

## **Exploring the Relationship between Self-Regulation Skill and Test Anxiety Level of Secondary School Students**

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### **Abstract**

This research studied the relationship between self-regulation skills and test anxiety level of secondary school students. The sample of the study, which was designed as a correlational research design, consisted of 234 7<sup>th</sup> and 8<sup>th</sup> grade secondary school students. The students were studying at different secondary schools in Aksehir District, Konya Türkiye in the 2020-2021 academic year. To collect the research data, the “Perceived Self-Regulation Scale” developed by Arslan and Gelisli (2015) and the “Westside Anxiety Scale” developed by Totan (2018) were used. Cronbach Alpha reliability of the scales were found as .97 and .94, respectively. As a result of the analyses, a moderate significant negative relationship was found between the self-regulation skills and the test anxiety levels of the students. In addition, simple linear regression analysis results showed that students’ self-regulation skill explained 14% of the total variance in test anxiety [R=.387, R<sup>2</sup>=.149, p<.05].

**Keywords:** Self-regulation skill, test anxiety, secondary school students.

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## **Introduction**

Education, which encompasses the learning and teaching knowledge and skills, is a basic and fundamental human right to all people as well as being a key factor to sustainable social, economic, and political development (McMillan & Schumacher, 2010). In today's educational system, academic achievement of the students is given utmost importance. Academic achievement indicates whether students have accomplished the specified learning outcomes (Kumari, 2020). Furthermore, academic achievement is related to the social and economic development of the countries. Therefore, raising students with the required skills and having the best quality graduates who will be responsible for social and economic developments of the societies have gained importance (Alemu & Feyssa, 2020). As a result, in the learning and teaching process, it has become a necessity to measure the success level of the students' learning achievement. Additionally, determination of academic achievement is required to have quality education and to make successful and effective interventions (Muhammedhussen, 2016). Accordingly, in education systems, examination results have been generally used in measurement and evaluation and testing of knowledge. The obtained results are used effectively in designing teaching environments, determining learning goals, and measuring students' success. However, while some students get through this process more positively and comfortably, some students experience anxiety to some extent during or before the examination.

When the test anxiety is considered as a special type of anxiety, it is highly likely that students will experience this state of tension at every level of education. Test anxiety is a broad term that includes some psychological and behavioral responses when individuals worry about failure on the exams or similar situations (Sarason & Sarason, 1990). It is the tendency to view exams as threatening, and predisposes the individual to experience high levels of state anxiety during assessment and measurement (Putwain & Daly, 2014). Students experience anxiety when they fear of failure and/or worry over performance (Meijer, 2001) and during or prior to taking exams since they desire to get good marks. Previous evidence shows that test anxiety is related to poor academic performance (Romera & de la Fuente Arias, 2021); learning difficulties, and lower achievement (Putwain et al., 2016). Furthermore, some physiological symptoms of anxiety such as facial redness, muscle tension, increased heart rate and feeling panic (Karatas et al., 2013) cause lack of focus and students may become irritable (Keogh et al., 2004). Students who experience these feelings become nervous and anxious not only during the exam but also when they are going to speak in a group. Additionally, their negative thoughts towards themselves can easily distract them (Aysan et al., 2001). Anxiety in education is a problem that needs to be resolved if not taken seriously, which can hinder productivity and lead to a decline in academic ability and learning outcomes, and even physical problems (Mukhliset al., 2020). As a result of the information presented in the literature, it becomes clear that test anxiety prevents students to obtain higher achievement.

There are various causes of test anxiety. Lower self-esteem and self-efficacy, embarrassing treatment from the teachers, tasks higher than students' capabilities, poor time management during exams, inadequate skills, low motivation, self-criticism, negative self-talk (Anwar & Batool, 2019), poor study habits, not knowing how to study effectively, high expectations for exams, failure to fulfill the duties and responsibilities, parents' expectations higher than the student's ability, fear that others will regard them as inadequate and worthless (Ozcan, 2017) are among the main causes of test anxiety. In addition, some academic reasons such as difficulty of the curriculum, long study hours, financial problems, some emotional factors such as inadequate peer support, lack of entertaining activities, competitive environment (Foster & Spencer, 2003) are some other reasons of text anxiety. Based on this information, reasons such as poor study habits, not fulfilling the duties and responsibilities, failing to complete the duties, and inability to manage time can be listed as factors that increase test anxiety. Therefore, it can be argued that reasons of text anxiety vary.

Although anxiety to some extent is considered as an effective motivational factor that can enhance the performance of the students, the excessive anxiety can have adverse effect on mental health by leading negative feelings such as anger, fear, and stress (Duan et al., 2015). Howard (2020) states that some students may have higher motivation by feelings of anxiety since they think that they should study hard for the exams, otherwise they may fail. Jerrim (2022) indicated that very low level of anxiety may lead to poor exam performance as students do not make sufficient preparation. Therefore, it can be argued that the association between test anxiety and academic achievement is affected by the amount of the anxiety experienced. We emphasize that moderate level of test anxiety may be the ideal for students to be successful.

