrepancy between the sample data covariance matrix and the hypothesized model covariance matrix. The probability value associated with chi-square indicates the likelihood of obtaining a chi-square value when the model is fit. For this model, the obtained chi-square value was 736.301. With 27 degrees of freedom, the probability value for this chi-square value was found to be significant ($p < .0001$). Since the research hypothesis was that there was no difference between the sample data covariance matrix and the hypothesized model covariance matrix, in order to continue the analyses, chi-square should be found to be insignificant. A significant chi-square indicates poor fit. Therefore, based on this test, this hypothesized model was disconfirmed.

Since the hypothesized model was disconfirmed, the paths included into the initial hypothesized model had to be studied and modified. As the next step, parameter estimates which give the significance of the causal and correlation paths included in the model were inspected. A test of the significance of each path coefficient is presented in Table 6.

Table 6: Regression Weights for Hypothesized Model.

		Estimate	S.E.	C.R.	P
Appraisal	<--- Efficacy	.091	.020	4.560	***
Appraisal	<--- Perceived resources	.216	.054	3.989	***
Appraisal	<--- Readiness	.229	.056	4.132	***
Stress	<--- Appraisal	-1.609	.125	-12.858	***
Stress	<--- Perceived pressure	.096	.067	1.441	.149
Problem-focused coping	<--- Stress	-.075	.015	-4.983	***
Emotion-focused coping	<--- Stress	.086	.013	6.779	***
Attitude	<--- Problem-focused coping	1.100	.266	4.134	***
Attitude	<--- Emotion-focused coping	-1.532	.308	-4.978	***

Non-significant paths are the ones which have a P value greater than .05.

This may indicate that there is no direct causal relationship between the two variables as hypothesized. Therefore, to modify the model the non-significant paths should be excluded from the model (Elitharp, 2005). However, there was only one such path. The direct effect of perceived pressure on anxiety was non-significant. After it was excluded, a chi-square value of 688 was obtained. With 20 degrees of freedom, the associated p value for this chi-square was significant ($p < .0001$), which indicated that the model did not fit with the data.

Modification of the Model

After the significance of the causal paths included in the model was inspected, to modify the model the non-significant path, direct effect of pressure on anxiety, was extracted from the model. After this exclusions, the model still did not indicate fit. Since there were no other non significant paths left for extracting from the model to make the model fit, it was decided to use findings of correlation coefficients of the variables which were presented in the previous part (Table 5).

In the initial hypothesized model the personal variables of readiness and efficacy and the situational variable of perceived resources had only direct effects on appraisal and indirect effect on anxiety and attitude. However, correlation coefficients showed significant associations between personal variables and anxiety, and personal variables and outcome, where the personal variables included readiness and efficacy and the outcome variable included attitude. Appraisal seemed to directly affect only anxiety and indirectly affect attitude. In addition to the significant relation between appraisal and stress, correlation coefficients also indicated significant relations between appraisal and attitude. In the model, coping was hypothesized as a mediator variable between anxiety and attitude. There was no direct relation between anxiety and attitude. According to the correlation coefficients there was a significant association between anxiety and attitude. Therefore, taking results of the correlation coefficients into account, without changing the places of any variables, by adding new causal relationships between readiness to anxiety, readiness to attitude, efficacy to anxiety, efficacy to attitude, perceived resources to anxiety, perceived resources to attitude and lastly appraisal to attitude, the second model was designed (Figure 23).

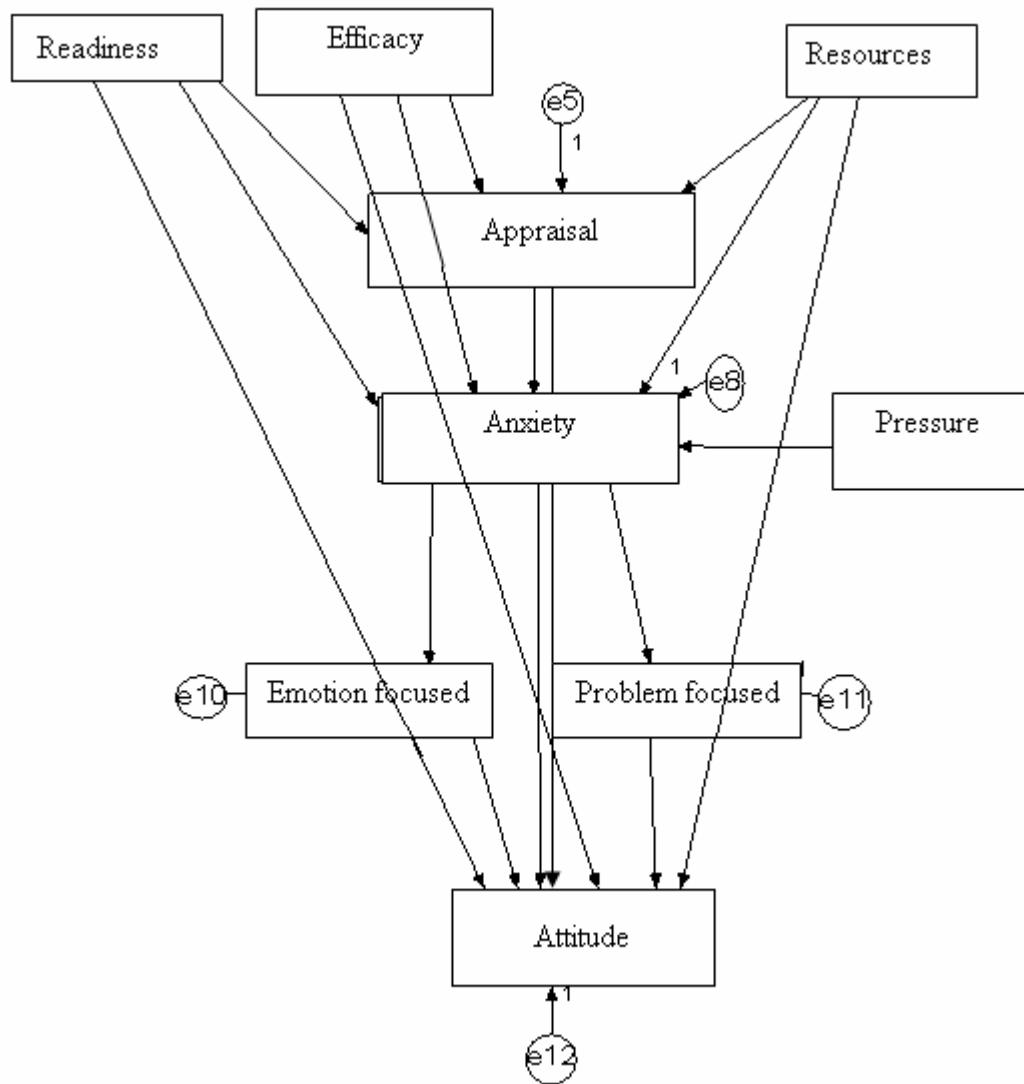


Fig. 23: The second model

Testing the Second Model

Chi-square statistics were used to confirm the second model. For this model, the chi-square value obtained was 359.923. With 19 degrees of freedom, the probability value for this chi-square value was found to be significant ($p < .0001$). Since the second model was not confirmed, it had to be revised and modified. To revise this model, parameter estimates which give the significance of the casual and correlational paths included in the model were inspected.

