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İlköğretim Öğrencilerinin Fen'e Karşı Tutumlarının Sınav Kaygı Düzeylerine
Etkisi

The Effect of Elementary Students' Attitude Towards Science on Their Levels of
Test Anxiety

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Öz

Bu çalışmanın amacı, ilköğretim ikinci kademe öğrencilerinin fen bilgisi dersine karşı tutumlarının sınav kaygı düzeylerine etkisini belirlemektir. Araştırmada betimsel yöntem kullanılmıştır. Araştırmanın deneklerini Ankara Balâ Ergin İlköğretim Okulu, Ankara Balâ Köseli İlköğretim Okulu ve Bolu Dörtdivan Merkez Şehit Orhan Yalçın İlköğretim Okulu'nda bulunan toplam 145 ikinci kademe öğrencisi oluşturmaktadır. Öğrencilere sınav kaygı envanteri ve fene karşı tutum ölçeği uygulanmıştır. Sınav kaygı puanları ile tutum puanları arasındaki ilişkiye, kaygı-cinsiyet ve tutum-cinsiyet ilişkilerine bakılmıştır. Sınav kaygı puanları ile tutum puanları arasında anlamlı bir ilişki bulunmuştur. Kaygı-cinsiyet ve tutum-cinsiyet ilişkilerine bakılmış ve aralarında anlamlı bir fark bulunamamıştır.

Anahtar Sözcükler: Fene karşı tutum, sınav kaygı düzeyi, cinsiyet.

Abstract

The objective of this study is to find out the effect of second-grade elementary students' (6th-, 7th- and 8th-year students) attitude towards science course on their levels of test anxiety. This study will be carried out by using the descriptive method. The subjects of this study will be 145 second-grade students in Ergin Elementary School in Bala, Ankara, Köseli Elementary School in Bala, Ankara and Şehit Orhan Yalçın Elementary School in Dörtdivan, Bolu. The Test Anxiety Inventory and the Scale of Attitude Towards Science will be administered to students. The correlation between test anxiety scores and attitude scores as well as the correlation between anxiety-gender and attitude-gender will be sought for in this study. It has been found out that there is a significant correlation between test anxiety scores and attitude scores. However, no significant difference is known about anxiety-gender and attitude-gender relations.

Keywords: Attitude towards science, levels of test anxiety, gender

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Introduction

Human beings, as individuals, are obliged to exist in a society and interaction with other people within all aspects. Emotions such as joy, delight, enthusiasm, worry, fear, anxiety, etc. are human characteristics which we have to live with, share with and analyze human beings (Sazak and Ece, 2004). The term “anxiety”, which is dealt with in this study, is categorized in various ways by researchers. To Köknel (1987), anxiety is an emotional state whose cause is unknown. People may often think at any moment they will be faced with an unexpected threat or disaster, and find themselves in an uneasy, tense, distressed condition. It is an emotional experience which emerges as a result of the inhibition of an expectation, a wish or a motive due to internal and/or external causes (qtd. in Börü, 2000).

“We know that we can specify some auxiliary emotions as well as our basic emotions such as joy, worry, fear and excitement. One of these emotions is anxiety which is a mere type of fear whose cause is unidentifiable. However, in our daily language, anxiety usually refers to our worries, in other words, fears which we are aware of. For instance, we are anxious because of an exam, our health or an engagement or for being prompt.” (Dağ, 1999). To Öner, anxiety is “an emotional state indecisiveness, uneasiness and inquietude which may emerge spontaneously, but can be perceived consciously by the individual and which is perceptible through physical changes by conversing” (Baykan, 1998). The main theoretical resources which shed light on most of the studies about anxiety are categorized under two methods:

I) Psychoanalytic theory

II) Learning theories (such as classical conditioning, stimulus-response rules)