Ariani (2016) emphasized that self-regulation is due importance to achieve the desired outcomes on the tests and exams. Self-regulation was first introduced by Bandura. This concept focused on the importance of thinking about the behavior, capacity and abilities of the individual (Bandura, 1991). Self-regulation is the generation of thoughts and emotions that a person needs for learning and motivation, planning their behavior and applying them gradually (Schunk & Ertmer, 2000). Pintrich (1999) defined self-regulation as an active process that includes controlling the behavior, motivation and cognition of the learning unit of the individual towards a specific goal. Zimmerman (2008) defined self-regulation as a set of behaviors such as goal setting, time management, strategy formation for the learning process, self-evaluation, motivation, getting help, and beliefs about academic performance. In this context, self-regulation can be expressed as the thoughts, feelings, and activities that an individual puts forth to achieve a specific educational goal (Zimmerman et al., 1996). Therefore, it can be argued that self-regulation requires learners to take active roles in their learning process.

Additionally, learners are expected to become responsible for taking the steps to achieve the learning outcomes.

The shift from teacher-centered learning approaches to student-centered learning approaches has led to an increase in the student's responsibility for learning. The processes in which a student takes responsibility for his/her own learning, organize his/her behaviors to fulfill his/her learning task and reach his/her goals emphasize self-regulation. Accordingly, self-regulation has become important in education since it has a great impact in terms of achieving lifelong success (Boekaerts & Cascallar, 2006). Students should acquire self-regulation skill to solve the problems they encounter while learning. Based on this, self-regulated learning is considered as a component that shapes students' identities and a part of life-long learning (Gu et al., 2020). In the learning processes, this skill also affects the academic success and performance of the students. Students with high self-regulation skill set goals, select the appropriate strategies they need to achieve the learning goals, implement these strategies and monitor their own progress (Schunk & Zimmerman, 1996).

The most basic characteristics of self-regulated learners are that they use strategies to achieve academic goals and are aware of the strategic relationships between learning outcomes and self-regulation processes. They take the responsibility for learning, use strategies to achieve their goals. They know how to access and use resources and how to plan with resources, as well as how to measure their performance, how to analyze and organize their work (Wolters & Pintrich, 1998). Therefore, self-regulated learning skill enables students to make less effort while learning and show higher academic success (Zimmerman, 1990). Additionally, even if a task is boring and difficult, they try to complete it, listen to the teacher, plan their studies effectively (Adesola & Li, 2018).

The previous studies also indicated that students with self-regulation skill have higher level of motivation to learn (Torrano & González Torres, 2004), are more successful (Pintrich, 2004; Zimmerman, 2008), take the responsibility of their own learning (Turan & Demirel, 2010), try to control and manage their complex learning activities (Kauffman, 2004), use cognitive strategies, control and direct their own mental processes (Torrano & González Torres, 2004), and develop realistic expectations and set learning goals for themselves (Moos & Ringdal, 2012). In other words, individuals with this skill can become students who can organize their educational life and academic processes and achieve success in this way. As seen, self-regulation, which encompasses determining future goals and making effort to achieve these goals, managing time, being aware of responsibilities and fulfilling them, monitoring, and controlling cognitive activities and behaviors, has an indispensable role in life. However, when students lack self-regulation skill, they cannot reach their goals, cannot achieve a certain success, are

unhappy in life and are bad in human relations. Besides directly affecting an individual's quality of life, it is a skill closely related to academic success. Based on this, it can be interpreted that the value of self-regulation can be easily seen at school and during the exam preparation process.

Self-regulation is a promising conceptual approach that may reduce the negative effects of anxiety. For example, students with self-regulation skill study hard to secure their academic success and have more control over their studies (Bembenutty et al., 1998). It is suggested by Morosanova and Fomina (2017) that students can acquire the psychological competencies that allow them to pass the exams successfully when they develop conscious self-regulation for the educational activities. The researchers further concluded that self-regulation positively affects the students' performance in exams. Morosanova et al. (2016) indicated that when students independently and responsibly promote educational goals, they can be more successful in the exams. In another study conducted by Brackney and Karabenick (1995), it was obtained that test anxiety level of the students negatively affects their use of effort regulation and time and study environment management. Adesola and Li (2018) obtained the finding that it is likely for the students with high test anxiety to have lower academic achievement. On the contrary, students with lower self-regulation are more likely to have higher test anxiety. According to Barrows et al. (2013), when students lose their self-confidence and do not believe in their capacities, they tend to be worried about their exam results. On this issue, Bandura (1993) emphasized that when students underestimate their competencies, they have lower academic performance. Kesuma et al. (2021) stated that when senior high school students follow the basic concepts of self-regulated learning, they have increased self-confidence, and since they do not worry about being graduated, they can be more successful. Romera and de la Fuente (2021) obtained the findings that individuals with high text anxiety level have low level of self-regulation.

