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# PREDICTIVE POWER OF MATH ANXIETY AND PERCEIVED SOCIAL SUPPORT FROM TEACHER FOR PRIMARY STUDENTS' MATHEMATICS ACHIEVEMENT

## (İLKÖĞRETİM ÖĞRENCİLERİNİN MATEMATİK KAYGISININ VE ÖĞRETMEN SOSYAL DESTEĞİNİN MATEMATİK BAŞARILARINI YORDAMA GÜCÜ)

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## ABSTRACT

This study aims to determine the predictive power of math anxiety and perceived social support from teacher for mathematics achievement of primary students. The sample was consisted of 292 Primary School students (156 girls and 136 boys) attending 7th and 8th grade. For such a correlational study, "Math Anxiety Scale" developed by Erol (***) to determine student' mathematics anxiety and "Perceived Social Support Scale-Revised/Teacher Support Subscale" developed by Yıldırm (***) to determine students' teacher support perception were used. Averages of students' mathematics scores in the first term of 2007-2008 academic year were taken as mathematic achievement scores. The obtained data were analyzed by means of a package program for Windows called SPSS 11.5. Independent-Sample t Test, Pearson Correlation Analyze and Regression Analyze were employed to analyze the obtained data. Results of the study revealed that math anxiety and teacher support are significant predictors of students' math achievements. Math anxiety is a more powerful predictor for male students' math achievements regarding gender. For female students, teacher support is a more powerful predictor for math achievement.

**Keywords:** Math Anxiety, Perceived Teacher Support and Mathematics Achievement

## ÖZ

Bu çalışmanın amacı, öğrencilerinin matematik dersi kaygıları ile algıladıkları öğretmen sosyal desteğinin matematik başarılarını yordama gücünün belirlenmesidir. Araştırmanın çalışma grubunu İstanbul'da bir ilköğretim okulunda 2007–2008 eğitim öğretim bahar yarıyılında okuyan 156'sı kız, 136'sı erkek olmak üzere toplam 292 ilköğretim 7. ve 8. sınıf öğrencisi oluşturmaktadır. İlişkisel tarama türü olan bu araştırmada öğrencilerin matematik kaygısı puanlarını belirlemek amacıyla Erol tarafından geliştirilen "Matematik Kaygısı Ölçeği", öğrencilerin algıladıkları öğretmen sosyal desteği puanlarını belirlemek amacıyla Yıldırım tarafından geliştirilen Algılanan Sosyal Destek Ölçeği'nin "Öğretmen Desteği Alt Ölçeği" kullanılmıştır. Öğrencilerin dönem sonu matematik dersi ortalamaları matematik başarı puanı olarak kabul edilmiştir. Verilerin çözümlenmesinde Bağımsız Gruplar t Testi, Pearson Korelasyon Analizi ve Çoklu Regresyon Analizi istatistiksel yöntemleri kullanılmıştır. Verilerin analizinde SSPS 11,5 Windows için istatistik paket programından yararlanılmıştır. Araştırmanın bulguları, matematik kaygısı ve öğretmen desteğinin öğrencilerin matematik başarılarının anlamlı yordayıcısı olduklarını ortaya çıkarmıştır. Cinsiyete göre bakıldığı zaman, erkek öğrenciler için matematik kaygısı, kız öğrenciler için ise öğretmen desteği puanın matematik başarısını daha fazla yordadığı görülmüştür.

**Anahtar sözcükler:** Matematik Kaygısı, Algılanan Öğretmen Sosyal Desteği ve Matematik Başarısı

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## INTRODUCTION

Mathematics is one of the fundamental skills an individual of modern societies needs in sustaining his daily life. A research of National Research Council (1989) shows that the basics of mathematics and geometry fields are essential for specialization in 75 percent of all occupations. Tobias (1993) stresses the effect of basic high school maths knowledge on achievement and failure in examinations done for employment in army and in private and public sectors. Similarly, mathematical skills and knowledge are detrimental in achievement in KPSS exam held for employment in public sector in our country.

