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Investigation of the Relationship between Science Burnout Levels and Test Anxiety of Secondary School Students According to Some Variables

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Abstract. In this study, it has been investigated whether there is a significant relationship between the science course burnout and test anxiety scores of the secondary school students in the teaching process. In addition, it was investigated whether the burnout and test anxiety scores of the students in the science course differed according to gender. Burnout and test anxiety for science course scales were used in the study as data collection tools. The universe of this study is composed of students who study at secondary schools in the central districts of Sakarya. The sample consists of a total of 641 students, 298 girls (46%) and 343 boys (54%), attending six different state secondary schools in the central districts. Research hypotheses were analyzed with “Speraman Correlation” and “Mann-Whitney U” because the data were not distributed normally. The results showed that there was a positive and significant relationship between the students' burnout scores and the test scores. Moreover, while the students' science course burnout scores differed statistically according to their gender ($p < .05$), the test scores did not show a statistically significant difference ($p > .05$).

Keywords: Science education, test anxiety, burnout, secondary school students.

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1. INTRODUCTION

There have been changes occurring in the traditional society after the emergence of official school institutions in the world. Accordingly, children are separated from their parents and other relatives at a very early age and go to the day care centers, from there to the preschool institutions and then to the educational life. It can be said that this situation causes more competition among the countries and the students in the world (Syokwaa, Aloka, & Ndunge, 2014).

The key to competition among students is the progress in academic achievement. Parents want their child's performance to be as high as possible. This high level of ambition for success has undermined students, teachers, schools, and the education system in general. Therefore, schools spend a large part of their time and labor in order to achieve better results in their academic achievements. The importance of school or academic success has led education researchers to ask some important questions, such as what factors encourage success of students? and how many different factors contribute to academic achievement? (Sridevi, 2013). Studies have shown that variables such as socioeconomic status, gender, intelligence, ability, and affective factors affect academic achievement. Besides, it affects the variables such as burnout, interpersonal relations, low achievement (Aluçdibi & Ekici, 2012a; Aysan, Tanrıöğen & Tanrıöğen, 1996; Balkıs, 2013; Boudreau, Santen, Hemphill ve Dobson, 2004; Dede & Yaman, 2008; Dodeen, 2009; Durán, Extremera, Rey, Fernández-Berrocal, ve Montalbán, 2006, 2006; Hoge, Smit & Crist, 1997), inadequate curriculum and late understanding (Dave & Anand, 1979), creativity, and institutional characteristics (Anand & Padma, 1978).

Students have a number of duties and responsibilities in their academic life. They must maintain happiness while fulfilling these duties and responsibilities. Otherwise, academic tasks and responsibilities may lead them to burnout after a while. In the academic sense, the first time, burnout is defined as by Freudenberger (1974) the state of exhaustion in the internal resources of the individual as a result of failure, wear, overload due to power and energy loss or unmet demands (Arı & Bal, 2008; Aypay & Eryilmaz, 2011; Maslach, Schaufeli & Leiter, 2001; Seidman & Zager, 1991). The concept of burnout has become even more popular with the development of the Maslach Burnout Inventory (Maslach & Jackson, 1981) and has been a popular research topic in psychology and related disciplines. In related research, burnout is defined as a psychological syndrome, which usually emerges as a feeling of emotional exhaustion, depersonalization, and reduction in personal accomplishment among people who help professionals (Firth, Micntee, Mckown ve Britton, 1985; Golembiewski, Sun, Lin ve Boudreau, 1995; Jackson, Schwab ve Schuler, 1986; Lahoz ve Mason, 1989; Maslach ve Pines, 1977; Maslach, 1978; Schwab ve Iwanicki, 1982). Burnout occurs when there is a major discrepancy between the work and the nature of the person doing the work. The main symptoms of burnout include excessive workload, lack of control, lack of reward, lack of social value, value conflict, and a sense of injustice (Maslach & Leiter, 1997; Yang, 2004). Studies (Cordes & Dougherty, 1993; Maslach & Pines, 1977; Maslach, 1978) have shown that burnout can lead to mental distress in the form of anxiety, depression,

frustration or fear, and may lead to a decrease in reluctance, absenteeism, low productivity, and depressed mood.

