Analysis of Primary School Student's Science Learning Anxiety According to Some Variables

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Abstract

On this research, it is analyzed if the science learning anxiety level shows difference according to variables which are gender, grade level, science lesson grade, mother education, father education level. Scanning Design is used for this study. Research working group is consisted of 294 primary school from 6th, 7th and 8th graders on 2015 – 2016 education year. For data collection, "Science Learning Anxiety Scale (SLAS)" is used. As a result of the research, it is mentioned that students' science learning anxiety is on an average level. On the other hand, it is analyzed that on learners' science learning anxiety, there is no effect of sex, but science lesson grades as well as mother and father education level variables ($p < 0.05$) has got an effect on relevance level.

Keywords: Science, Anxiety, Science Learning Anxiety, Science Lesson Grade

1. Introduction

The basic reason for the failure of learners because of science subjects and science classes is the student and teacher oriented factors (Yildirim, 2015). One of these factors is the goals of the learners. Goals that individuals determine for their lives has got three dimensions as cognitive, affective and Phys-motor (Bloom, 1979). There are some cognitive and affective dimension factors that affects achieving determined goals in a successful way. Anxiety, which is analyzed on 19th century by Freud in detail, is on affective dimension. According to Freud, anxiety is described as a feeling that occurs unconsciously because of individual's not being able to have an effective action and self-defense resistance against a confronted danger (Uldas, 2005). Anxiety is also expressed as a feeling that generally creates uneasiness and makes individual to have creativity and constructive behaviors or hinder such behaviors by pushing him or her against an event that is confronted on daily life (Tasdemir, 2015).

Anxiety and attitude that learners have against a subject leads individual differences about learning. Yildirim (2015) described educational anxiety as "Everything that leads to uneasiness, stress, worry, fear, heart throb etc., individual's creating a negative attitude, hindering permanent behavior changes on their life that will occur as a result of his/her interaction with the environment."

Among the reasons for the success of individuals during learning and teaching process, many affective factors like anxiety, attitude and self-sufficiency levels as much as cognitive factors (Krylova, 1997; Pribyl & Bodner, 1987; Rixse & Pickering, 1985; Sevenair, Carmichael, O'Connor & Hunter, 1987; Turner & Lindsay, 2003). It is not possible to have success without getting rid of learners' previous negative experiences against lessons and factors that can lead anxiety. As a result of a study of him, Learner (1993) found out that anxiety of learners hinders individual to think related with lesson and establishing a relationship and organization between information (Rotella & Learner, 1993).

Anxiety has got positive effects that contributes to individuals as well as the negative effects during learning process. For example, individual's preparing himself or herself against situations like pain, separation and injury is *stimulus,* his/her taking precautions against possible negative happenings is *protective* and the ambition to study more and more against becoming unsuccessful can be named as *motivating* characteristics (Akgün, Gönen & Aydin, 2007). As a result, Allwright and Bailey (1991) expressed that anxiety actually is not a feeling to be avoided. This means, individual makes his/her anxiety positive and if he/she can manage it correctly, anxiety will have a positive effect on learning.

Science Anxiety is described as being scared from science concepts, situations related with science and scientists (Mallow, 1986). It is also expressed as tension that hinders using equipment on academical subjects and scientific subjects (Seligman, Walker & Rossenhan 2001). Science learning anxiety that creates a serious hinder for learning science subjects is a significant element that affects learners' interest for science lessons, their attendance, even career choice (Ulucinar-Sagir, 2014; Udo, Ramsey & Mallow, 2004). The expectation that female learners will have a lower success when compared to males and the idea that science intelligence is hereditary creates anxiety for students against learning science (Erökten, 2010; Mallow, 1994; Mallow & Greenburg, 1983).