Mathematics courses are often highly considered by school administrations, parents and students in Turkey, but the desired level of success has not been reached yet. Turkish students are having a poor performance in examinations held in both national and international level. For instance, in 2003, Turkey was 34th among 41 countries in mathematics-weighted program PISA (Programme for International Student Assessment). In addition, with a country average score of 424, Turkey was far below the Organization for Economic Co-operation and Development (OECD) average in PISA 2006 (OECD, 18.03.2008). Other indicators of the poor mathematics performance are the OKS and ÖSS exams. Although mathematics questions have the highest points, the lowest average scores are obtained in math section of these exams (Milli Eğitim Bakanlığı, 10.08.2009; OSYM, 19.08.2009).

In this research, the predictive strength of math anxiety and perceived social support from teacher in explaining the students' mathematics achievement are investigated. Tobias and Weissbrod (1980, 64) describe math anxiety as "the panic, helplessness, paralysis, and mental disorganization that arises among some people when they are required to solve a mathematical problem". On the other hand, Richardson and Suinn (1972, 551) defines it as "feelings of tension and anxiety that interfere with the manipulation of numbers and the solving of mathematical problems in a wide variety of ordinary life and academic situations".

Although math anxiety is not hereditary, the confidence of parents on their own mathematical skills and their attitudes affects the feelings of children towards math. Besides parents, views of the teachers and peers are also influential in the increase or decrease of students' confidence in their mathematical skills (Shields, 2006; Alcı, 2001; He, 2007). Affective and cognitive alleviating strategies help in decreasing anxiety. Affective suggestion focuses on psychological interventions such as peer support groups, counseling and relaxation techniques. On the other hand, cognitive suggestion accepts the assumption that the more the students learn about the content the less the anxiety they have (Shields, 2006).

Research results show that high math anxiety is correlated with poor mathematics performance, low math grades, poor math achievement in selection exams and poor performance in mathematics field at university (Betz, 1978; Erol, 1989; Pajares and Miller, 1994; Ramirez and Dockweiler, 1987; Wigfield & Meece, 1988). In his meta-analysis on 26 studies investigating the relationship between math anxiety and mathematics achievement in primary and secondary schools, Ma (1999) has found that there is a significant negative relation (r=-0,27) between these variables in all studies. In addition, there are research results showing that the anxiety increases with the education grade, reaches a maximum at $9^{th}$ and $10^{th}$ grade and then tends to decrease ( Tektaş, 2002; He, 2007).

The research on the relationship between math anxiety and gender shows different results. Woodard ([15.06.2008]) mentions that in many research female students are found to have higher anxiety. The study of Gierl and Bisanz (1995) shows that there is no relation between gender of students and their math anxiety in early ages. Bernstein, Reilly and Cote'Bonanno (1992) have compared the math anxiety of boys and girls and they found similar results. However, these researchers found that male students began to be less anxious than females in 14 years age. In other words, although gender has no effect on anxiety in early ages, girls are found to be more anxious as they are grown up. This situation points out that gender appears as a factor determining the math anxiety of students not because of the biological differences but due to cultural reasons. The widely accepted belief in society that girls are not good in math may cause girls feel more anxious in cases requiring mathematical skills (Bernstein and Cote-Bonanno, 1992).

In this research, perceived social support from teacher and the math anxiety is considered as a factor affecting the math achievement of students. Social support assures the individual that he is loved, protected, respected, appreciated and that he is a member of a reciprocal communication network (Cobb, 1976, 300). Many researches claim that the support provided by other people improves the abilities of individual in combating stress and enhances the psychological happiness (House, Umberson and Landis, 1988; Kaymakçıoğlu, 2001; Thoits, 1982; Turner and Marino, 1994).