There are some significant differences between these two concerning the effects of anxiety on behavior and regarding anxiety as “normal” or “pathological” (Başarır, 1990). Psychoanalytic theory asserts that anxiety is an emotional state, uneasiness and inquietude whose origin is subconscious; however, it is experienced consciously by individuals and can be ascertained objectively due to physical changes (blushing, turning pale, sweating, acceleration of breathing and heartbeats, etc.) (Freud, 1936; qtd. in Başarır, 1990). The anxiety is “normal” or “pathological” depending on the situation it results from. According to the theory of Freud, the anxiety deriving from objective threats or external stimuli is defined as subjective or realistic anxiety and accepted as “normal”. However, the anxiety stemming from suppressed sexual or aggressive drives – internal threats – is defined as “neurotic anxiety”. Learning theories define anxiety as an emotion gained through conditioning, which has the characteristic of motives. Öner (1977) states that anxiety theories based on learning approaches assert that anxiety and fear which emerge because of the connection between neutral stimuli and painful stimuli spread through stimulus generalization. According to these theories, it is not the source of emotion which determines whether the anxiety is “normal” or “pathological”, but its intensity and duration as well as the degree of importance of the external threat (qtd. in Başarır, 1990). The type of anxiety whose intensity is high is known as “pathological” anxiety, and the type of anxiety which lasts for a short time and is proportional to the significant level of external threat is known as “normal” anxiety, though it is severe and intensive.

The findings of empirical studies, which are based on psychoanalytic theory and examine the correlations between anxiety and learning, success and adaptation, reveal that the correlations between anxiety and given variables are linear and negative (mean $r=.45$) (Philips, 1966; Öner, 1972). It is observed that the positive impacts of anxiety are generally emphasized in learning theories. These theories acknowledge that anxiety determine the role of a drive in gaining new behaviors, succeeding in various tests or in general therapy. Nevertheless, they maintain that the correlation between anxiety and behaviors does not usually show a minute linear characteristic. There have also been some efforts to integrate the two main methods about anxiety in a single system. For instance, Reynolds (1975) supports that it will be easier to comprehend and explain the concept of anxiety when the psychoanalytic theory which emphasizes how anxiety originates and the learning theories which deal with how anxiety

spreads are used together in studies toward anxiety. Moreover, Sarason's (1960) concept of test anxiety and Spielberger's (1966) two-factor anxiety theory include such a method (Başarır, 1990). In his anxiety theory Spielberger (1966) address upon two different types of anxieties. One of them is trait anxiety and the other one is state anxiety. The average degree of connection between these two types of anxieties (between .33 and .66) indicates that they are not completely independent of each other. Spielberger defines trait anxiety as an individual's tendency to regard or interpret most life experiences as distressful. The second type of anxiety defined by Spielberger, state anxiety, does not emerge in "normal" conditions, but under certain conditions when the individual or his/her interests are threatened; however, the threat is temporary.

"Test is the evaluation of the knowledge gained by students through their fields of interest, skills and studying habits". Test "is not an evaluation of personality". Tests evaluate students' knowledge and success, not their personality (Baltaş 2000). Test anxiety is a specific state of anxiety. The signs of anxiety are emotional, physical and behavioral responses which accompany the uneasiness about a probable failure. If the ideals and expectations of parents about their child exceed the capacity of children, it is possible that test anxiety emerges (Öztürk, 1977; qtd. in Sazak ve Ece, 2004). Anxieties and excessive sensitivity cause students to be always distressed and tense and to desires their hopes easily. They are indecisive since they are unable to concentrate on anything and are hesitant in making decisions. Even if they produce a decision, they are highly anxious about the results they have made and adverse effects of these decisions (Geçtan, 1985). Henceforth, we are living in an age of tests. The lives of many people everywhere in the world are affected merely by tests; and the decisions about their lives are made according to their level of success in tests. That is why, it is not surprising that most students perceive tests as threatening and have a state of anxiety, which is known as temporary emotional change of mood, during tests particularly in the disciplines of natural sciences (Öztürk, 1977; qtd. in Sazak and Ece, 2004). Any individual whose test anxiety is high is afraid that his/her "self-identity" is threatened in the event of a test evaluation. They are fearful, nervous, tense and distressed not only in a test but also when they have to converse, ask a question, answer questions, take part in discussions or read loudly in a group. "High test anxiety limits the functioning process of the mind, rationalism and adaptation to the situation and thus, leads to a decline in test performance. In a study on test anxiety it is found out that the anxiety level of students who prepare for the university entrance exam is higher than the anxiety level of patients who are to have general surgery " (Baltaş, 2000). The test is a "matter of survival" for youngsters. The results of the same study indicate that the anxiety level of the female students is higher than male students (Yeşilyaprak, 2003).