Burnout is defined as “occupational burnout” among employees, and “burnout for school or lesson” among students. Occupational burnout is defined as a state that occurs among individuals over time depending on the stress in the workplace (Schaufeli, Leiter, & Maslach, 2009). Various definitions have been put forward for students' burnout to school or class. Burnout of students towards the school has been defined as burnout against the school's wishes, the development of cynical and indifferent attitudes towards school and the feeling of inadequacy (Salmela-Aro, Kiuru, Leskinen & Nurmi, 2009). Burnout against the course has been defined as a three-factor psychological syndrome which is generally burnout towards the lesson, insensitivity to the course, and inadequate academic achievement (Schaufeli, Martínez, Pinto, Salanova & Bakker, 2002). According to another definition, burnout of students towards the course can be defined as students experiencing emotional exhaustion, depersonalization tendency and low sense of emotion syndrome due to course stress, load and other psychological factors (Yang, 2004).

Studies have shown that burnout takes place among undergraduate and graduate students as well (Balogun ve diğerleri, 1996; Koeske ve Koeske, 1991; Mc-Carthy, Pretty ve Catano, 1990), and that student burnout syndrome is similar to that of service workers (Meier & Schmeck, 1985; Ramist, 1981; Yang, 2004). Pines, et al. (1981), in his study, showed that students' burnout scores were ranked in the middle to upper level, and that students had some degree of burnout throughout their study life. Boudreau, et al., (2004) reported that burnout is associated with academic achievement, whereas Durán, et al., (2006) reported that burnout is directly related to emotional exhaustion and perceived stress (Balkis, 2013). In another study, Balkis (2013) showed that there was a significantly negative relationship between burnout emotions and academic achievements of university students. Tansel (2015) stated that university students' burnout scores differ according to gender.

Research on student burnout was mostly conducted with university students. There are few studies showing the effect of burnout syndrome on secondary variables in secondary school students. Aypay and Eryilmaz (2011) stated that as the loss of interest in school and the burnout levels of the family increased, the levels of subjective well-being decreased. He also stated that there was a significant relationship between loss of interest in school and burnout from family and motivation to participate in class. Palabıyık (2014) showed that the burnout levels of high school students were high in all grades, and that general burnout levels related to gender and class level were high among the 12th grade male students and low in the 10th grade female students. In another study, Acar and Çakır (2015) observed that school burnout levels of secondary school students differ according to gender, area of education, housing status, and their monthly economic income.

One of the affective factors affecting the students' academic achievement is the anxiety in the process of evaluating student learning (Mehrothra, 1986). According to Hill and Sarason (1966), anxiety is a feeling that can affect the individual in daily life and is often uneasy. In addition to this, it frequently manifests itself in school environments by causing a certain mismatch by affecting the behavior of individuals (Erözkan, 2004). Different definitions of anxiety have been made in the studies conducted (France ve Robson, 1997; Levitt, 1967; Peleg-Popko, 2004; Rachman, 1998; Reber, 1985; Sapir ve Aranson, 1990; Sarason, 1975). Spielberger (1972 a, b) stated that anxiety is a two-component structure that is seen as continuous and state anxiety (Başpınar Can, Dereboy & Eskin, 2012). In addition, the test anxiety is a special form of state anxiety (Allen, 1970), a sense of uneasiness with the fear felt when it comes to evaluation of the individual (Dibattista ve Gosse, 2006; Erözkan, 2004). Suinn (1968) defined the test anxiety as the difficulty in reading and understanding the simple sentences in the exam and in remembering the knowledge studied, or in integrating ideas (Lufi & Darliuk, 2005). The reasons for test anxiety (Sarason ve Stoops, 1978; Sarason 1980) are stated to be (Kavakçı, Güler & Çetinkaya, 2011) negative thoughts, deficiencies in learning strategies (Meichenbaum & Butler, 1980) and motivation (Bandura, 1997). In his study, Deffenbacher (1978, 1986) found that students with high test anxiety had more distortions in their attention in relation to higher physiological excitability and distressed thoughts. It was also found that students with higher test anxiety showed poorer performance. It was determined that the students who were worried about the examination (Shermis & Lombard, 1998) perceived their assessment status as threatening personally, creating anxiety, irritability and emotional stimulation (as cited in Başpınar & Dereboy, 2007). In addition, the studies (Cassady, 2004; Hembree, 1988; Wachelka ve Katz, 1999) have shown that high test anxiety causes lower self-esteem, less time to work, low success expectancy, falling notes, disturbing behaviors in the classroom, nervous feelings such as testiness, unpleasant feelings such as sadness, intense fear of failure, and negative attitudes towards school or lesson (as cited in Başpınar & Dereboy, 2007).