The most important sources of support for students are their families, peers and teachers whom they interact most. In a study with 12 years old $7^{th}$ grade students, Laugesen and others (2003) found that the social support provided by family has preventive effect on possible anxiety, fear and depression cases occurring in kids. Demaray and Malecki (2002b) indicated that the social support perceived from family, peers and teachers is related with the social, emotional and behavioral signs (adaptive skills, learned behaviors, problem behaviors) of students. It is also pointed out that the one perceived from family is the most influential factor among the social support sources determining

behavioral signs. In a study on 2918 young people whose ages vary between 12 and 14 years; Helsen, Vollebergh and Meeus (2000) have found that the perceived social support shifts from family support towards peers support. In this period, family support gradually declines and peers support gains strength besides continuing to be the most detrimental factor of psychological problems.

Besides families and peers, their teachers are also an important source of support for students. Teachers support children in growing as independent individuals and help them for the improvement of their personality (Sayar, 2006). Demaray and Malecki (2002a; 2002b) indicate that the adaptation of students to school and their attitudes towards teachers and towards school is closely related with teacher support. These researchers also showed that the social skills, problem behaviors and core personality notion of students are related to the social support that they perceive from teachers (2001). Sayar (2006) mentions a positive correlation between the psychological happiness of students and social support perceived from teachers and a negative correlation between depressive signs and such support.

Studies on understanding the relation between social support and school outputs shows that social support directly or indirectly affects the exam performances, achievement test results and school grades of students (Baştürk, 2002; Bowen, Lawrence and Richman, 2000; Chen, 2003; Cutrona, Cole, Colangelo, Assouline and Russell, 1994; Demaray and Malecki, 2002a, 2002b, 2003, 2005, 2006; Karadağ, 2007; Yıldırım, 2000, 2006).

Regarding the social support and gender relation, research results differ, as they do in math anxiety. Although some researches confirm that women have wider social network, recent researches point out that the size of social networks of women and men are more or less the same (Umberson, Meichu, House, Hopkins and Slaten, 1996).

In this study, the effect of math anxiety and perceived social support from teacher related to gender on mathematics achievement is investigated. Perceptions related to gender have different properties in different societies. Therefore, another aim of this study is to understand how cultural aspects affect the students with different genders in Turkey. Shields (2006) points out that 45 percent of students meet with math anxiety for the first time when they are in $6^{th}$, $7^{th}$ and $8^{th}$ grade and the reason for this is that they learn equations. This research is also on students of $7^{th}$ and $8^{th}$ grade.

## METHOD

The correlation model was used in this research since it aimed to determine the relation between math anxiety and teacher support and to

investigate the gender based affect of these two variables on math achievement.

The sample consisted of 292 Istanbul Kartal İhsan Bayrakçı Primary School students (156 girls and 136 boys) who attend 7th and 8th grade.

The data was gathered by means of students' math anxiety scale and perceived teacher social support scale, which was a subscale of perceived social support scale. The gender of students was determined with the help of demographic information form. Final grades of students in mathematics were accepted as the achievement scores of mathematics.

***Math anxiety scale,*** developed by Erol (1989), was used in measuring the math anxiety of students in this study. For the reliability of scale, the internal consistency coefficient (Cronbach alpha) was calculated as 0,91 (for n=350) in Erol's study and factor analysis resulted in 6 significant factors (Erol, 1989). In this research, on the other hand, Cronbach alpha was found to be 0,93 (for n=292). Four step Likert type scale consisting of 45 elements had a minimum value of 45 and a maximum of 180. Higher values of scale correspond to higher math anxiety.

***Perceived social support scale/teacher support subscale:*** This scale was developed by Yıldırım in 1997 and revised in 2004, again by same researcher. The scale consisting of 50 elements had 3 subscales which were perceived social support from family, peers and teacher (Yıldırım, 2004a). Yıldırım (1997) used a sample of 660 students of 8th, 9th, 10th and 11th grade in testing the validity and reliability of the scale. The test-retest reliability coefficient was 0,91 for total; 0,89 for family support subscale, 0,85 for peers support subscale and 0,86 for teacher support subscale. The Cronbach internal consistency coefficient was calculated as 0,91 for the whole scale, 0,94 for family support, 0,91 for peer support and 0,93 for teacher support (Yıldırım, 2004a).

Only teacher support subscale was used in line with the purpose of this study. The internal consistency coefficient of teacher support subscale in this study was computed as 0,90.