The literature is abundant in the definitions of the concept of "attitude" which holds a significant place in learning:

To Pratkanis et al. (1988), attitude is the evaluation of an individual's existent knowledge about some forms. Senemoğlu (2000) defines attitude as an acquired internal state which affects the choice of individual activities in the presence of a group of anything, individuals, events or miscellaneous situations. Another definition is that the attitude is the demonstration of positive or negative feelings of individuals towards certain forms or the tendency to adopt an idea (Koballa, 1988). Gardner defines attitude towards science as "a learned tendency to evaluate forms, people, actions and situations in certain ways" or "propositions about learning science" (qtd. in George, 2000). To Kaptan (2001), attitudes are not behaviors, but the tendency to display behaviors and are abstract concepts. However, there are some situations where they can be monitored. There are two important reasons for researchers to carry out researches on the attitudes of students towards science courses. First, it is known that attitude towards science encourages course selection, qualified and appropriate in-class activity, participation into scientific researches and scientific researches (Koballa and Crawley, 1985; Germann, 1988; Weinburgh, 1995). Second, there is a correlation between students' attitude towards science and their success (Schibeci and Riley, 1986; Kesamang and Tawio, 2002; Fleming and Malone, 1983,

qtd in: Bilgin, İ. Karaduman, A, 2005). In literature, the correlation between attitude and success is taken into consideration in terms of effect and cause. In their studies Eisenhardt (1977) and Peterson and Carlson (1979) state that with a successful performance results produce a positive attitude.

Further studies which focus on the effects of social and psychological factors on learning science reveal that there is a positive correlation between students' science competence and their success (Wilson, 1983; Talton and Simpson, 1986, qtd. in: Bilgin, İ. Karaduman, A, 2005). Some researchers who study the correlation between students' attitude towards science and their success do not confirm the proposition that "Students' success in science affect their attitudes" (Schibeci and Riley, 1986; Oliver and Simpson, 1988; Simpson and Oliver, 1990, qtd. in: Bilgin, İ. Karaduman, A, 2005). The results of these researches show that the nature of science teaching has strong impacts on students' attitude towards science and that the attitude towards science is one of the most significant variables which determine the success of students. Schibeci and Riley (1986) report that the proposition concerning this problem should be as follows: "Attitude determine success". There are several factors which affect the attitudes of students. These are gender, age, educational level of the family, occupation of the family, number of students in the classroom, relations with the teacher, consistency and determination to have a career in the field of science, teaching methods used in the course, etc. Mordi (1991) carried out a research among 2059 subjects composed of 6th- and 10th-year students to study the effects of such factors as home characteristics, student characteristics, teaching and learning variables and school factors on the attitude towards science courses; and revealed that these variables have a contribution of 70% to students' adoption of positive attitudes towards science. The contribution rates of the abovementioned factors are as follows: home characteristics 1%, student characteristics 16%, school characteristics 11%, learning and teaching variables 41%. These results show that the teaching methodology used by the teacher is the most important factor which determine students' adoption of positive attitudes towards science.

This study was carried out to find out the effect of second-grade elementary students' (6th-, 7th- and 8th-year students) attitude towards science course on their levels of text anxiety.

Method

In this study a descriptive method was used to find out the effect of second-grade elementary students' attitude towards science course on their levels of text anxiety. In our country the duration of education from 1st to 5th year is classified as first grade of elementary education and the remaining 6th to 8th years are known as the second grade. The sample group of the study is composed of 145 students. The Scale of Classroom Management Profile was used to find out whether there were differences among the classroom management styles of teachers. The students included in the sample group were chosen among classes whose teachers have the same classroom management style. The Test Anxiety Inventory and the Scale of Attitude towards Science were administered to students. SPSS 10.0 program was used to analyze this data.

Classroom Management Profile

Classroom Mangement Profie Scale was developed by Bosworth (1996) as a12-item scale.. The scale is made up of four management profile style: (1) authoritarian style, (2) democratic style, (3) laissez-faire style and (4) indifferent style. Score for each management style can range from 3 to 15. A high score indicates a strong preference for that particular style.