Table 7: Regression Weights for Second Model

			Estimate	S.E.	C.R.	P
Appraisal	<---	Perceived resources	.216	.054	3.989	***
Appraisal	<---	Efficacy	.091	.020	4.560	***
Appraisal	<---	Readiness	.229	.056	4.132	***
Stress	<---	Appraisal	-.965	.111	-8.700	***
Stress	<---	Readiness	-.758	.125	-6.070	***
Stress	<---	Perceived resources	-.072	.122	-.589	.556
Stress	<---	Efficacy	-.448	.045	-9.941	***
Stress	<---	Outside pressure	.184	.055	3.324	***
Problem-focused coping	<---	Stress	-.075	.016	-4.625	***
Emotion-focused coping	<---	Stress	.086	.014	6.292	***
Attitude	<---	Problem-focused coping	-.165	.202	-.815	.415
Attitude	<---	Emotion-focused coping	.005	.240	.020	.984
Attitude	<---	Efficacy	.266	.086	3.081	.002
Attitude	<---	Readiness	.155	.224	.694	.488
Attitude	<---	Perceived resources	.050	.209	.240	.811
Attitude	<---	Stress	-.558	.089	-6.268	***
Attitude	<---	Appraisal	1.769	.207	8.531	***

According to the results of path analyses of the second model, shown in Table 7, six hypothesized causal relationships were identified as non-significant. Among six of them, direct effect of perceived resources on stress, direct effect of both emotion and problem-focused coping on attitude, direct effect of readiness on attitude and direct effect of perceived resources on attitude were excluded from the model. Direct effect of efficacy on attitude was not excluded because its p value was lower than .05.

Since both emotion and problem-focused coping were among the dropped paths, in the second model no significant relation was found between coping and attitude. As a result, coping was eliminated from the model.

After five paths were eliminated from the second model a chi-square value of 268.025 was obtained. With 11 degrees of freedom, the probability value was found to be significant ($p < .0001$). This indicated that the second model still did not show fit with the data. In the next step, modification indices were inspected.

In the modification indices, AMOS program provides suggestions about causal and correlation paths should be included into the model. Each path is accompanied by a modification index (M.I.) and expected parameter change (Par change). The value of the modification index of a path corresponds to a drop in Chi-square value of the model fit. The value of the expected parameter change provides information about the sensitivity of the evaluation of fit if that specific path is included in the model.

Table 8: Modification Indices from Second Model

			M.I.	Par Change
Readiness	<-->	Perceived pressure	4.971	2.640
Efficacy	<-->	Readiness	112.446	15.843
Perceived resources	<-->	Perceived pressure	12.431	4.283
Perceived resources	<-->	Readiness	72.542	4.691
Perceived resources	<-->	Efficacy	70.889	12.907
E5	<-->	Perceived pressure	10.642	-4.256

By taking the suggestions of AMOS into account, the correlation paths between readiness and perceived pressure, readiness and efficacy, perceived resources and perceived pressure, perceived resources and efficacy, perceived resources and readiness and error 5 to perceived pressure were included in the model.

After these changes were made, the significance of the parameter estimates was assessed again in order to check whether the changes in the model resulted in the changes of C.R value of the variables. However, after adding six correlation relations

to the model, there were slight changes in two causal relations value of C.R., which were not significant.

After the modifications were done, the model explaining teachers' stress during the implementation of the new curriculum reached its final form, shown in Figure 24.

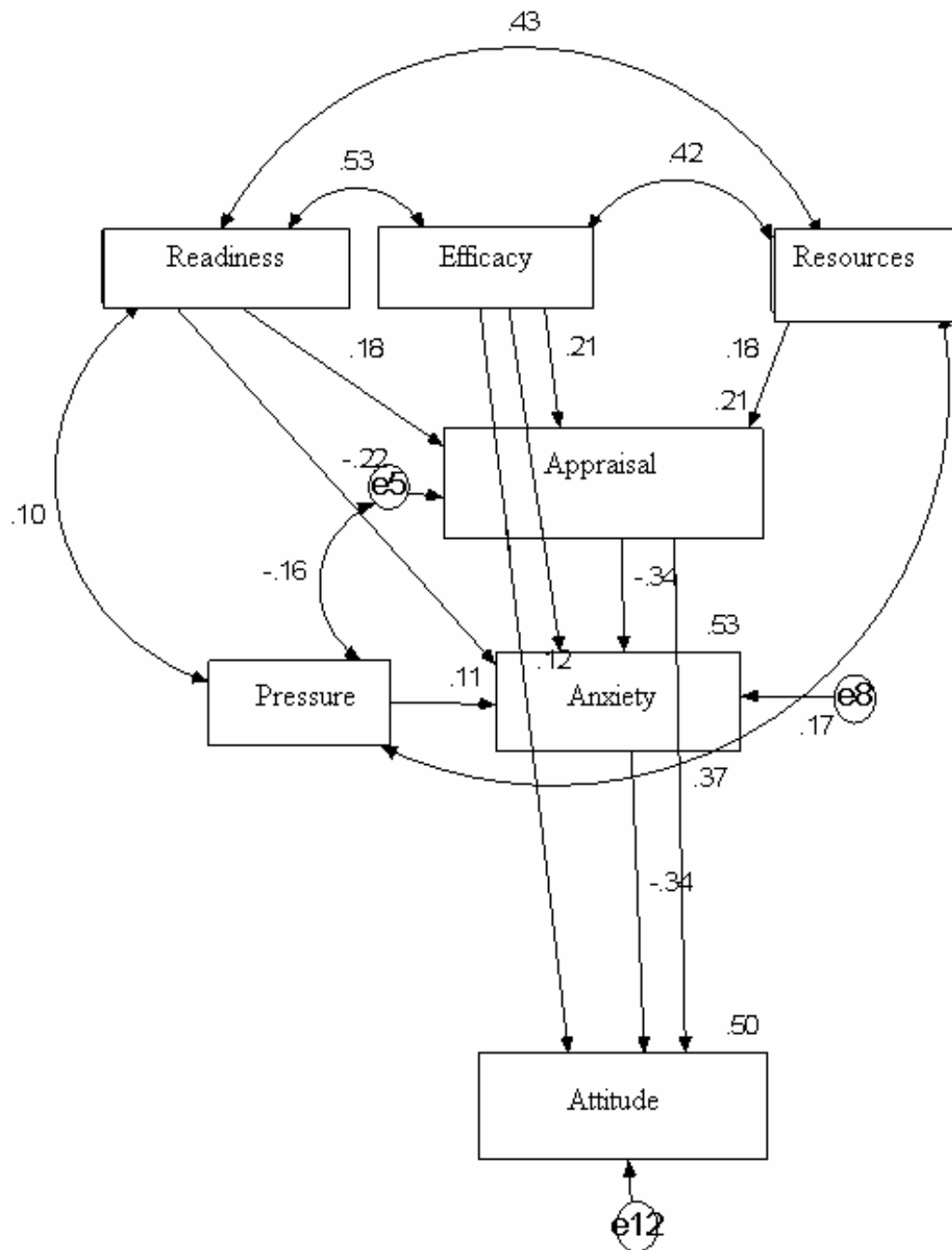


Fig. 24: The final model

On the path diagram of the model, causal relationships are represented by single headed arrows. Correlation relationships are represented with double-headed arrows. The values corresponding to causal paths represent the standardized regression whereas the values corresponding to the correlation paths represent correlation coefficients. For the final model, chi-square statistics gave the value of 1.439. With 5 degrees of freedom, the associated p value for that chi-square is $p=.920$. Good model fit is indicated by p values that are greater than 0.5 and the larger p value indicates the better model fit. A p value of $p=.920$ provided evidence that the final model fit the data. This confirmed that chi-square was not significant and there was no significant difference between the sample data covariance matrix and the hypothesized model covariance matrix.