When the literature on anxiety is analyzed, it is seen that subjects are mainly on maths anxiety level (Akgün, Gönen, Aydin, & 2007; Sirmacı, 2007; Aydın, Ertekin, Delice & Dilmaç, 2009; Dursun & Bindak, 2011; Tasdemir, 2015; Yurt & Kurnaz, 2015; Onder & Gelbal, 2016) On the studies about science anxiety, subjects like anxiety of university students and (Greenburg & Mallow, 1982; Mallow & Greenburg, 1983; Mallow, 1994;

Udo, Ramsey & Mallow, 2004; Mallow & et al. 2010), concern for science teaching (Marso & Pigge, 1998; Yürük, 2011), anxiety against chemisty and chemistry lab. (Bowen, 1999; Azizoglu & Uzuntiryaki, 2006; Yücel, 2008; Anılan, Görgülü & Balbag, 2009; Erökten, 2010) are common. Yildirim (2015), Ulucinar-Sagir (2014), Kagitci & Kurbanoglu (2013) had contributions to literature about subject with their study about anxiety scale about science.

As a result of their study, Mallow and Greenburg (1982), mentioned that learners have got science anxiety, but there is not enough research on them. To determine the anxiety level on learning science classes and learn about factors that have an effect on anxiety is a significant problem area. When the subject is analyzed from this perspective, the research is thought to have a contribution to literature for determining the variables that affect learners' science learning anxiety.

1.1. The aim of research

On this research, it is aimed to determine with which variables is science learning anxiety of 6th, 7th and 8th grade students. On the frame of this research, answers for research questions below are searched:

- Does the science learning anxiety of 6th, 7th and 8th grade students show difference according to their gender?
- Does the science learning anxiety of 6th, 7th and 8th grade students show difference according to their grade level?
- Does the science learning anxiety of 6th, 7th and 8th grade students show difference according to science lesson grade?
- Does the science learning anxiety of 6th, 7th and 8th grade students show difference according to their mother's education level?
- Does the science learning anxiety of 6th, 7th and 8th grade learners show difference according to their father's education level?

2. Method

On this study, scanning design, which is a qualitative research method, is used. Scanning Design is to describe the environment's attitude, tendency or opinions through the analysis on samples that are chosen from the environment of the research (Bursal, 2014, 155).

2.1. Research group

Environment of this study is consisted of 6th, 7th and 8th grade students from 2015-2016 educational year from Kahramanmaras city. Examples of the research is including 294 students that are chosen from the environment with suitable exemplifying method. Suitable exemplifying method is the one that stops the waste of elements like time, work force and money. (Buyukozturk, et al., 2015, 6). Demographic characteristics of student are given in table 1.

When data from table 1 is analyzed, it is seen that examples for the research consists 36.7% (n=108) 6th grade 29.3% (n=86) 7th grade, 34.0% (n=100) 8th grade learners. 43.9% (n=129) of these students are female and 56.1% (n=165) of these students are male.

Tablo 1. Demographic characteristics of student

		f	%
Gender	Female	129	43.9
	Male	165	56.1
Grade Level	6th grade	108	36.7
	7th grade	86	29.3
	8th grade	100	34.0
Academic achievement scores for science lesson	85-100	91	31.0
	70-84	94	32.0
	55-69	86	29.3
	Other	23	7.8
Mother Education Level	Primary- Middle	208	70.7
	High School	66	22.4
	University	20	6.8
Father Education Level	Primary- Middle	115	39.1
	High School	117	39.8
	University	62	21.1
All		294	100.0

2.2. Data Collection Tool.

On this study, "Science Learning Anxiety Scale (SLAS)", whose reliability and validity is provided by Yildirim (2015), is used as the data collection tool. On the scale, there are 19 items in total. While Yildirim (2015) decides the reliability factor as .85, the reliability factor for this study is determined as .89. Scale is prepared according to 5-items Likert scale. On the scale; items are evaluated with number system as 1= strongly disagree, 2=disagree, 3=neutral, 4= agree, 5= totally agree. Science Learning Anxiety Scale (SLAS) consists three (3) factors: Student, Content and Teaching Anxiety (Factor 1), Evasion from lesson scale (Factor 2) and Anxiety towards the lesson (Factor 3). Reliability values for these factors (Cronbach's Alpha) are provided on table 2.