When the national and international literature is reviewed, many studies have shown that test anxiety which has a significant effect on students' academic achievement and is related to various variables in the teaching and learning process (Akman, İzgi, Bağçe ve Akıllı, 2007; Dünder, Yapıcı ve Topçu, 2008; Erözkan, 2004; Fiore, 2012; Hembree, 1988; Kapıkıran, 2002; Muola, Kithuka, Ndirangu ve Nassiuma, 2009). The results of these studies showed that the relationship between the students' test anxiety and academic achievement was significant. Test anxiety was higher in girls than in boys, and the relationship between test anxiety scores and attitude scores was significant. The results of the examinations such as PISA and TIMSS conducted within the scope of the International Student Assessment Program have been found to result in academic failure among the students in our country, especially in the examinations for the field of science. This situation led us to investigate different variables related to the causes of failure in examinations for science. When the literature is examined, there is no study showing the

relationship between the burnout of the students and its relationship with various variables. Research has shown that student burnout may lead to more absenteeism and lower motivation to do the homework required. In addition to causing higher percentages and similar situations in school drop-out (Meier & Schmeck, 1985; Ramist, 1981; Yang, 2004), it can also cause high test anxiety. In this respect, it is important to examine these factors in increasing students' academic achievement. Therefore, the aim of this study is to investigate whether there is a significant relationship between the burnout and test anxiety scores of the secondary school students in the teaching process. Another aim of this study is to investigate whether the students' science course burnout and test anxiety scores differ according to gender variable. For this purpose, the following questions were sought. Is there a significant relationship between the burnout scores of the secondary school students' science course burnout scores and the test anxiety scores? Do the burnout scores and test anxiety scores of the science students' secondary school students differ according to gender?

2. METHOD

Research Model

In this study, relational screening model of general screening models was used. The general screening model is a research approach that aims to describe a situation that existed in the past or exists at the present. The relational screening model is called a screening approach which aims to determine the presence of interchange between two and more variables. In the relational survey model, it is tried to determine whether the variables change together and if there are changes (Karasar, 2011). In the second semester of the 2016-2017 academic years, the burnout and examination anxiety scales for science course were applied before the examinations.

Participants

The universe of this study consists of students in the central districts of Sakarya province (Erenler, Adapazarı, Serdivan and Arifiye) and in the middle school (grades 5, 6, 7 and 8) between the ages of 10-14. The sample consists of 641 students, 298 (46%) girls and 343 (54%) boys, who study at six different state secondary schools in the central districts.

Data Collection Tools

Maslach Burnout Scale (MBS): It was developed by Schaufeli, Leiter ve Maslach (2002a). 16-item scale with three sub-factors in the original scale was reduced to 13 items for Turkish adaptation, validity and reliability studies in the sample of university students were carried out by Çapri, Gündüz ve Gökçakan (2011).

The reliability coefficient was found to be 0.91. The scale was prepared in 4-point Likert type. The scoring of the scale is "1-Never, 2-Sometimes, 3-Mostly, 4-Always". In this

study, Maslach Burnout Scale-Student Form (MBS-SF) scale, which was adapted to Turkish to measure student burnout for science, was applied by writing the “science course” instead of “the courses”. There are 4 negative items in the scale (3, 8, 12 and 13). In our study, reliability coefficient was found to be 0.77 for secondary school students.

Test Anxiety Scale (TAS): In order to determine the test anxiety levels of the students, 4-point Likert scale type, which had been revised by Benson and El-Zahhar (1994) and adapted to Turkish by A. Akın, Ü. Akın, Sariçam, Erguvan ve Çardak (2013), was used. Examination anxiety scale includes 20 items in four dimensions (Tension, physical symptoms, anxiety, and unrelated thoughts). The reliability coefficient of the scale was 0.89 and it was found to be 0.88 for secondary school students.

Data Analysis

The Spearman Correlation Coefficient was calculated to see if there was a significant relationship between the burnout scores and the test anxiety scores of the secondary school students participating in the study. In addition, since data were not distributed normally, the Mann-Whitney U test was used to evaluate whether the students' burnout and test anxiety scores differed significantly according to gender.

3. FINDINGS

The aim of this study was to determine whether there was a significant relationship between the burnout scores of the secondary school students and the test scores. In addition, it was aimed to determine whether the students' burnout and test anxiety scores were different in terms of gender. The obtained data were analyzed and interpreted according to the research questions.