In addition to chi-square, other model fit indices such as GFI, AGFI, NFI, RMSEA were also considered for the final model. The Goodness of Fit Index (GFI) and Adjusted Goodness of Fit Index (AGFI) were assessed for the final model. It yielded 0.999 GFI value and 0.994 AGFI value. Research suggests that to accept a model the Goodness-of Fit Index (GFI) should be equal to or greater than .90 and the Adjusted Goodness-of fit (AGFI) should be at least .90, (Elitharp, 2005). The closer the GFI and AGFI values are to 1.0, where they range between zero and one, the better is the fit of the model. So, both of GFI and AGFI values are indicators of a good model fit. GFI and AGFI values of the final model are given in Table 9.

Table 9: GFI and AGFI

Model	RMR	GFI	AGFI	PGFI
Default model	1.218	.999	.994	.178
Saturated model	.0001	1.000		
Independence model	35.873	.504	.338	.378

In order to assess model fit of the final model Bentler and Bonnet's normed fit index (NFI) was also examined. A well fitting model is usually accompanied by NFI values greater than 0.95 where it takes values between zero and one. (Byrne, 2001). For the final model the NFI value obtained was 0.998 which, indicates of a good fit (Table 10).

Table 10: Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.998	.994	1.004	1.016	1.000
Saturated model	1.000		1.000		1.000
Independence model	.0001	.0001	.0001	.0001	.0001

The root mean square error of approximation (RMSA), another index of model fit, was also used to evaluate the goodness of a fit of the final model. In order to indicate a good fit, the root mean square error of approximation (RMSEA) should be less than or equal to .05. The final model yielded a RMSEA value of .0001 which indicates excellent model fit. Moreover, since the RMSEA value is less than 0.05, indicating good model fit, a high Pclose value is desirable. A Pclose value greater than .50 indicates good model fit (Byrne, 2001). For this model, the Pclose value was .989.

Table 11: RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.0001	.0001	.024	.989
Independence model	.332	.314	.351	.0001

All of the goodness of fit indices (GFI, AGFI, Chi-square, NFI, and RMSEA) used in this study indicated a good fit between the model and the data.

Analyses of data

Teachers' stress during the implementation of the new curriculum was explained with the final model. In the final model, the standardized direct effect of an independent variable on a dependent variable is represented by the standardized regression coefficient used as a standardized beta value. If a standardized beta value is 2.0, then the dependent variable will increase by 2.0 standard units for each standard deviation increase in the independent variable. Indirect effects are effects which are transmitted through intervening variables, and the total effect represents the sum of the direct and indirect effects.

As proposed by Zeidner's (1998) model of test anxiety, the personal variable and situational variable were hypothesized to be related with the appraisal. According to the structural equation model the personal variables efficacy and readiness and the situational variable, which was measured as perceived available resources had direct effects on appraisal. Readiness had .18, efficacy had .21 and availability of resources had .18 standardized beta values. In the test anxiety model, appraisal precedes anxiety. In the final model of teachers' stress during the implementation of the new curriculum, appraisal also preceded anxiety. Appraisal had a direct effect on anxiety with a standardized beta value of -.34 (Table 12).

Table 12: Standardized Direct Effects

	Outside pressure	Efficacy	Readiness	Perceived resources	Appraisal	Stress
Appraisal	.0001	.207	.185	.178	.0001	.0001
Stress	.111	-.356	-.217	.0001	-.340	.0001
Attitude	.0001	.125	.0001	.0001	.373	-.343

In the hypothesized model, personal and situational variables had indirect effects on appraisal. There were no direct effects of personal and situational variables on anxiety. However, in this model different from the original model, it was found that personal variables, readiness and efficacy, had a direct effect on anxiety with a standardized beta value of -.22 and -.36. Moreover, as expected, readiness, efficacy and perceived resources had indirect effects on anxiety with the standardized beta values of -.063, -.071 and -.61 respectively (Table 13).

Table 13: Standardized Indirect Effects

	Outside pressure	Efficacy	Readiness	Perceived resources	Appraisal	Stress
Appraisal	.0001	.0001	.0001	.0001	.0001	.0001
Stress	.0001	-.071	-.063	-.061	.0001	.0001
Attitude	-.038	.223	.165	.087	.117	.0001

In the hypothesized model, perceived pressure had a direct effect on anxiety. After the analyses, it was found that outside pressure had a direct effect on anxiety with the standardized beta value of .11.

According to the test anxiety model, coping is a mediator variable between outcome and anxiety. In this model, no significant relation was found between coping and outcome, which was measured as attitude. So, coping was excluded from the model. As coping was excluded from the model, it was found that anxiety had a direct effect on the outcome, which in this case was attitude. The standardized beta value was -.34. Moreover, direct effects of efficacy and appraisal on anxiety were found with a standardized beta value of .17 and .37 respectively. As expected, perceived pressure, efficacy, readiness perceived resources and appraisal had indirect effects on attitude with the standardized beta values of -.038, .223, .165, .087 and .117 respectively.

Table 14 reports standardized total effects, which are the sum of the direct and indirect effects. The following indicates which variables had sizeable total effects on other variables: the total effects of perceived pressure, efficacy, readiness, perceived resources, appraisal on anxiety were, .179, -.544, -.998, -.211 and -.976 respectively. Moreover, the total effects of perceived pressure, efficacy, readiness, perceived resources, appraisal and anxiety on attitude were -.102, .740, .978, .504, 2.336 and -.571 respectively.

Table 14: Standardized total effects

	Outside pressure	Efficacy	Readiness	Perceived resources	Appraisal	Stress
Appraisal	.0001	.092	.229	.216	.0001	.0001
Stress	.179	-.544	-.998	-.211	-.976	.0001
Attitude	-.102	.740	.978	.504	2.336	-.571

To summarize, data from the constructs, namely readiness, efficacy, appraisal, anxiety, perceived pressure, perceived resources and attitude which were entered in the hypothesized model, were found to be related to each other as proposed in a test anxiety model (Zeidner, 1998), except coping which was excluded. The final model explained 50.4 percent of the variance in the attitudes towards the new curriculum, 53.4 percent of the variance in teachers' anxiety and 20.9 percent of the variance in the appraisals of teachers during the implementation of the new curriculum.

Table 15: Squared Multiple Correlations

	Estimate
Appraisal	.209
Stress	.534
Attitude	.504

CHAPTER 5

DISCUSSIONS

This study aimed to explain teachers' stress during the implementation of the new curriculum within a framework mostly based on a test anxiety model. The test anxiety model included personal and situational variables, appraisal, anxiety, coping and an outcome. In the hypothesized model, readiness and efficacy were taken as personal variables and perceived resources was a situational variable. Appraisal was regressed upon the situational and personal variables. Perceived stress and anxiety had a direct effect on stress. Attitude towards the new curriculum was the outcome of the model. Coping was the mediator variable between stress and attitude. In addition to these variables, although not present in test anxiety model, direct effect of perceived pressure on anxiety was added to the model since it was thought to have a significant role in explaining teachers' stress during the implementation of the curriculum

According to the results, readiness, efficacy, appraisal, anxiety, perceived pressure, availability of resources and attitude which were entered in the hypothesized model, were found to be related to each other. As expected, in the final model positive direct effects of readiness, efficacy and perceived resources on appraisal were observed. In the hypothesized model, there were no direct effects of the personal variables, readiness and efficacy, on anxiety. However, in addition to the indirect effects of readiness and efficacy on anxiety, their direct effects on anxiety was found in the final model. In addition to the

indirect effects of efficacy and appraisal on attitude, their direct effects on attitude were found in the final model while there were no direct effects of efficacy and appraisal on attitude in the hypothesized model. As hypothesized in the model, anxiety had a direct effect on attitude. Contrary to expectations, it was found that coping, which was a mediator variable between anxiety and stress in the hypothesized model, had no significant effect on attitude. Therefore, it was excluded from the final model.