Tablo 2. Science learning anxiety scale and its sub – factors' reliability values

Test Sub Dimensions	Reliability Value
Factor 1	.714
Factor 2	.825
Factor 3	.723
SLAS	**.897**

When data on table-2 is analyzed, it is seen that the reliability of SLAS is (.897) and three factors that it includes are Factor 1 (.714), Factor 2 (.825) and Factor 3 (.723). According to these results; it can be said that SLAS is highly reliable and its sub factors are reliable. On the other hand, in order to find out about the demographical information of learners, "Personal Information Questionnaire", which is prepared by researchers, is used.

2.3. Analysis of Data

Data gathered from samples of the research are analyzed by the help of statistical software IBM SPSS-21. For the evaluation of gathered data, t-test, one direction variance analysis (Anova) test is performed. Also on research, data are evaluated on 0.05 significance level. Its percentage, frequency, average and standard deviation are also given.

3. Findings

On this section, 6th, 7th, 8th graders science learning anxiety field information is analyzed according to different variables and gathered values are presented. Minimum, maximum, average and standard deviation values of SLAS that is used for this study and its sub factors are given on Table-3

Table 3. Values related with descriptive statistical and reliability level of SLAS and its sub- dimensions

Test Sub Dimensions	N	Min	Max	$\bar{x}$	SS
Factor 1		1.00	4.29	2.04	0.75
Factor 2	294	1.00	5.00	2.24	0.92
Factor 3		1.00	5.00	2.54	1.00
SLAS	294	1.00	4.37	2.25	0.78

When data from table-3 is analyzed, it is seen that learners' points' average is the highest on factor 3 that creates the scale. When the average points of scale and factors that create the scale are analyzed, it can be said that learners that attended to research have got a middle level of science learning anxiety.

On this study, the effects of gender, class level, science lesson grade, mother education and father education level on 6th, 7th and 8th graders' science learning anxiety is analyzed.

Firstly, an answer for question "Is the level of science learning anxiety of 6th, 7th,8th grade students as the samples of this research show a difference according to gender?" is searched and t-test results are given on table - 4.

Table 4. Analysis results of t-test that is done according to gender

Test Sub Dimensions	Gender	N	$\bar{x}$	Sd	T	p
SLAS	Female	129	2.17	292	-1.381	.168
	Male	165	2.30			

When t-test results that are given on table-4 are analyzed, it is seen that there is no meaningful difference on the points that learners got from science learning scale (t (292) = -1.381; p>0.05) related with gender. According to these results, it can be said that sex doesn't have a meaningful effect on 6th, 7th and 8th graders' science learning anxiety. It is seen that male students' point average of science learning anxiety ($\bar{X}$= 2.30) is higher than female learners' point average of science learning anxiety ($\bar{X}$=2.17). On this condition, it can be explained that male learners are a little bit more anxious than female learners.

An answer to question "Does the science learning anxiety level of students that are the samples of this research show a meaningful difference according to their grade level?" is searched and gathered frequency, average point, standard deviation and one direction variance analysis (anova) test results are given on table-5 and

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table-6.

Table 5. Frequency, average and standard deviation levels according to grade level

Grade level	SLAS		
	N	$\overline{\text{x}}$	SS
6th Grade (1)	108	2.04	0.76
7th Grade (2)	86	2.39	0.85
8th Grade (3)	100	2.35	0.76
All	294	2.25	0.46

Table 6. One direction variance analysis (anova) results according to grade level

Test Sub- Dimension		Square Sub.	Sd	Square Average	F	p	Reliability (Tukey)
	Between Groups	7.330	2	3.665			
SLAS	In-Group	175.075	291		6.091	0.003*	2>1
	All	182.405	293	.602			3>1

*p<0.05

When the given one direction variance analysis (anova) test results that are given on table 6 are analyzed, a statistical reliability of 0.0.5 level is seen between the points that students got from science learning anxiety level scale (SLAS) [F(2,291)=6.091; p<0.05] and class level. According to this result, it can be said that there is no reliable effect of grade level on 6th, 7th and 8th grade students related with their class level. Turkey analysis, which is done in order to determine from which graders is the reliability caused, it is seen that 7th and 8th grade students science learning anxiety is higher than 6th grade students' science learning anxiety level. So, it can be expressed that increase on class level creates an increase of science learning anxiety level.