Test Anxiety Inventory

"Test Anxiety Inventory" designed by Spielberger was used to determine students' level of anxiety. The inventory was adapted into Turkish by Albayrak Kaymak and Öner. This inventory is composed of 20 items which includes three factors: worry, emotionality and tension. The inventory was administered two times in time intervals differing from the same

day to three weeks; and thus, the reliability coefficients calculated through test-retest method range between .72 and .93. Reliability coefficients, calculated through "alpha correlations" which is a generalized form of Kuder-Richardson-20 formula, are .87 for the "whole text", .74 for the subscale of "worry" and .79 for the subscale of "emotionality". The score of "almost never" response to items is 1 and the scores of the following responses are "2", "3" and "4". Only the first item is ters anlatımlıdır ve tersine puanlanır. The scores of the inventory can vary from a minimum of 20 to a maximum of 80 (Ramazan, 1988).

Scale of Attitude Towards Science

In this study the "Scale of Attitude towards Science Course" developed by Oğuz (2000) was used to find out students' attitude towards science courses. It is a 5-point likert-type scale composed of 28 items. Kuder-Richardson-20 formula coefficient of the scale is .86. Regression is used to find out whether there was a significant correlation between test anxiety scores and attitude scores; and independent sample-t test was used to analyze the correlation between anxiety scores and gender, and to analyze the correlation between attitude scores and gender.

Results

Teaching is a process in which many variables interact with each other. Factors such as performance of teachers, methods, techniques and strategies used in teaching, tools and materials, utilization of opportunities in the environment and the means in the school and in the classroom are among the factors which determine the quality of science education. Furthermore, students' interest in science, their level of perception, their self-confidence, attitudes and opinions are some other factors which play an important role in their attitude towards science (Lederman et al., 1991). To Nokelainen and Ruohotie (2000), students should be informed about the objectives in science education. Thus, students will adopt a positive perspective about science. Each student has a different learning ability as well as different motivational, attitude and proficiency factors. When students feel less productive, their interest in the course declines and their self-perception about their adequacy is less positive. This situation evokes anxiety about the said course.

Regression is used to find out whether there is a significant correlation between test anxiety scores and attitude towards science scores of students in the second grade of elementary education; and the findings are illustrated in Table 1.

Table 1.

The Correlation Between Test Anxiety Scores and Attitude towards Science Scores of Students in the Second Grade of Elementary Education

Model	R	R ²	Statistics of Variation			
			R ² variability	F	Level of Independence	Significance
1	,201	,040	,040	6,033	143*	,015

*p < 0.05

As seen in Table 1 there is a significant correlation between test anxiety scores and attitude towards science scores of students in the second grade of elementary education. However, the degree of attitude towards science to explain test anxiety is low (r= -.20). Moreover, it is detected that there is a negative correlation between them and that the students whose attitude scores are high have lower test anxiety.

T-test is used to find out whether there is a significant correlation between test anxiety level and gender of students in the second grade of elementary education; and the findings are illustrated in Table 2.

Table 2.

The Correlation Between Test Anxiety Level and Gender of Students in the Second Grade of Elementary Education

Test Anxiety Scores	n	X	SD	t	p
Male	70	40,63	8,967	,155	,698
Female	75	40,39	9,807		

As seen in Table 2 there is no significant correlation between test anxiety level of students and their gender.

T-test is used to find out whether there is a significant correlation between attitude towards science and gender of students in the second grade of elementary education; and the results are displayed in Table 3.

Table 3.

The Correlation Between Attitude towards Science and Gender of Students in the Second Grade of Elementary Education

Test Anxiety Scores	n	X	SD	t	p
Male	70	101,94	16,145	-1,746	,287
Female	75	106,97	18,380		

As seen in Table 3 there is no significant correlation between students' attitude towards science and their gender.

Discussion

The results of this study revealed that there was a significant correlation between test anxiety scores and attitude towards science scores of students in the second grade of elementary education. It is observed that the students whose attitude scores are high have lower test anxiety. The studies which focus on the impact of test anxiety on academic success-performance generally show that there is a negative correlation between these two variables (Zatz & Chassin, 1985; Horns & Dollinger, 1989; Öner, 1990; Araki, 1992; Schonwetter, 1995). The result of Beidel and Turner's (1988) research reveal that 60% of the children at the age of 8-12 who suffer from high test anxiety have the symptoms of anxiety disorder. To Nokelainen and Ruohotie (2000), students should be informed about the objectives of the course in teaching science. Therefore, they can adopt more positive viewpoints about science courses. Teachers should provide the opportunities which ensure that students develop positive attitudes towards science. Students who feel productive are more interested in the course and their self-perception about their adequacy is more positive (Selçuk, 2001).