These results indicated that teachers who had high efficacy beliefs, who were ready to implement the new curriculum and who perceived the resources to be adequate perceived the implementation of the new curriculum as a challenge. These teachers had low levels of anxiety during the implementation of the new curriculum. Teachers who had low levels of anxiety had more positive attitudes towards the new curriculum. It was also found that teachers who perceived high pressure during the implementation of the new curriculum, felt high levels of anxiety during the implementation of the new curriculum.

Appraisal had significant positive effect on teachers' attitude towards the new curriculum. Appraisal was regressed upon the personal and situational variables. When the effects of personal and situational variables on attitude were compared, it was observed that the personal variables, readiness and efficacy, had more effect on attitude than the situational variable, perceived resources. These findings revealed that personal factors had a more significant role to explain teachers' stress during the implementation of the new curriculum and they determined teachers' attitudes towards the new curriculum. These findings were parallel with other findings that indicated the importance of personal factors during the implementations of new curricula. Ransford (2007) stated that teachers

with higher efficacy set more challenging goals for themselves and they were more persistent when facing challenging tasks, such as implementation of new curricula. Some teachers, depending on their personality and affected by their previous experiences and stage of career are more self-actualized and have a great sense of efficacy, which leads them to take action and persist in the effort required to bring about successful implementation (Fullan,1991).

In the hypothesized model, coping was a mediator variable between anxiety and attitude. However, coping was excluded in the final model. There may be two reasons to explain this situation. One of them would be that, actually, coping does act as a buffer between anxiety and outcome in this situation. Another reason could be that coping may not have been measured well in this study. However, correlation coefficients revealed that there was a negative relation between anxiety and emotion-focused coping and there was a positive relation between anxiety and problem-focused coping. These findings were parallel with the findings of other studies' conducted on teacher stress in which a negative relationship between problem-focused coping and anxiety and a positive relationship between problem-focused coping and anxiety was observed. These results decrease the probability of not being able to measure coping and its being a reason for excluding it from the model.

Although not presented in the test anxiety model, the direct effect of perceived pressure on anxiety was added to the initial hypothesized model. Results indicated that perceived pressure had a small direct effect on anxiety.

Results indicated that teachers on average experienced a moderate level of anxiety during the implementation of the new curriculum. Distributions of the scores indicated that approximately 22 % of the teachers reported they never or

only occasionally experienced anxiety; 16 % of the teachers reported they experienced anxiety or high levels of anxiety; and 38 % of teachers experienced moderate levels of anxiety during the implementation of the new curriculum. In most of the research studies that examined teacher stress, teachers mostly reported that they were experiencing high levels of stress (Chaplin, 2008; Finlayson, 2005; Richter, 2003, Kyriacou, 1998; Borg, 1991). However, there are some studies where teachers reported moderate or low levels of stress (Jepson 2006; Stevenson, 2006; Griffith et al.1999). Moreover, while examining teacher stress during the implementation of the new curriculum it was observed that teachers generally reported high levels of stress. It was explained that change can exacerbate stressful conditions already associated with teachers' occupation and may create new stressful conditions for teachers (Smylie, 2006). It is understandable that teachers can experience more stress during the implementations of new curricula. Although it seems that the findings of this study about teacher stress are not parallel with other studies on teacher stress and educational reforms, normal distribution of anxiety scores of teachers was an advantage for this study. In order to explain teachers' stress with a model, normal distribution of all variables was required.

In this study outcome of the model was taken to be the scores on the Attitude towards the New Curriculum Scale. It was thought that teachers with a more positive attitude towards the new curriculum would be more willing to implement it in their courses. So, teachers with higher efficacy beliefs, higher readiness, higher perceived resources, lower perceived pressure, lower anxiety and who perceive the situation as a challenge are expected to be willing to implement the new curriculum. As a result of all these results, it can be

concluded that teachers may be the key factors of the reform. Fullan (1991) claimed that many educational reforms could not be put into practice because of teachers' resistance. According to him, the lack of appreciation of how people actually experience change is the cause of failure of many reforms. Evans (2001) claimed that there is a gap between what change means to its author and what it means to its targets. Therefore, the significance of a particular reform depends on the unique characteristics of person, institution, and situation. So, effective change must emerge from the professional concerns of teachers.

CHAPTER 6

CONCLUSION

The aim of this study was to explain teachers' stress during the implementation of the new mathematics curriculum within a framework that is mostly based on a test anxiety model. It was hypothesized that the personal variables, readiness and efficacy, and the situational variable of perceived resources had a direct effect on appraisal. Appraisal would be regressed upon personal and situational variables. Perceived pressure would have a direct effect on anxiety. Coping was supposed to be the mediator between anxiety and attitude towards the new curriculum which was the outcome of the model.

It was hoped that this model would provide implications for teacher education, teachers' in-service trainings and research. Eight instruments were developed and their psychometric properties were evaluated. The hypothesized model was tested with the data gathered from 395 elementary school teachers and mathematics teachers. Results indicated that the hypothesized model mostly explained teachers' stress and their attitudes towards the new curriculum. In the final model no significant relation was found for coping.

In light of these findings, it can be concluded that teachers' stress could be explained using a test anxiety model. Most striking aspects of the model were the importance of appraisal in determining stress. How the teachers, as the key factor of the reform, appraise the change determines their stress during the implementation of new curricula and hence their attitudes. It is important that

they should perceive the change as a challenge rather than a threat. This might have implications for teacher education. Prospective teachers should be equipped with knowledge of both content and pedagogy in a way to enhance their efficacy and feeling of being ready for change. The curricula in faculties of education should be planned such that teachers gain robust knowledge of mathematics and obtain self regulatory skills in learning new materials. In terms of life long learning this should also have implications for in-service training.

Limitations of the Study

Using self-report instruments to measure the variables is one of the limitations of this study. The large sample size of this study necessitated the use of self-report instruments for the measurement of the variables. It was stated that the use of self-report questionnaires has been very successful in generating information about teacher stress, and provided a suitable basis for model building and comparisons between subgroups. However, measuring the variables with self-report instruments were all based on subjective criteria (Kyriacou, 1998).

Time of the gathering data may be another limitation of this study. Data were gathered just after two weeks from the vocation. Therefore, teachers may have come back refreshed and ready to start again for the next semester. The method of gathering data, may be another limitation. In the first visit to schools,, the questionnaires were distributed to teachers. In the second visit they were collected. However, not all teachers who received questionnaires responded. The teachers who responded may have had more motivation. They may have been

more conscious and more confident during the implementation of the new curriculum.