On the research, an answer to question "Does the research sample students' science learning anxiety show a difference according to academic achievement scores for science lesson?" is searched and gathered frequency, average point, standard deviation and one direction variance analysis (anova) test results are given on table 7 and table 8.

Table 7. Frequency, average and standard deviation levels according to academic achievement scores for science lesson

Academic achievement scores for science lesson	SLAS		
	N	$\overline{\text{x}}$	SS
85-100 (1)	91	1.84	0.69
70-84 (2)	94	2.38	0.76
55-69 (3)	86	2.57	0.71
Other (4)	23	2.54	0.83
All	294	2.25	0.78

Table 8. One direction variance analysis (anova) results according to academic achievement scores for science lesson

Test Sub Dimensions		Square All	Sd	Square Average	F	p	Reliability (Tukey)
	Between Groups	26.287	3	8.762			4>1, 3>1,
SLAS	In Group	156.117	290		16.277	0.000*	3>2, 2>1
	All	182.405	293	.538			

*p<0.05

When the one direction variance analysis (anova) test results are analyzed on table 8, it is seen that the points that students got from science learning anxiety scale [F (3,293) =16.277; p<0.05], a 0.05 point level statistical reliability is seen according to science lesson grades. According to these results, academic achievement scores for science lesson has got a reliable effect on 6th, 7th and 8th grade students' science learning anxiety level. Turkey analysis, which is done in order to understand from which academic achievement scores for science lesson is the reliability caused, it is seen that; student's in the category other, from the scores 85-100, the ones with academic achievement scores for science lesson among 55-69 has got a higher anxiety than the ones with scores 70-84 and 85-100. Also, students with a scores among 70-84 has got a higher anxiety level than the ones with a note among 85-100. According to this, it can be said that a decrease on the academic achievement scores increases the science learning anxiety level.

An answer to question Does the research sample students' science learning anxiety show a difference according mother education level?" is searched and gathered frequency, average point, standard deviation and one direction variance analysis (anova) test results are given on table 9 and table 10.

Table 9. Frequency, average and standard deviation levels according to mother education level

Education Level	SLAS		
	N	$\overline{x}$	SS
Primary-Mid. (1)	208	2.31	0.76
High School (2)	66	1.99	0.80
University (3)	20	2.40	0.85
All	294	2.25	0.78

Table 10. One direction variance analysis (anova) results according to science lesson grade

Sub dimensions of Test		Square All	Sd	Square Standard	F	p	Reliability (Tukey)
SLAS	Between Groups	5.899	2	2.950			
	In Group	176.506	291	.607	4.863	0.008*	1>2
	All	182.405	293				

*p<0.05

When the one direction variance analysis (anova) test results, which are given on table 10, are analyzed, it is seen that there is a 0.05 levelled statistical reliability according to mother education level on the points [F(2,291)=4.863; p<0.05] that learners got from science learning anxiety scale (SLAS). According to this result, it can be said that there is an effect of mother education level on 6th, 7th, 8th graders' science learning anxiety. On Turkey analysis, which is performed in order to see from which education levels does the effect occur; it is expressed that students whose mother's education level is primary-middle has got a higher level of anxiety when compared with the ones whose mother education level is high school.

An answer to question Does the research sample students' science learning anxiety show a difference according to father education level?" is searched and gathered frequency, average point, standard deviation and one direction variance analysis (anova) test results are given on table 11 and table 12.