The questionnaire and the scales were applied to the students of the previously determined school and one class hour was given to the students to answer them. The time was sufficient for all the respondents. SPSS 11.5 for windows statistics package was employed in analysis of data.

## RESULTS

***The effect of perceived social support and math anxiety on math achievement***: A multiple regression model is used for analyzing the effect of independent variables math anxiety and perceived social support on dependent variable math achievement. Regression analysis requires linear relations

between each of independent variables and dependent variable. Therefore, Pearson correlation analysis is employed to determine the relation between dependent variable and independent variables before the regression analysis. The results are given in table 3.1.

**Table 3.1. Results of Correlation Analysis Between Independent Variables and Dependent Variable**

| Variables | N | r | P |
|---|---|---|---|
| Math Anxiety & Math Achievement | 292 | -,59** | ,00 |
| Perceived Teacher Social Support & Math Achievement | 292 | ,55** | ,00 |

*** p<,01*

Table 3.1 demonstrates that there is statistically significant inverse relation between math anxiety and math achievement and a positive relationship between perceived teacher social support and math achievement.

Considering these results, a regression model (mathematical model) which explains math achievement as a linear function of math anxiety and perceived teacher social support can be written as:

$$\text{Mat. Ach.} = C_0 + C_1 * \text{Mat. Anx} + C_2 * \text{Teach. Soc.Sup.}$$

The multiple regression analysis results of the model above are given in Table 3.2

**Table 3.2. The Multiple Regression Analysis Results of the Model Explaining Math Achievement as a Function of Math Anxiety and Perceived Teacher Social Support**

| Variables | Unstandardized Coefficients | | Standardized Coefficients | t | p |
|---|---|---|---|---|---|
| | *B* | *SE* | *Beta* | | |
| Intercept | 61,09 | 7,07 | | 8,64 | ,00 |
| Math Anxiety | -14,60 | 1,82 | -,42 | -8,02 | ,00 |
| Perceived Teacher Social Support | 12,31 | 2,00 | ,32 | 6,13 | ,00 |

*R= ,655 R²= ,43 F= 108,832 (P=,000)*

Table 3.2 presents that the t-statistics for math anxiety is -8,02 when significance level is p=,00 and it is 6,13 for teacher social support for same significance level. The F statistics, which shows the joint power of the independent variables in explaining the changes in dependent variable, is computed as 108,83 at p=0,00 significance level. The mentioned independent variables explain the 43 % of the variation in dependent variable math achievement. The results in Table 3.2 affirm that holding everything else constant; one unit increase in math anxiety will reduce the math achievement by 14,60 points, and 1 unit increase in perceived teacher social support will increase math achievement by 12,31 points. Thus, the explicit regression equation for estimating the math achievement can be written as:

$$\text{Mat. Ach.} = 61{,}093 - 14{,}602 * \text{Mat. Anx.} + 12{,}314 * \text{Teach. Soc.Sup.}$$

***Explaining the effect of the perceived teacher social support and math anxiety on math achievement of female students:*** The correlation coefficients between math achievement of female students and math anxiety and perceived teacher social support are given in Table 3.3 with their significance level.

**Table 3.3. The Analysis Results of Correlation Between Dependent Variable and Independent Variables for Female Students**

| Variables | N | r | P |
|---|---|---|---|
| Math Anxiety & Math Achievement | 156 | -,56** | ,00 |
| Perceived Teacher Social Support & Math Achievement | 156 | ,56** | ,00 |

*** p<,01*

Table 3.3 shows that there is statistically significant inverse relation between math anxiety and math achievement and a positive relation between perceived teacher social support and math achievement for female students.