In some studies, researchers examined the relationships between test anxiety and study skills of the students. Eker (2016) found significant relationships between high test anxiety and poor study skills of students. The researcher also stated that students who do not prepare enough for the exam experience a great deal of anxiety. Academic inadequacy lowers the student's self-confidence and raises the level of anxiety because he/she considers the exam to be more difficult than his/her capacity. Kutlu and Bozkurt (2003) indicated that when students lack study skills and do not have the organizing skills required to remember and use information, they have higher test anxiety. Therefore, due to inadequate preparation for the exams, they experience test anxiety. The study conducted by Kılıc (2014) also reveals that when student think that they forget the information they study and they do not prepare for the tests adequately and effectively, they have high level of test anxiety.

It is seen that most of the factors affecting success in the preparation process for the exams are related to self-regulation. Another condition that affects exam success is test anxiety. Although there are many factors that cause test anxiety, some of these factors are related to inadequate preparation for exams, and improper study habits. When students do not study for the exam adequately and do not have the necessary knowledge, they cannot feel ready for the exam and may think that they will not be successful, which can cause high test anxiety.

### **Present Study**

There are many challenges that secondary school students face during the education and training process. Among them, test anxiety, which prevents students to be successful, has a leading role (Kavakcı et al., 2014). Similarly, Habibullah and Ashraf (2013) stated that tests and exams especially at secondary education level are important for decision making in our competitive society.

Exams are an important form of evaluation due to the education and schooling system of Türkiye (Golcek, 2020). Therefore, as in many other countries, in Türkiye, students take many exams during their education and training process starting from primary schools. The education system in Türkiye is graded into four levels: *primary level, secondary level, high school level and higher education*. The secondary school level is of 4 years (5<sup>th</sup>, 6<sup>th</sup>, 7<sup>th</sup> and 8<sup>th</sup> grades) and students in this level are between 10 and 14. Students take an exam at 8<sup>th</sup> grade, and they are registered to high school according to the mark they get from this exam. Therefore, secondary school students in Türkiye study for a central exam for the first time, create certain goals and start to study towards these goals. Additionally, 7<sup>th</sup> and 8<sup>th</sup> grade students are in the adolescence period, which is known to be a painful process with many changes in the life of the individual, and this period begins in the secondary school period. Adolescence is a sensitive period, and the academic performance of the student during this period largely shapes his/her future life. In this critical period, revealing the factors affecting the academic success of students will shed light on the studies to be carried out to prevent failure (Basol & Zabun, 2014). It is known that one of the factors that causes failure is exam anxiety, and studies show that there is a negative relationship between success and exam anxiety. Both the importance of success for adolescents and the fact that they will take a national exam for the first time show that test anxiety experienced in this period is a subject that needs to be studied in Türkiye. Additionally, as outlined in the literature, self-regulation is a factor that can promote academic achievement level of the students and therefore may have a synergistic effect on anxiety. Motivated by the information presented in the literature, it is thought that better outcomes can be achieved in preventing the test anxiety by improving the self-regulation skills of the students. In light of all these mentioned above, this study aimed to examine the relationship between the test anxiety level and self-regulation skills of secondary school students studying in Konya Province, Türkiye.

### **Objectives of the Study**

This study was conducted with the problem statement of “*Is there a significant relationship between the self-regulation skills and test anxiety level of 7<sup>th</sup> and 8<sup>th</sup> grade secondary school students?*”. In response to this, the following sub-problems were tried to be answered:

1. What are the self-regulation skill levels of the 7<sup>th</sup> and 8<sup>th</sup> grade secondary school students?
2. What are the test anxiety levels of the 7<sup>th</sup> and 8<sup>th</sup> grade secondary school students?
3. Is there a significant relationship between the self-regulation skill and test anxiety levels of the 7<sup>th</sup> and 8<sup>th</sup> grade secondary school students?
4. Is the self-regulation skill of the 7<sup>th</sup> and 8<sup>th</sup> grade secondary school students a predictor of their test anxiety levels?
5. Is there a significant relationship between the self-regulation skills and test anxiety levels of the 7<sup>th</sup> and 8<sup>th</sup> grade secondary school students in gender and grade groups?

### **Method**

#### **Research Design**

This study was designed as correlational research. Correlational research design is employed when researchers examine the relationship between two or more variables and the existence of the change between the variables without any interference with these variables (Buyukozturk, 2020). Based on this, the current study questions the relationship between the self-regulation skill level and test anxiety level of 7<sup>th</sup> and 8<sup>th</sup> grade secondary school students in Türkiye without making any interference.