Table 11. Frequency, average and standard deviation levels according to father education level

Education Level	SLAS		
	N	$\overline{X}$	SD
Primary-Mid. (1)	115	2.44	0.75
High Sch. (2)	117	2.10	0.73
University (3)	62	2.18	0.87
All	294	2.25	0.78

Tablo 12. One direction variance analysis (anova) results according to father education level

Test Sub Dimensions		Square All	Sd	Square Average	F	p	Reliability (Tukey)
SLAS	Between Groups	7.007	2	3.504			
	In Group	175.397	291	.603	5.813	0.003	1>2
	All	182.405	293				

*p<0.05

When the one direction variance analysis (anova) test results, which are given on table 10, are analyzed, it is seen that there is a 0.05 levelled statistical reliability according to father education level on the points [F(2,291)=5.813; p<0.05] that learners got from science learning anxiety scale (SLAS). According to this result, it can be said that there is an effect of father education level on 6th, 7th and 8th graders' science learning anxiety. On the Tukey analysis that is performed to see from which education level does the effect caused; it is expressed that learners with a primary and middle school graduated father have got a higher level of anxiety than the ones with a high school graduate father.

4. Discussion and Results

On this research, it's aimed to see the 2015-2016 educational year Kahramanmaras 6th, 7th and 8th grade learners' anxiety of science learning and if it changes according to gender, grade level, academic achievement scores for science lesson, mother and father education level.

For data collection, "Science Learning Axiety Scale (SLAS), which is generated and tested for validity and reliability by Yildirim (2015), and also "Personal Information Form" that is generated by researchers and shaped through expert point of views is used. Gathered data' percentage, frequency, standard deviation is calculated. On the other hand, independent variables' effects on students' science learning anxieties are determined in a statistical frame through the applied t-test and one direction variance analysis. When the research results are analyzed, learner averages are gathered as SLAS ($\overline{X}$=2.25), sub dimension Factor 1 ($\overline{X}$=2.04), Factor 2 ($\overline{X}$=2.24), and Factor 3 ($\overline{X}$=2.54). It is seen that 6th, 7th and 8th grade students have got a science learning anxiety

on a middle level.

It is determined that there is no meaningful (p>0.05) statistical difference between male and female students' points that they got from SLAS (t (292) = -1.381; p>0.05).

According to this result, it can be said that gender is not a factor that effects science learning anxieties of 6th, 7th and 8th grade students. This result shows a correlation with the research results of Tekdemir, 2015; Zeybek & Kurbanoglu, 2012; Dursun & et al., 2011; Cooper & Robinson, 1991. Yet, some research results are not correlated with this research. Researchers like Akgün & et al., 2007; Ergene (2011); Sahin (2008) mentioned that there is a difference related with gender and girls have got a higher anxiety level.

It is seen that there is a statistical meaningful (p<0.05) difference on SLAS in terms of students' grade levels [F (2,291) = 6.091; p<0.05]. On performed Tukey test to see in order to determine from which grade do the meaningfulness is caused it is mentioned that students on 7th and 8th graders' science learning anxiety is higher than 6th grade students. According to this result, it can be said that grade level is a factor that affects 6th, 7th, and 8th grade students' science learning anxiety and increase on grade level is also increasing science learning anxiety for the learners. This result is in correlation with research from Dede & Dursun, 2008, Dursun & et al., 2011 and so on.

It is determined that there is a statistical meaningful (p<0.05) difference between the points that research students got from SLAS. It is analyzed from the Tukey test, which is performed to understand from which academic achievement scores for science lesson the meaningfulness occurs, that students with grade among 85-100 have got a higher anxiety level from the ones with grade among 55-60 and also the students with 70-84 have got a higher level of anxiety than the ones with scores 85-100. According to that result, science grade is a factor that affects science learning anxiety and it can be said that decrease on science grade has got an increase on learning anxiety. This result is correlated with Bekdemir's (2009) research results. Yet, as a result of their research Zeybek & Kurbanoglu (2009) found that success level of primary learners does not have a meaningful effect on science learning anxiety. This situation does not suit with the results of the research.

It is determined that there is a statistical meaningful (p<0.05) difference between the points that students get from SLAS [F (2,291) =4.863; p<0.05 according to the mother education level. On performed Tukey analysis that is done for understanding from which education level is the meaningfulness caused, it is expressed that students with primary and middle school graduate mother have got a higher level of science learning anxiety than students with high school graduate mother. According to this result, it can be said that mother education level is a factor that affects students' education level and a decrease on mother education level increases the learning anxiety.