Suggestions for Further Research

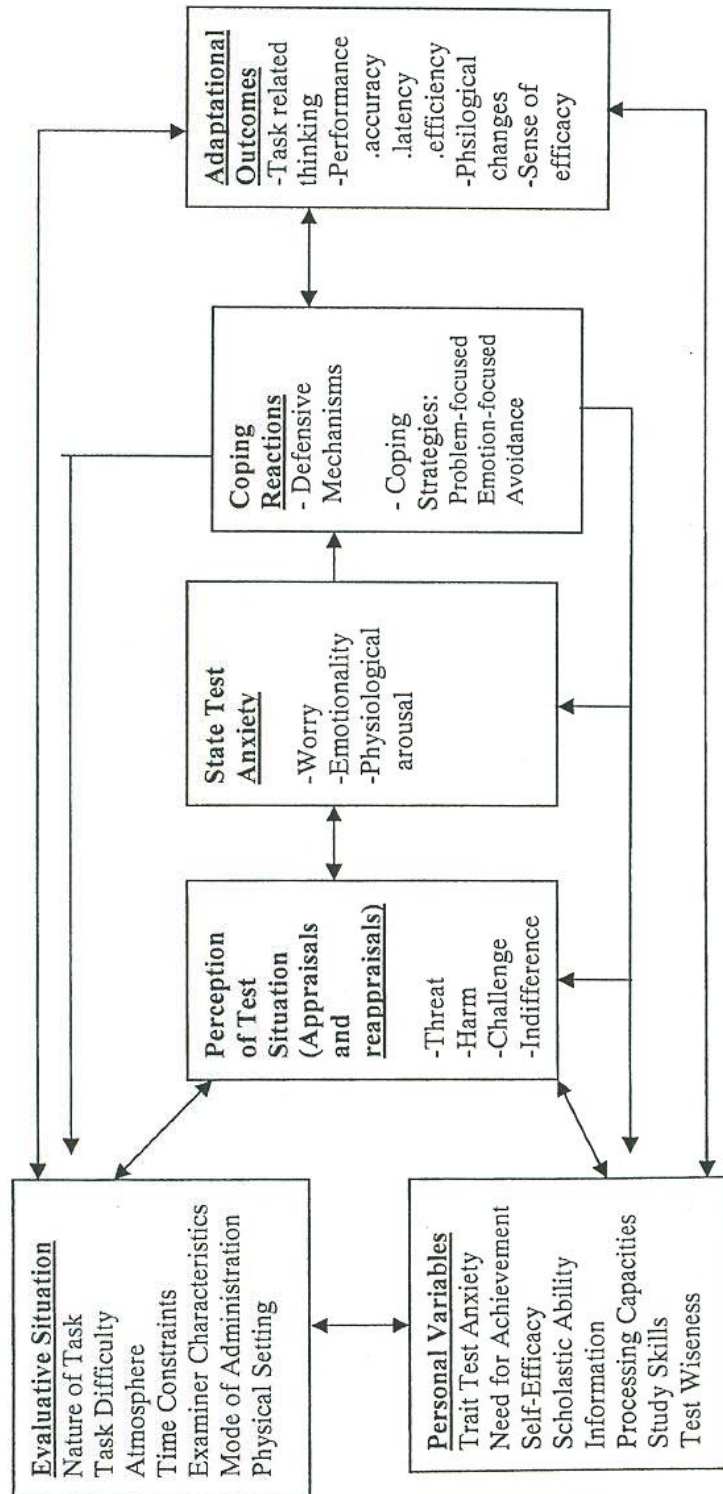
In this study, outcome of the model was taken to be teacher attitude. For further research it can be suggested to find a way to assess teachers' performance as an outcome of the model

Although, in the hypothesized model, coping was the mediator variable between anxiety and attitude, in the final model, no significant relation was found for coping. Why coping was not significant in this study might be a question for further research. Measuring teachers' coping strategies using different instruments might produce a different result.

Since efficacy and readiness were found to be important to explain teacher stress during the implementation of the new curriculum, ways to improve teachers' efficacy beliefs and readiness to implement new curriculum would be worthy of further study.

APPENDIX A: Test Anxiety Model

Transactional model of test anxiety. Based on Zeidner (1997 in Zeidner, 1998)



APPENDIX B: Implementing New Mathematics Curriculum Anxiety Scale

Aşağıda yeni eğitim programını uygulayan öğretmenlerin duygu ve düşüncelerini belirten ifadeler sıralanmıştır. <u>Yeni programı uygulamadaki duygu ve düşüncelere ilişkin ifadeleri sizin için uygun olan Hiçbir zaman, Bazen, Sık sık ve Her zaman seçeneklerinden birini işaretleyerek belirtiniz.</u>		Hiçbir zaman	Bazen	Sık sık	Her zaman
		1	2	3	4
1	Yeni programın nasıl uygulanacağına dair belirsizlikler beni rahatsız ediyor.	()	()	()	()
2	Yeni programda öğrenciler iyi matematik öğrenemeyeceği için endişeleniyorum.	()	()	()	()
3	Yeni programda matematik konularını zamanında yetiştirememekten korkuyorum.	()	()	()	()
4	Yeni programda yeterince etkinlik hazırlayabildiğim için rahatım.	()	()	()	()
5	Velilerin yeni programla birlikte uygulamaya başladığımız yeni eğitim yöntemlerine tepki göstermeleri beni bunaltıyor.	()	()	()	()
6	Yeni matematik programını uygularken öğrencilerimi liselere giriş sınavına yeterince hazırlayamamaktan dolayı rahatsızım.	()	()	()	()
7	Yeni program hakkında yeterince bilgilendirildiğim için rahatım.	()	()	()	()
8	Yeni programda konuların sıralanışının net olmaması sıkıntı yaratıyor	()	()	()	()
9	Yeni programın yetersizliği nedeniyle öğrencilerim iyi matematik öğrenemeyecekler ve sorumlusu ben olacağım diye düşünüyorum.	()	()	()	()
10	Yeni programlar hakkında her kafadan ses çıkması beni rahatsız ediyor.	()	()	()	()
11	Yeni programdaki bazı etkinlikleri işe yaramayacağını bildiğim halde yapmak beni bunaltıyor.	()	()	()	()
12	Velilerin etkinliklere destek olmalarından dolayı memnunum.	()	()	()	()
13	Velilerin öğrencileri liselere giriş sınavlarına hazırlamamız yönünde baskı yapmaları beni bunaltıyor.	()	()	()	()
14	Yeni programda öğrencilerime nasıl not vereceğimi bilmemekten dolayı rahatsızım.	()	()	()	()
15	Yeni program için yazılmış yeterince kaynak bulduğum için rahatım.	()	()	()	()
16	Öğrencilerimi liselere giriş sınavına hazırlarken yeni matematik programını uygulayamamak beni üzüyor.	()	()	()	()
17	Yeni programda herkesin farklı uygulamalar yaptığını gördükçe programı doğru anlayıp anlamadığım konusunda endişeleniyorum.	()	()	()	()
18	Yeni programda istenen değerlendirme yöntemlerini tam olarak bilmediğim için rahatsız oluyorum.	()	()	()	()
19	Öğrencilere verdiğim ödevlerin veliler tarafından yapılması beni üzüyor.	()	()	()	()
20	Yeni programlarda uygulanması istenen etkinliklerle ilgili yeterince kaynak bulduğum için rahatım.	()	()	()	()
21	Yeni programın uygulanmasına dair yeterince eğitim verilmemiş olması beni rahatsız ediyor.	()	()	()	()
22	Bazı etkinlikleri materyal eksikliği nedeniyle yapamamak beni üzüyor.	()	()	()	()

APPENDIX C: Initial Psychometric Properties of the Implementing New
Mathematics Curriculum Anxiety Scale.

Initial Means and standard deviations of the items in Implementing New
Mathematics Curriculum Anxiety Scale.