Considering these results, a regression model (mathematical model) which explains math achievement of female students as a linear function of math anxiety and perceived teacher social support can be written as:

$$\text{Mat. Ach.} = C_0 + C_1 * \text{Mat. Anx} + C_2 * \text{Teach. Soc.Sup.}$$

The multiple regression analysis results are given in Table 3.4

**Table 3. 4. The Multiple Regression Analysis Results of the Model Explaining Math Achievement of Female Students as a Function of Math Anxiety and Perceived Teacher Social Support**

| Variables | Unstandard Coefficients | | Standardized Coefficients | t | p |
|---|---|---|---|---|---|
| | *B* | *SE* | *Beta* | | |
| Intercept | 55,78 | 9,42 | | 5,92 | ,00 |
| Math Anxiety | -12,34 | 2,40 | -,37 | -5,13 | ,00 |
| Perceived Teacher Social Support | 13,42 | 2,62 | ,37 | 5,11 | ,00 |
| *R= ,64* *R²= ,41* | | *F= 54,83 (P=,00)* | | | |

Table 3.4 on female students point out that the t-statistics for math anxiety is -5,13 when significance level is p=,00 and it is 5,11 for teacher social support for the same significance level. The F statistics, which shows the joint power of the independent variables in explaining the changes in dependent variable, is computed as 54,83 at p=0,00 significance level. The mentioned independent variables explain the 41 % of the variation in dependent variable math achievement. The results in Table 3.4 assert that holding everything else constant; one unit increase in math anxiety will reduce the math achievement by 12,34 points, and 1 unit increase in perceived teacher social support will increase math achievement by 13,42 points. Regression results show that the perceived social support has relatively larger effect on math achievement of female students. Thus, the explicit regression equation for estimating the math achievement can be written as:

$$\text{Mat. Ach.} = 55{,}78 - 12{,}34 * \text{Mat. Anx.} + 13{,}42 * \text{Teach.Soc.Sup.}$$

***Explaining the effect of the perceived teacher social support and math anxiety on math achievement of male students:*** The correlation coefficients between math achievement of male students and math anxiety and perceived teacher social support are given in Table 3.5 with their significance level.

**Table 3.5 The Analysis Results of Correlation Between Dependent Variable and Independent Variables for Male Students**

| Variables | N | r | P |
|---|---|---|---|
| Math Anxiety & Math Achievement | 136 | -,64** | ,00 |
| Perceived Teacher Social Support & Math Achievement | 136 | ,50** | ,00 |

*** p<,01*

Table 3.5 demonstrates that there is statistically significant inverse relation between math anxiety and math achievement and a positive relation between perceived teacher social support and math achievement for male students.

Considering these results, a regression model (mathematical model) which explains math achievement of male students as a linear function of math anxiety and perceived teacher social support can be written as:

$$\text{Mat. Ach.} = C_0 + C_1 * \text{Mat. Anx} + C_2 * \text{Teach. Soc.Sup.}$$

The multiple regression analysis results are given in Table 3.6

**Table 3. 6: The Multiple Regression Analysis Results of the Model Explaining Math Achievement of Male Students as a Function of Math Anxiety and Perceived Teacher Social Support**

| **Variables** | **Unstandard Coefficients** | | **Standardized Coefficients** | **t** | **p** |
|---|---|---|---|---|---|
| | *B* | *SE* | *Beta* | | |
| Intercept | 74,43 | 10,77 | | 6,91 | ,00 |
| Math Anxiety | -18,26 | 2,74 | -,52 | -6,65 | ,00 |
| Perceived Teacher Social Support | 8,37 | 3,16 | ,20 | 2,64 | ,00 |
| *R= ,66* *R²= ,43* | *F= 52,95 (P=,00)* | | | | |

Table 3.6 on male students shows that the t-statistics for math anxiety is -6,65 when the significance level is p=000 and it is 2,64 for teacher social support for the same significance level. The F statistics, which shows the joint power of the independent variables in explaining the changes in dependent variable, is computed as 52,95 at p=0,00 significance level. The mentioned independent variables explain the 43 % of the variation in dependent variable math achievement. The results in Table 3.6 describes that holding everything else constant; one unit increase in math anxiety will reduce the math achievement by 18,26 points, and 1 unit increase in perceived teacher social support will increase math achievement by 8,37 points. Regression results show that the math anxiety has relatively larger effect on math achievement of male students. Thus, the explicit regression equation for estimating the math achievement can be written as:

$$\text{Mat. Ach.} = 74{,}43 - 18{,}26 * \text{Mat. Anx.} + 8{,}37 * \text{Teach. Soc.Sup.}$$