It is determined that there is a statistical meaningful (p<0.05) difference between the points that learners get from SLAS according to the father education level. On performed Tukey analysis that is done for understanding from which education level is the meaningfulness caused, it is expressed students with primary and middle school graduate father have got a higher level of science learning anxiety than students with high school graduate father.

5. Conclusion

This research performed on 6th, 7th and 8th graders shows that; increase on grade level, mother education and father education level and decrease on academic achievement scores for science lesson causes the increase on students' science learning anxiety levels. Science Learning Anxiety's being on a level that will contribute to learner on achieving his/ her target is significant. Because of this, families, school administrators and teachers should not be in ideas and expectations that will increase science learning anxiety on learner. On later studies, increasing different variables' effects and determining the relation between anxiety and attitude, which are on emotional dimension.

References

Akgün, A., & Aydın, S. (2007). The investigation of anxiety levels of primary school science and mathematics teacher students' according to some variables. *Electronic Journal of Social Sciences, 20*(20), 283-299.

Allwright, D., Bailey, K.M. (1991). Focus on the language classroom: an introduction to classroom research for language teachers. Cambridge University Pres, Cambridge.

Aydın, E., Delice, A., Dilmac, B., & Ertekin, E. (2009). The influence of gender, grade and institution on primary school mathematics student teachers' anxiety levels *Elementary Education Online*, *8*(1), 231-242.

Bekdemir, M. (2009). Evaluation of vocational school student's mathematics anxiety levels and achievement. *Erzincan University Journal of Science and Technology, 2(*2), 169-189.

Bloom, B. S. (1979). *Human Nature and Learning in Schools, (Translated by: D. Ozcelik), Ankara: Ministry of Education Publications.*

Bursal, M. (2014). Quantitative methods. Selcuk Besir Demir (Ed.) *Qualitative, quantitive and mixed method*

approachesi (s: 155-182). Ankara: Egiten Publishing.

Buyukozturk, Ş. Çakmak, E., Akgün, O., Karadeniz, Ş., Demirel, F., (2015) *Scientific Research Techniques*. Improved 19th publishing. Pegem Akademi Bookstore.

Dede, Y., Dursun, Ş. 2008. An investigation of primary school students' mathematics anxiety levels. *Uludag University Faculty of Education Journal, XXI* (2), 295-312.

Dursun, Ş., & Bindak, R. (2011). The investigation of elementary school students' mathematics anxiety. *Journal of Social Sciences*, *35*(1), 18-21.

Ergene, T. 2011. The relationships among test anxiety, study habits, achievement, motivation, and academic performance among Turkish high school students. *Education and Science*, 160, 320-330.

Erökten, S. (2010). The evaluation of chemistry laboratory experiences on science students' anxiety levels. *H. U. Journal of Education 38*(38), 107-114.

Greenburg, S. L. & Mallow, J.V. (1982). Treating science anxiety in a university counseling center. *The Personel and Guidance Journal, 61*(1), 48-50.

Kagitci, B., Kurbanoglu, N.İ. (2013). The development of science and technology education for the anxiety scale: Validity and reliability study. *Journal of Science Education 10*(3), 95-107.

Krylova, I. (1997). Investigation of causes of differences in student performance on the topics of stereochemistry and reaction mechanisms in an undergraduate organic chemistry course. Ph.D. Thesis. Catholic University of America, Washington, D.C.

Mallow, J., Kastrup, H., Bryant, F. B., Hislop, N., Shefner, R., & Udo, M. (2010). Science anxiety, science attitudes, and gender: Interviews from a binational study. *Journal of Science Education and Technology*, *19*(4), 356-369.

Mallow, J. V. (1994). Gender-related science anxiety: A first binational study. *Journal of Science Education and Technology*, *3*(4), 227-238.