Item number	N	Mean	Standard Deviation
1	37	2.43	0.90
2	37	2.54	1.02
3	37	2.54	1.04
4	37	2.41	0.60
5	37	2.43	0.77
6	37	2.65	0.92
7	37	2.76	0.80
8	37	2.92	0.83
9	37	2.27	1.00
10	37	2.78	0.98
11	37	2.57	0.87
12	37	2.7	0.85
13	37	1.97	0.90
14	37	2.03	0.87
15	37	2.68	0.82
16	37	2.08	0.76
17	37	2.03	0.80
18	37	2.24	0.93
19	37	2.89	0.90
20	37	2.51	0.84
21	37	2.59	0.93
22	37	2.65	1.06

Initial Item-total Correlations of the Items in Implementing New Mathematics
Curriculum Anxiety Scale.

Item number	Corrected Item- Total Correlation
1	0.46
2	0.59
3	0.63
4	0.34
5	0.45
6	0.33
7	0.54
8	0.37
9	0.49
10	0.49
11	0.65
12	0.33
13	0.53
14	0.29
15	0.37
16	0.01
17	0.77
18	0.53
19	0.54
20	0.49
21	0.31
22	0.28

APPENDIX D: Psychometric Properties of the Implementing New Mathematics

Curriculum Anxiety Scale.

Means and Standard Deviations of the Items In Implementing New Mathematics
Curriculum Anxiety Scale.

Item number	N	Mean	Standard Deviation
1	96	2.28	.99
2	96	2.09	.96
3	96	2.12	.95
4	96	2.32	.92
5	96	1.83	.85
6	96	2.00	.95
7	96	2.46	.99
8	96	2.30	1.08
9	96	1.93	.97
10	96	2.32	.96
11	96	2.19	.81
12	96	2.58	1.03
13	96	1.70	.87
14	96	1.65	.81
15	96	2.42	.98
16	96	1.80	.86
17	96	2.04	.71
18	96	1.91	.80
19	96	2.49	.93
20	96	2.43	.937
21	96	2.49	.10
22	96	2.49	.92

Item-total Correlations of the Items In Implementing New Mathematics Curriculum

Anxiety Scale

Item number	Corrected Item- Total Correlation
1	.514
2	.720
3	.424
4	.308
5	.613
6	.627
7	.483
8	.577
9	.606
10	.465
11	.583
12	.376
13	.330
14	.728
15	.439
16	.428
17	.586
18	.600
19	.648
20	.551
21	.435
22	.564

APPENDIX E: Attitudes Towards the New Curriculum Scale

Aşağıda yeni eğitim programını uygulayan öğretmenlerin yeni program ile ilgili görüşlerini belirttikleri ifadeler sıralanmıştır. Lütfen yeni eğitim programı ile ilgili görüşlerinizi her ifadenin karşısına **1-Katılmıyorum - 5-Katılıyorum** aralığında sizin için uygun olan dereceyi işaretleyerek belirtiniz.

		<u>Katılmıyorum</u>		<u>Katılıyorum</u>		
		1	2	3	4	5
1	Yeni programda yer alan konular matematiksel derinlikten uzak.	()	()	()	()	()
2	Yeni program matematik dersini planlamada öğretmene kolaylık getiriyor	()	()	()	()	()
3	Yeni programda yer alan aktivitelere vakit harcamak yerine matematik öğretmede daha etkili metotlar kullanılabilir.	()	()	()	()	()
4	Yeni program yeni uygulamalar geliştirmeme izin vermiyor.	()	()	()	()	()
5	Yeni program matematik öğretiminde gerekli kavramlara öncelik veriyor	()	()	()	()	()
6	Yeni programla birlikte öğrencilerin matematiğe ilgisi arttı.	()	()	()	()	()
7	Yeni programın amaçları gerçekçi değil.	()	()	()	()	()
8	Yeni programla bir konuyu farklı yollarla işleme fırsatı buluyorum.	()	()	()	()	()
9	Yeni programdan her öğrenci eşit oranda yararlanıyor.	()	()	()	()	()
10	Yeni program öğrencilerin hangi seviyede ne yapabileceklerine açıklık getiriyor.	()	()	()	()	()
11	Yeni program kafamı karıştırıyor.	()	()	()	()	()
12	Yeni programı uygulamadan da gayet güzel matematik öğretebilirim.	()	()	()	()	()
13	Yeni programda yer alan kavramları ve becerileri öğretmekte bir sıkıntı yaşanmıyor.	()	()	()	()	()
14	Yeni program öğrencileri ileri seviyelerdeki matematiğe hazırlıyor.	()	()	()	()	()
15	Çalışmalarımı yeni programda önerilen doğrultuda yapmaya çalışıyorum.	()	()	()	()	()
16	Yeni programda yer alan matematiksel kavramlar ve beceriler öğrencilerin hepsine uygun değil.	()	()	()	()	()
17	Matematik öğretiminin yeni programlara göre yapılması yakında vazgeçilecek bir moda.	()	()	()	()	()
18	Yeni program bize yeni bir yük getiriyor.	()	()	()	()	()
19	Yeni programın içeriği öğrencilerin seviyelerinin üzerinde.	()	()	()	()	()
20	Yeni programda, ünitelerde yer alan matematik konularının ele alınış biçimi, öğrencilerin matematik alt yapısını oluşturmakta yetersiz kalıyor.	()	()	()	()	()
21	Yeni program daha iyi olduğu için derslerimi yeni programa göre işliyorum.	()	()	()	()	()
22	Yeni programların her seviyede uygulanması önemlidir.	()	()	()	()	()
23	Yeni program matematik öğretmeyi kolaylaştırıyor.	()	()	()	()	()
24	Yeni program üzerimde çok baskı yaratıyor.	()	()	()	()	()
25	Matematiği yeni programla öğrenmiş öğrenciler ilerideki konulara daha iyi hazırlanmış olacaklar.	()	()	()	()	()
26	Yeni program çok fazla beceri ve kavram içeriyor.	()	()	()	()	()
27	Öğrencilerin daha iyi matematik öğrenebilmesi için yeni programda önerilen uygulamalar gerekli.	()	()	()	()	()
28	Yeni programda konular daha zevkli işleniyor.	()	()	()	()	()

APPENDIX F: Initial Psychometric Properties of the Attitude Towards the New
Curriculum Scale

Initial Means And Standard Deviations of the Items In Attitudes Towards the New
Curriculum Scale.

Item number	N	Mean	Standard Deviation
1	36	2.83	0.91
2	36	2.61	0.87
3	36	2.19	1.09
4	36	2.78	1.15
5	36	2.56	0.80
6	36	2.61	0.90
7	36	2.83	0,91
8	36	2.83	0.74
9	36	2.56	0.97
10	36	2.5	0.85
11	36	2.83	0.85
12	36	2.11	0.92
13	36	2.69	1.04
14	36	2.14	0.96
15	36	3.31	0.62
16	36	2.39	1.02
17	36	2.36	1,046
18	36	2.22	1.02
19	36	3.31	0.82
20	36	2.47	1
21	36	2.97	0.74
22	36	3.11	0.67
23	36	2.61	0.87
24	36	2.86	0.99
25	36	2.33	0.83
26	36	2.39	0.87
27	36	2.5	0.78
28	36	2.94	0.67

Initial Item-total Correlations of the Items In Attitude Towards the New Curriculum
Scale.

Item number	Corrected Item-Total Correlation
1	0.47
2	0.37
3	0.62
4	0.39
5	0.53
6	0.61
7	0.73
8	0.30
9	0.45
10	0.70
11	0.47
12	0.17
13	0.218
14	0.66
15	0.29
16	0.40
17	0.49
18	0.37
19	-0.13
20	0.75
21	0.47
22	0.20
23	0.73
24	0.67
25	0.46
26	0.10
27	0.38
28	0.6

APPENDIX G: Psychometric Properties of the Attitude Towards the New
Curriculum Scale

Means And Standard Deviations of the Items In Attitudes Towards the New
Curriculum Scale.