## DISCUSSION

Predictive power of math anxiety and perceived social support from teacher for mathematics achievement of students is investigated in this study. For this purpose, the relation between math anxiety and perceived social support from teachers is analyzed firstly. The results of the research indicate that an increase in math anxiety reduces math achievement but perceived teacher support results in an increase in it for both genders. In addition, it is shown that both math anxiety and perceived teacher support have significant effect in variation of math achievement of students. Considering the gender issue, although perceived teacher support is more influential on math achievement of female students, math anxiety is found to be more significant in explaining the achievements of males. These results are in line with the previous research indicating a significant negative relation between math anxiety and achievement (Wigfield and Meece, 1988; Erol, 1989; Bates, 2007; Eldemir, 2005; Ma, 1999) and a significant positive relation between teacher support and math achievement (Chen [27.02.2008], Karadağ, 2007; Yıldırım, S. 2006).

The most important result of the research is that math anxiety and teacher support explains 43 % of variation in math achievement for male students and for the whole group, though this ratio is 41 % for females. In other words, students are more successful when they have less anxiety and when they are supported more by teacher. It is striking that these two affective factors explain an important portion of achievement. Therefore, it might be recommended that teachers should avoid the factors causing anxiety and they should provide support that is more social to students in class. Jackson and Leffingwell (1999) have found that teachers' behaviors like negative speech, insufficient feedback, ignoring students or disappointing them may cause math anxiety in a period starting from kindergarten to college,. All these negative behaviors are also signs of lack of teacher support. In other words, the more the social support the less is the anxiety. Research reveals that social support assists students in adaptation to school (Demaray and Malecki, 2002b, 2005; Bowen and Brewster, 1998). Students attuned to school, on the other hand, are more interested in their studies and they are more successful.

Considering the gender factor, the fact that teacher's social support is more effective on female students' math achievement can be the result of more social support that female students perceive. However, this point needs more evidence.

In summary, math anxiety level and teacher social support are found significant in explaining students' mathematics achievement. The institutions educating teachers should focus on methods for and importance of improving the affective skills of teacher candidates besides improving their cognitive skills in occupational courses. For this purpose, there is a need for further

research and study on determining the teacher behaviors both improving the social support perception and reducing the anxiety of students.

## KAYNAKÇA

Alcı, B. (2007). Yıldız Teknik Üniversitesi öğrencilerinin, matematik başarıları ile algıladıkları problem çözme becerileri, özyeterlik algıları, bilişüstü özdüzenleme stratejileri ve öss sayısal puanları, arasındaki ve yordayıcı ilişkiler örüntüsü. Doktora Tezi. Yıldız Teknik Üniversitesi Sosyal Bilimler Enstitüsü.

Baştürk, D. (2002)**.** Ortaöğretim kurumlarındaki öğrencilerde algılanan sosyal desteğin akademik başarı üzerindeki etkisi. Yüksek Lisans Tezi. Selçuk Üniversitesi Sosyal Bilimler Enstitüsü.

Bates, Vincent M. (2007). The impact of preparedness, self-efficacy, and math anxiety on the success of African American males in developmental mathematics at a community college. Doktora Tezi. Morgan State University.

Bernstein, J., L. ., & Cote-Bonanno J. (1992). Barriers to women entering the workforce: math anxiety. (Report No. CE 064 012). Montclair, NJ: Montclair State College, *Life Skills Center*. (Eric Document Reproduction Service No. ED 359 381)

Betz, N. E. (1978). Prevalence, distribution, and correlates of math anxiety in college students. *Journal of Counseling Psychology, 25*:441-48.

Bowen, G. L., Rosenfeld L. B., & Richman J. M. (2000). Social support networks and school outcomes: The centrality of the teacher. *Child and Adolescent Social Work Journal, 17*(3):205-226.