There are some studies which show that there is a negative correlation between test anxiety and success / failure (Öner, 1977; Albayrak, Kaymak, 1987). To Öner (1988), the first stage of the university entrance exam results in a significant increase in the anxiety level of both male and female students. Yıldırım (2000) states that the variables of teacher support, family support, loneliness and test anxiety predict academic success, but peer support does not predict it. Waite, Sorasan, Lighthall and Davidson (1958) created high- and low-anxiety groups among their subjects composed of second, third, fourth and fifth year students, and then distributed numbers and geometric forms to the groups. In this study they detected that students with lower level of anxiety learned more rapidly and made less mistakes in comparison to those with higher level of anxiety (qtd. in Başarır, 1990). In their study on the correlation between

students' level of anxiety and their academic success Hill and Sarason (1966) obtained some results which showed that the students in the low-anxiety group were more successful. Similarly, Spielberger (1980) studied the correlation between the students' level of anxiety and their success at school, and the results indicated that there was a significant negative correlation between the two variables and that the individuals who had a higher level of anxiety were less efficient in cognitive activities such as school performance and learning.

Sarason et al. (1964) and Öner (1971) observed that anxiety has a significantly inhibitive effect on learning and school success of male students whereas high or low level of anxiety does not result in any significant change on learning or school performance of female students (qtd. in Başarır, 1990). McCandles and Palermo (1956) carried out some researches among elementary students and attained some results which stated that there was a negative correlation between students' level of anxiety and their success in mathematics and that this correlation is higher among female students ($r=-,45$) than male students ($r=-,28$) (qtd. in Başarır, 1990).

In literature there were some results which contradicted with the results that there was a negative correlation between level of anxiety and performance. For instance, Klimko (1986) conducted a study on the correlation between students' level of anxiety, gender, characteristic of "cognitive entry" (the previous knowledge brought by a student to the learning platform and a students' attitude towards his/her own competence), the order of test items (ranking the items from the most difficult to the simplest or simple to the complex) and test performance, and obtained some findings which disclosed that, among all these variables, only the characteristic of "cognitive entry" was a significant variable to predict test performance. They could not find any correlation between test performance and other variables.

Conclusion and Recommendations

The cognition and effect dimension of attitude affects behavior, and thus, learning. However, this relation is not simple because enjoying something is not the only criteria for being involved with it. Various conditions may evoke different feelings and gists or even affect an individual's physical state. Bland and unhygienic environments evoke different feelings among people and deter them from science and scientific activities whereas picturesque environments may evoke an interest in science even among people who are less inclined about science (White and Tisher qtd. in: Atasoy 2004). Moreover, the greatest responsibility weighs on the teachers who can ensure that students adopt a more positive attitude towards science. A condition is that the education in the classroom is more closely related with reality, students will be motivated to learn the course. It is possible to attain the following conclusion: Because the effect of attitude on learning is distinct, it is not treated frequently in studies; there is no negligence about it. There cannot be any justification for the assertion that if a person is interested in science, he/she learns it, otherwise, they do not learn it; the situation is not quite simple. Since attitude incorporates characteristics such as curiosity and evaluation which evoke interest for something, it does not only affect the achievements of learning, but also the style of learning. In other words, it affects the use of cognitive strategies (Atasoy 2004).

This study focuses on the effect of attitude on test anxiety and the correlation between them. Students' who have got a high level of attitude lessens their test anxiety. Science is the course in which it is easy to use visual aids, experiments and projects. When observations, experiments and projects are incorporated into a science course, students will undoubtedly adopt more positive attitudes towards the course. Hence the increase in attitude will result in a decrease in anxiety for the course. On the basis of the results of the study, it can be concluded that courses such as child psychology and communication should be integrated into higher education programs for teacher training and "social support education programs" within the framework of in-service trainings should be developed and offered to existent teachers. Furthermore, schools should develop and implement, within the framework of psychological counseling and guidance programs, schemes which aim at promoting family and teacher support as well as lessening the test anxiety of students.

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