Item number	N	Mean	Standard Deviation
1	113	3.33	1.26
2	113	3.29	1.24
3	113	2.77	1.30
4	113	3.50	1.45
5	113	3.43	1.23
6	113	3.16	1.29
7	113	3.42	1.30
8	113	3.49	1.22
9	113	2.88	1.24
10	113	3.21	1.20
11	113	3.54	1.44
12	113	2.80	1.38
13	113	3.43	1.25
14	113	2.80	1.364
15	113	3.88	1.17
16	113	3.01	1.37
17	113	3.33	1.44
18	113	3.27	1.45
19	113	3.74	1.26
20	113	2.99	1.46
21	113	3.40	1.26
22	113	3.58	1.22
23	113	3.15	1.32
24	113	3.73	1.24
25	113	3.34	1.22
26	113	2.96	1.26
27	113	3.38	1.18
28	113	3.41	1.26

Item-total Correlations of the Items In Attitude Towards the New Curriculum Scale.

Item number	Corrected Item-Total Correlation
1	.30
2	.37
3	.48
4	.33
5	.50
6	.60
7	.49
8	.59
9	.41
10	.59
11	.63
12	.062
13	.461
14	.466
15	.389
16	.383
17	.609
18	.590
19	.332
20	.530
21	.642
22	.560
23	.712
24	.442
25	.671
26	.042
27	.515
28	.601

APPENDIX H: Coping with the New Curriculum Scale

Aşağıdaki soruları yeni öğretim programlarının uygulanmasıyla birlikte matematik öğretimine ilişkin değişiklikleri ve bu değişikliklerin neden olduğu baskıyla baş etme yöntemlerinizi göz önünde bulundurarak cevaplayınız. Belirtilen ifadelerle ilişkin Hiçbir zaman, Bazen, Sık sık ve Her zaman seçeneklerinden sizin için uygun olanı işaretleyiniz		Hiçbir zaman	Bazen	Sık sık	Her zaman
		1	2	3	4
1	Yeni programların uygulanmasıyla ortaya çıkan sorunları öğretmen arkadaşlarımla paylaşıyorum.	()	()	()	()
2	Yeni programla ilgili eğitim programlarına katılıyorum.	()	()	()	()
3	Yeni programla ilgili bilgilerimi arttırmaya çalışıyorum.	()	()	()	()
4	Yeni programı iyi uyguladığımı düşündüğüm okulları inceliyorum.	()	()	()	()
5	Canım çok sıkıldığında dertlerimi arkadaşlarımla ve ailemle paylaşıyorum.	()	()	()	()
6	Yeni programla ilgili ne buluyorsam okuyorum.	()	()	()	()
7	Yeni programların uygulanmasıyla ortaya çıkan sorunlardan kurtulmak için başka şeylerle uğraşıyorum.	()	()	()	()
8	Yürüyüş yapmak ya da spor yapmak beni yeni programın getirdiği baskılardan kurtarıyor.	()	()	()	()
9	Yeni programın uygulanması ile gelen sıkıntılardan dolayı 1 sigara, kahve ve aşırı yemek yeme gibi davranışlarımın sıklaştığını farkettim.	()	()	()	()
10	Okul dışında dinlenmeye ve eğlenmeye daha çok vakit ayırmaya başladım.	()	()	()	()
11	Arasıra baskılardan uzaklaşıp kafamı dinlemeye çalışıyorum.	()	()	()	()

APPENDIX I: Initial Psychometric Properties of the Coping with the New
Curriculum Scale

Initial Means And Standard Deviations of the Items In Coping with the New Curriculum Scale

Item number	N	Mean	Standard Deviation
1	43	1.16	.37
2	43	3.21	.89
3	43	1.16	.37
4	43	2.00	.85
5	43	1.56	.80
6	43	1.56	.59
7	43	2.00	.79
8	43	2.72	1.16
9	43	3.47	.98
10	43	3.05	.84
11	43	2.51	.91

Initial Item-total Correlations of the Items In the Coping with the New Curriculum Scale

Item number	Corrected Item-Total Correlation
1	.24
2	.38
3	.42
4	.55
5	.35
6	.24
7	.36
8	.60
9	.31
10	.13
11	.35

APPENDIX J: Psychometric Properties of the Coping with the New Curriculum
Scale

Means And Standard Deviations of the Items In Coping with the New Curriculum

Scale

Item number	N	Mean	Standard Deviation
1	122	3.37	.74
2	122	2.76	.89
3	122	3.34	.70
4	122	2.44	.95
5	122	3.23	.84
6	122	3.01	.82
7	122	1.86	.92
8	122	1.77	.93
9	122	1.49	.84
10	122	1.77	.83
11	122	1.98	.93

Item-total Correlations of the Items In the Coping with the New Curriculum Scale

Item number	Corrected Item-Total Correlation
1	.38
2	.39
3	.34
4	.49
5	.37
6	.30
7	.48
8	.43
9	.43
10	.36
11	.41

APPENDIX K: Teachers' Efficacy Beliefs in the Implementation of the New
Mathematics Curriculum Scale.

Aşağıda öğretmenlerin yeni programda istenilen şekliyle matematik öğretimine ilişkin yeterlilik inanışlarını belirttikleri ifadeler sıralanmıştır. Lütfen her maddede sizin için uygun olan ifadeyi **1-Katılmıyorum – 5- Katılıyorum** aralığında işaretleyiniz.

		<div style="display: flex; justify-content: space-between; align-items: center;"> <u>Katılmıyorum</u> <u>Katılıyorum</u> </div> <div style="text-align: center; margin-top: 5px;"> ← → </div>				
		1	2	3	4	5
1	Yeni eğitim programında yer alan etkinlikleri başarıyla uygulayabiliyorum.	()	()	()	()	()
2	Öğrencilerimin deneyimlerinden, sezgilerinden yararlanarak matematiği anlamaları ve soyutlama yapabilmeleri için kavramsal bir yaklaşım izleyebiliyorum.	()	()	()	()	()
3	Öğrencilerimin etkinliklerde materyal kullanarak psikomotor becerilerini geliştirmelerini sağlayabiliyorum.	()	()	()	()	()
4	Öğrencilerime yeni programda yer alan kazanımları gerçekleştirebilmelerini sağlayabiliyorum.	()	()	()	()	()
5	Derslerimde öğrencilerimin matematiksel konuları tartışabilecekleri bir ortam yaratabiliyorum.	()	()	()	()	()
6	Öğrencilerimin matematiğin günlük hayatta vazgeçilmez bir araç olduğunu fark etmelerini sağlayabiliyorum.	()	()	()	()	()
7	Yeni eğitim programında yer alan yeni değerlendirme yöntemlerini başarıyla uygulayabiliyorum.	()	()	()	()	()
8	Öğrencilerimin öğrenme sürecinde aktif katılımlarını sağlayabiliyorum.	()	()	()	()	()
9	Proje ve ödevlerle bireysel farklılıklarını ve yeteneklerini ortaya çıkarabilmelerine imkan sunabiliyorum.	()	()	()	()	()
10	Öğrencilerime araştırma yapabilecekleri, keşfedebilecekleri, problemlerin çözümlerini tartışabilecekleri ortamlar hazırlayabiliyorum.	()	()	()	()	()
11	Konuları yeni eğitim programında istenilen şekilde öğretebiliyorum.	()	()	()	()	()
12	Öğrencilerime farklı çevre ortamlarına uyarlanabilen etkinlik örnekleri sunabiliyorum.	()	()	()	()	()

APPENDIX L: Psychometric Properties of the Teachers' Efficacy Beliefs in the
Implementation of the New Mathematics Curriculum Scale.