Bowen N., & Brewster A. (1998). Sense of school coherence, perceptions, of danger at school, and teacher support among youth at risk of school failure. *Child and Adolescent Social Work Journal, 15*(4):273-86

Chen, L. J. [27.02.2008] "Academic Support From Parents, Teachers, and Peers: Relation to Hong Kong Adolescents Academic Behavior and Achievement". http://www.gse.harvard.edu/hfrp/projects/fine/resources/digest/hong_kong.html.

Cutrano, C. E., et.al. (1994). Parental social support and academic achievement: an attachment theory perspective. *Journal of Personality and Social Psychology. 66*(2):369-78.

Demaray, M. K., & Malecki C. K. (2001). Mesuring percieved social support: development of the child and adolescent social support scale (CASSS). *Psychology in the Schools. 39*(1):1-18.
Demaray, M. K., & Malecki C. K.

Demaray, M. K., & Malecki C. K. (2002a). Critical levels of perceived social support associated with student adjustment. *School Psychology Quarterly. 17*:213–41.

Demaray, M. K., & Malecki C. K. (2002b). The relationship between perceived social support and maladjustment for students at risk. *Psychology in the Schools. 39*:305–16.

Demaray, M. K., & Malecki C. K. (2003). Carrying a weapon to school and perceptions of social support in an urban middle school. *Journal of Emotional and Behavioral Disorders. 11*(3):169-78.

Demaray, M. K., & Malecki C. K. (2005). The relationship between social support and student sdjustment: A longtitudinal analysis. *Psychology in the Schools. 42*: 691–706.

Demaray, M. K., & Malecki C. K. (2006). Social support as a buffer in the relationship between socioeconomic status and scademic performance. *School Psychology Quarterly. 21*(4): 375-95.

Eldemir, H. H. (2006). Sınıf öğretmeni adaylarının matematik kaygısının bazı psiko-sosyal değişkenler açısından incelenmesi. Yüksek Lisans Tezi. Cumhuriyet Üniversitesi Sosyal Bilimler Enstitüsü.

Erktin, E., Dönmez. G., & Özel S. (2006). Matematik kaygısı ölçeğinin psikometrik özellikleri. *Eğitim ve Bilim, 31* (140): 26-33.

Erol, E. (1989). Prevalence and correlates of math anxiety in Turkish high school students. Master's Thesis. Boğaziçi Üniversity, Institute of Social Sciences.

He, H. (2007). Adolescents percepeption of parental and peer mathematics anxiety and attitude toward mathematics: a comparative study of european-american and mainland-chinese student. Unpublished PhD dissertation. Washington State University College of Education.

Helsen, M., Vollebergh W., & Meeus W. (2000). Social support from parents and friends and emotional problems in adolescence. *Journal of Youth and Adolescence, 3*(29), 319-35.

House, James S., D. Umberson., & K. R. Landis. (1988). Structures adm Processes of Social Support. *Annual Review of Sociology, 14*:293-318.

Jackson, C. D., Leffingwell J. R. (1999). The Role of the instructors in creating math anxiety in students from kindergarten through College. *The Mathematics Teacher, 92*(7):583-86.

Karadağ, İ. (2007). İlköğretim beşinci sınıf öğrencilerinin akademik başarılarının sosyal destek kaynakları açısından incelenmesi. Yüksek Lisans Tezi. Çukurova Üniversitesi Sosyal Bilimler Enstitüsü.

Laugesen, N., Dugas M. J., & Bukowski W. M. (2003). The relationship between perceived social support and worry in adolescence. Poster presented at the *37th Annual Convention for the Assocition for the Advancement of Behavior Therapy*, Boston, MA.

Ma, X., N. Kishor (1997). Assessing the relationship between attitude toward mathematics and achievement in mathematics: a meta analysis. *Journal for Research in Mathematics Education, 28*:26-47.

Miller, F. B. (1991). The influence of the family and social environment (aktaran sayar, melisa. 2006. a longitudinal study of the relationship between percieved social support and psychological well-being of adolescent from low socioeconomic status. Yüksek Lisans Tezi. Boğaziçi University, Institute of Social Sciences).