Mallow, J. V., & Greenburg, S. L. (1983). Science Anxiety and Science Learning. *Physics Teacher*, *21*(2), 95-99.

Mallow, J. V. (1986). Science anxiety: Fear of science and how to overcome it. Clearwater, FL: H & H Publishing Co.

Marso, R. N., & Pigge, F. L. (1998). A longitudinal study of relationships between attitude toward teaching, anxiety about teaching, Self-Perceived Effectiveness, and Attrition from Teaching. Paper presented at the Annual Meeting of the Association of Teacher Educators, Dallas, TX.

Önder, A.G.R. & Gelbal, S. A study on students' self-efficacy and anxiety towards pisa 2012 mathematics scores based on some variables. *Journal of Research in Education and Teaching, 5*(3), 271-278.

Pribyl, J. R., & Bodner, G. M. (1987). Spatial ability and its role in organic chemistry: A study of four organic courses. *Journal of research in science teaching*, *24*(3), 229-240.

Rachman, S. (1998). Anxiety. East Sussex: Psychology Press

Rotella R. J., Learner J. D. 1993. Responding to Competitive Plesure, in R.N. Singer, M.Murphey ve L. Tennant (eds.), Handbook on Research in Sport Psychology, New York, 528-541.

Rixse, J. S. & Pickering, M. (1985). Freshman chemistry as a predictor of future academic success. *Journal of Chemical Education, 62*(4), 313-315.

Seligman Walkman, M. E. P., Walker, E.F. & Rossenhan, D. L. (2001). Abnormal Psychology (4thedition). N.Y.:W.W. Norton & company, Inc.

Sevenair, J. P., Carmichael, J. W., O'Connor, S. E. & Hunter, J. T. (1987). Predictors of organic chemistry grades for Black Americans. Xavier University, ERIC Document Reproduction Service No. ED 286 974, Washington, D.C.

Sahin, F.Y. (2008). Mathematics anxiety among 4th and 5th grade Turkish elementary school students. *International Electronic Journal of Mathematics Education, 3*(3), 179-192.

Tasdemir, C. (2015). Examination of mathematics anxiety of middle school students. Batman University. *Journal of Life Sciences, 5*(1), 1-12.

Turner, R. C. & Lindsay, H. A. (2003). Gender differences in cognitive and non-cognitive factors related to achievement in organic chemistry. *Journal of Chemical Education, 80*(5), 563-568

Udo, M.K., Ramsey, G.P., Reynolds-Alpert, S. & Mallow, J.V. (2001). Does physics teaching affect gender-based science anxiety? *Journal of Science Education and Technology, 10* (3), 237-247.

Udo, M. K., Ramsey, G. P., & Mallow, J. V. (2004). Science anxiety and gender in students taking general education science courses. *Journal of Science Education and Technology*, *13*(4), 435-446.

Ulucinar-Sagir, Ş. (2015). Science anxiety scale for primary school students. *Journal of Faculty Education Buca, (37),* 1-20.

Uldas, İ. (2005), Development of a mathematics anxiety scale towards teachers and teacher candidates (MAS-T) and an assessment on mathematics anxiety. Published Master's Thesis, Institute of Education Sciences at Marmara University, Istanbul.

Yıldırım, B. (2015). Sciences learning anxiety scale: validation study. *Journal of Social Sciences Mus Alparslan University, 3*(1), 33-43.

Yurt, E., & Kurnaz, A. (2015). An investigation of the effects of the mathematics sources of self-efficacy on talented students' mathematics anxiety. *Pegem Education and Training Journal, 5*(4), 347-360, http://dx.doi.org/10.14527/pegegog.2015.019.

Yuruk, N. (2011). The predictors of pre-service elementary teachers' anxiety about teaching science. *Journal of Baltic Science Education*, *10*(1), 17-26.

Zeybek, F., & Kurbanoglu, N. İ. (2012). The primary school students' anxiety and attitudes towards basic courses: an investigation of gender and academic achievement. *Sakarya University, Faculty of Education Journal*, *23*(23), 57-73.