Means And Standard Deviations of the Items In the Teachers' Efficacy Beliefs in the
Implementation of the New Mathematics Curriculum Scale

Item number	N	Mean	Standard Deviation
1	143	3.85	1.08
2	143	3.85	1.01
3	143	3.84	1.05
4	143	3.89	1.09
5	143	3.71	1.15
6	143	4.03	1.05
7	143	3.57	1.11
8	143	4.02	.92
9	143	3.76	1.10
10	143	3.71	1.05
11	143	3.78	1.06
12	143	3.84	1.03

Item-total Correlations of the Items In Teachers' Efficacy Beliefs in the
Implementation of the New Mathematics Curriculum Scale

Item number	Corrected Item- Total Correlation
1	.70
2	.70
3	.73
4	.77
5	.76
6	.65
7	.56
8	.73
9	.71
10	.79
11	.74
12	.73

APPENDIX M: Pressure During the Implementation of the New Curriculum Scale

Hiç baskı hissetmiyorum						Çok baskı hissediyorum
Yeni eğitim programları nedeniyle	1	2	3	4	5	
Okul yönetiminden,						
Yeni programı uygulamak yerine ÖKS/SBS'ye yönelik ders işlenmesi için	()	()	()	()	()	
Yeni programın tam olarak uygulanması için	()	()	()	()	()	
Velilerden						
Yeni programı uygulamak yerine ÖKS'/SBSye yönelik ders işlenmesi için	()	()	()	()	()	
Yeni programın tam olarak uygulanması için	()	()	()	()	()	
Öğrencilerden						
Yeni programı uygulamak yerine ÖKS/SBS'ye yönelik ders işlenmesi için	()	()	()	()	()	
Yeni programın tam olarak uygulanması için	()	()	()	()	()	
Müfettişlerden, yeni programın tam olarak uygulanması için	()	()	()	()	()	
Öğretmen arkadaşlardan yeni programın tam olarak uygulanması için	()	()	()	()	()	

APPENDIX N: Initial Psychometric Properties of the Pressure During the
Implementation of the New Curriculum Scale

Initial Means And Standard Deviations of the Items In the Pressure During the
Implementation of the New Curriculum Scale

Item number	N	Mean	Standard Deviation
1	11	1.27	.47
2	11	1.36	.51
3	11	1.64	1.21
4	11	1.18	.41
5	11	1.36	.67
6	11	1.36	.67
7	11	2.27	1.79
8	11	1.45	.69

Initial Item-total Correlations of the Items In the Pressure During Implementation of
the New Curriculum Scale

Item number	Corrected Item- Total Correlation
1	.73
2	.52
3	.72
4	.35
5	.77
6	.77
7	.60
8	.42

APPENDIX O: Psychometric Properties of the Pressure During the Implementation
of the New Curriculum Scale

Means And Standard Deviations of the Items In the Pressure During the
Implementation of the New Curriculum Scale

Item number	N	Mean	Standard Deviation
1	114	2.17	1.28
2	114	2.50	1.30
3	114	2.18	1.25
4	114	2.08	1.23
5	114	1.92	1.19
6	114	1.96	1.14
7	114	3.32	1.41
8	114	2.51	1.25

Initial Item-total Correlations of the Items In the Pressure During Implementation of
the New Curriculum Scale

Item number	Corrected Item- Total Correlation
1	.62
2	.69
3	.66
4	.78
5	.73
6	.76
7	.34
8	.68

APPENDIX P: Readiness to Implement the New Curriculum Scale

Hiç faydalı olmadı					Çok faydalı oldu	Eğitim almadım
	1	2	3	4	5	
1) Yeni eğitim programları ile ilgili aldığınız hizmet içi eğitim, yeni matematik programını uygulamada size ne kadar faydalı oldu?	()	()	()	()	()	()
Yeterince bilgi sahibi değilim					Çok iyi bilgi sahibiyim	
	1	2	3	4	5	
2) Yapılandırmacı eğitim hakkındaki bilginiz.	()	()	()	()	()	
3) Yeni eğitim programlarının uygulanması hakkındaki bilginiz.	()	()	()	()	()	
4) Yeni eğitim programındaki matematik konularına ne kadar hakim olduğunuzu düşünüyorsunuz?	()	()	()	()	()	

APPENDIX Q: Psychometric Properties of the Readiness to Implement the New
Curriculum Scale

Means And Standard Deviations of the Items In Readiness to Implement the New Curriculum Scale

Item number	N	Mean	Standard Deviation
1	133	2.28	1.46
2	133	3.41	.99
3	133	3.80	.81
4	133	4.11	.77

Item-total Correlations of the Items In Readiness to Implement the New Curriculum Scale

Item number	Corrected Item-Total Correlation
1	.28
2	.57
3	.60
4	.46

APPENDIX R: Appraisal of Implementation of the New Curriculum Scale

	Katılmıyorum				Katılıyorum
	1	2	3	4	5
1) Yeni programın öğretmenlerin kendilerini geliştirmeleri için bir fırsat yarattığını düşünüyorum.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2) Yeni eğitim programı biz öğretmenleri mesleki açıdan zorluyor.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3) Öğretmenlerin yeni eğitim programını uygulamaya zorlanması onların öğrencilerin gözündeki konumunu zedeliyor.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4) Yeni eğitim programındaki aksaklıklar öğretmenlerin saygınlığını yitirmesine neden oluyor.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5) Öğretmenler yeni eğitim programının getirdiği yenilikleri uyguladıklarında daha çok takdir ediliyor.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

APPENDIX S: Psychometric Properties of the Appraisal of Implementation of the
New Curriculum Scale

Means And Standard Deviations of the Items In Appraisal of Implementation of the
New Curriculum Scale

Item number	N	Mean	Standard Deviation
1	147	3.41	1.38
2	147	3.41	1.37
3	147	3.79	1.33
4	147	3.46	1.46
5	147	2.69	1.42

Item-total Correlations of the Items In Appraisal of Implementation of the New
Curriculum Scale

Item number	Corrected Item- Total Correlation
1	.19
2	.35
3	.42
4	.53
5	.18

APPENDIX T: Perceived Resources During the Implementation of the New
Curriculum Scale

1) Ders verdiğiniz sınıflar ortalama kaç kişilik?

.... —15 () 15–25 () 25–35 () 35–45 () 45-....()

2) Çalıştığınız okulda ailelerin genelde eğitim düzeyi nedir?

Düşük () İlköğretim () Lise () Yüksek ()

3) Çalıştığınız okulda ailelerin genelde ekonomik düzeyi nedir?

Yoksul () Düşük gelirli () Orta gelirli () İyi () Varlıklı ()

4) Çalıştığınız okul derslerinizde ihtiyaç duyduğunuz malzemeyi sağlamada yeterli mi?

Hiç yeterli değil () Yeterli değil () Yeterli () Oldukça yeterli ()

APPENDIX U: Psychometric Properties of the Perceived Resources During the
Implementation of the New Curriculum Scale

Means And Standard Deviations of the Items In Perceived Resources During the
Implementation of the New Curriculum Scale

Item number	N	Mean	Standard Deviation
1	151	3.36	.81
2	151	2.35	.93
3	151	2.88	.97
4	151	2.64	.77

Item-total Correlations of the Items In Perceived Resources During the
Implementation of the New Curriculum Scale

Item number	Corrected Item- Total Correlation
1	.05
2	.70
3	.71
4	.62

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