In order to determine the relationship between the burnout scores of the secondary school students and the test scores, Spearman correlation between burnout and test anxiety scores was examined. The results are presented in Table 1 below.

Table 1.

Science Course Correlation Value Between Burnout and Test Anxiety Scores

	SCB	TA
Science course burnout (SCB)	1	
Test Anxiety (TA)	.62**	1

**p< .05

When Table 1 is examined, it is seen that there is a positive ($r=.62$; $p<.05$) and moderately significant relationship between the science students' burnout scores and test anxiety scores. According to this, as the students' burnout of the science lesson

increases, the test anxiety also increases. Considering the determination coefficient ($r^2 = .38$), it can be said that 38% of the total variability of the students' test anxiety is due to the science course burnout.

Mann Whitney U analysis was used to see whether the difference between the students' science course anxiety level and test anxiety scores was significant according to gender. The results are presented in Table 2.

Table 2.

Mann Whitney U Test Results for Burnout and Test Anxiety Points for Science Course according to Gender.

Scale	Gender	N	\bar{X}	Rank Average	Rank Total	U	p
S C B	Male	343	28.52	338.30	116038.50	45171.500	.011*
	Female	298	27,35	301.08	89722.50		
T A	Male	343	40.81	330.50	113361.50	47848.500	.163
	Female	298	39.37	310.07	92399.50		

* $p < .05$ SCB: Science Course Burnout, TA: Test Anxiety

When the data in Table 2 were analyzed, it was seen that there was a statistically significant difference between the burnout scores of males and females ($U=45171.500$; $p=.011$). Considering the rank averages, it is seen that male students' burnout for science is higher than that of female students. This finding shows that the gender variable makes a difference in the burnout of the students. However, there was no statistically significant difference between the test anxiety scores of male and female students ($U=47848.500$; $p=.163$).

4. DISCUSSIONS AND CONCLUSION

In this study, it was determined whether there was a significant relationship between the burnout and test anxiety scores of the students in the process of evaluating the students' learning. In addition, it was determined whether the burnout and test anxiety scores of the students' science course differed by gender. As a result of the analysis of the data obtained from the study, it has been shown that there is a positive and significant relationship between the burnout scores, and test anxiety scores of the secondary school students ($p < .05$). This relationship was found to be moderate. According to this, when the science students' burnout scores of the secondary school students increased, their examination anxiety scores increased. The reason for this

increase in test anxiety scores can be said to be resulting from the negative impact of science burnout on students' anxiety concerns. When the studies showing that burnout among students are related to various variables are examined, we see that Pines, et al. (1981) found that burnout scores of the undergraduate students were in the middle and upper level (Yang, 2004). Balkis (2013) showed that there was a significantly negative relationship between burnout feelings and academic achievement of university students. In another study, Boudreau, et al. (2004) found that burnout is related to academic achievement (Balkis, 2013). These studies show that there is burnout among students and their results support our study.

When the differences between the gender and the burnout scores of the students in the study were examined, it was seen that there was a significant difference between the gender and the science burnout scores ($p<.05$). According to this, it was seen that the male students' burnout scores ($\bar{X}=28.5$) were higher than the female students' burnout scores ($\bar{X}=27.3$). Similar results were observed in the studies conducted so far. For example, Tansel (2015) observed that burnout scores of university students differ according to gender. Acar and Çakır (2015) observed that school burnout levels of secondary school students differ according to gender. In another study, Yeni Palabıyık (2014) showed that the burnout of high school students was higher among the 12th grade male students according to gender and grade level. In addition, he has shown that it is low in the 10th grade female students. In addition, when the difference between the gender and test anxiety scores of the students in the study was examined, it was seen that there was no significant difference between sex and test anxiety scores ($p>.05$). When the literature is examined, the results of the current research is supported by the results of the studies of Akman, et al. (2007), Muola, et al. (2009) and Fiore (2012). However, there are also some results showing that there is a difference between the gender of the students and the test anxiety scores. Kapıkıran (2002) and Dündar, Yapıcı and Topçu (2008) observed that test anxiety is higher in girls than in boys.

As a result, it was observed that there was a positive and significant relationship between the science course burnout scores and the test anxiety scores of the students in the secondary school. It was found that there was a significant difference between the gender of the students and the burnout scores of the science course. Another finding is that the male students' burnout scores were higher than the scores of female students.

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