Milli Eğitim Bakanlığı [10.08.2009]. Merkezi Sistem Sınavları http://egitek.meb.gov.tr/Sinavlar/index.asp

National Research Council (1989). *Everybody counts: a report to the nation on the future of mathematics education***.** Washington, DC: National Academy Press.

OSYM. [19.08.2009]. Geçmiş yıllara ait sınav bilgileri. http://www.osym.gov.tr/BelgeGoster.aspx?F6E10F8892433CFFAC8287D72AD903BE8F59EC4393613791

Pajares, F., & Miller D. (1994). Role of self-efficacy and self-concept beliefs in mathematical problem solving: a path analysis. *Journal of Educational Psychology, 86*:193-203.

Pisa OECD. [18.05.2008]. Pisa 2003 and 2006 Results. http://www.pisa.oecd.org

Ramirez, O. M., & Dockweiler C. J. (1987). Mathematics anxiety: a systematic review. In R.Schwarzer, H. M. Van Der Ploeg, C. D. Spielberger (Eds.), *Advanced in Test Anxiety Research, 5*, 157-175. Berwyn, PA: Swetz North America.

Richardson, F. C., & Suinn R. M. (1972). The mathematics anxiety rating scale: Psychometric data**.** *Journal of Counseling Psychology, 19*, 551-54.

Sayar, M. (2006). A longitudinal study of the relationship between perceived social support and psychological well-being of adolescent from low socioeconomic status. Yüksek Lisans Tezi. Boğaziçi Üniversity, Institute of Social Sciences.

Shields, D. J. (2006). Causes of math anxiety: the student perspective. Doktora Tezi. Indiana University of Pennyslvania.

Suinn, R. M., Taylor S., & Edwards R. W. (1988). Suinn mathematics anxiety rating scale for elementary school students (MARS-E): Psychometric and normative data**.** *Educational and Psychological Measurement, 48*, 979-86.

Tektaş, A. H. (2002). Effects of math learning journals on mathematics achievement, attitudes toward mathematics and mathematics anxiety. Yüksek Lisans Tezi. Boğaziçi Üniversity, Institute for Graduate Student in Science and Engineering.

Tobias, S., & Weissbrod C. (1980). Anxiety and mathematics: An update**.** *Harvard Educational Review, 50*: 63-70.

Tobias, S. (1993). *Overcoming math anxiety.* New York: W. W. Norton Company, Inc.

Umberson, D., Meichu D. C., House J. S., Hopkins K., & Slaten E. (1996). The effect of social relationships on psychological well-being: Are men and women really so different? *American Sociological Review, 61*:837-57.

Wigfield, A., & Meece J. L. (1988). Math anxiety in elementary and secondary school students. *Journal of Educational Psycholog, 80*:210-16.

Woodard, T. [15.06.2008]. The Effect of Math Anxiety on Post-Secondary Developmental Student as Related to Achievement, Gender, and Age. http://www.vccaedu.org/inquiry/inquiry-spring2004/i-91-woodard.html

Yıldırım, İ. (1997). Algılanan sosyal destek ölçeğinin geliştirilmesi: Güvenirliği ve geçerliği. *Hacettepe Eğitim Fakültesi Dergisi, 13*:81-87.

Yıldırım, İ. (2004a). Algılanan sosyal destek ölçeğinin revizyonu. *Eğitim Araştırmaları (Eurasian Journal of Educational Research). 17*:221-36.

Yıldırım, İ. (2004b). Depresyonun yordayıcısı olarak sınav kaygısı, gündelik sıkıntılar ve sosyal destek. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi. 27*:241-50

Yıldırım, İ. (2006). Akademik başarının yordayıcısı olarak gündelik sıkıntılar ve sosyal destek. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 30*:258-67.

Yıldırım, S. (2006). Validity, reliability, and partial norm study of the Turkish teacher's acceptance-rejection/control questionnaire child short form. Yüksek Lisans Tezi. Boğaziçi Üniversity, Institute of Social Sciences.