#### **Population and Sample of the Study**

The population of the study were the 7<sup>th</sup> and 8<sup>th</sup> grade secondary school studying at different schools in Aksehir District, Konya Türkiye. Among this population, 234 7<sup>th</sup> and 8<sup>th</sup> grade students were determined as the study group. 116 (49.6%) of them were 8<sup>th</sup> grade students and 118 (50.4%) of them were 7<sup>th</sup> grade students. In addition, 128 of them (54.7%) were female and 106 of them (45.3%) were male. Convenience sampling method was used in determining the study group. Convenience sampling involves selecting individuals from a target population based on practical considerations such as their easy accessibility, proximity to the study location, availability during the study period, or their willingness to participate (Dornyei, 2007). It was assumed that the students had similar characteristics as they were at the same age level. Based on this, in the study the students who were easy to reach and willing to participate in this study were included.

### **Data Collection Tools**

The research problems of the study were answered using two data collection tools. The first data collection tool was the “*Perceived Self-Regulation Scale*”. Arslan and Gelisli (2015) developed this five-point Likert type scale to determine students’ self-regulation skills. It has two sub-dimensions as *openness* and *searching*. The scale has a total of 16 items, 8 in the “*openness*” sub-dimension and 8 in the “*searching*” sub-dimension. The items range from “never (1)” to “always (5)”. In addition, there is no reverse item in the scale. In the original study, the Cronbach alpha reliability coefficient was obtained as .84 for openness, .82 for searching sub-dimensions, and .90 for the total mean score of the scale. In the current study, the reliability value of the scale was found as .79 for openness, .95 for searching sub-dimensions, and .95 for the total mean score of the scale.

The other data collection tool was the “*Westside Test Anxiety Scale*” developed by Totan (2018). It is a one-dimensional five-point Likert-type scale. There are 11 items in the scale. All questions are reversed, and a total mean score is obtained. The items in the scale range between “never true (1)” and “always true (5)”. The lowest and the highest scores that are obtained from the scale are 11 and 55, respectively. In the original study, the Cronbach alpha reliability coefficient of the scale was obtained as .92 for the sample of the secondary school students and as .91 for the sample of high school students. In the current study, the Cronbach alpha reliability coefficient was obtained as .94, which indicates a high-level reliability.

### **Data Collection and Analysis**

To collect the research data, the scale items were processed into Google form. All items were marked as “required” to prevent missing data. The relevant link was shared with the students. Students submitted their answers regarding the items online. Their responses to the items were also stored in Google Form database. The obtained data were analyzed in computer environment using a statistical program. Students’ self-regulation skills and test anxiety levels were calculated with the formula of “range of series/number of groups to be performed” (Tekin, 1996; cited in Ocak & Yurtseven, 2016). As a result of this calculation, self-regulation skill scores of 16-37 were determined as low, 38-59 as moderate, and 60-80 as high level. The test anxiety scores were grouped as low between 11-24, moderate between 25-39, and high between 40-55.

Among the descriptive statistics, means and standard deviations were used to display the students’ overall responses for the scales. Pearson correlation analysis was utilized for the relationship between the two variables. In determining the correlation level, the intervals of 0.00-0.30, 0.30-0.70, and 0.70-1.00 were considered as low correlation, moderate correlation, and high correlation, respectively (Buyukozturk, 2020,



p. 32). Regression analysis was conducted to determine how a dependent variable is explained by other independent variables. Finally, two-way analysis of variance was utilized. The significance level of  $p < .05$  was taken into account in data analysis.

## Findings

### *Self-Regulation Skill Level of 7<sup>th</sup> and 8<sup>th</sup> Grade Secondary School Students*

The first sub-problem of the study tried to reveal the self-regulation skill level of 7<sup>th</sup> and 8<sup>th</sup> grade secondary school students, and the obtained findings are given in Table 1.

Table 1

#### *Self-Regulation Skill Level of the Students*

Self-Regulation	n	%
Low level	19	8.1
Moderate level	73	31.2
High Level	142	60.7
Total	234	100

As seen in Table 1, 19 students had low level of self-regulation skill, 73 of them had moderate level of self-regulation, and 142 of them had high level of self-regulation. In general, it is seen that the majority of the students (60.7) had a high level of self-regulation skills.

### *Test Anxiety Level of 7<sup>th</sup> and 8<sup>th</sup> Grade Secondary School Students*

Table 2 presents the findings related to the test anxiety level of the 7<sup>th</sup> and 8<sup>th</sup> grade secondary school students.

Table 2

#### *Test Anxiety Level of the Students*

Test Anxiety	n	%
Low level	40	17.1
Moderate level	96	41
High Level	98	41.9
Total	234	100

Table 2 shows that test anxiety levels of 40 students were at low level, test anxiety of 96 students were at moderate level, and test anxiety of 98 students were at high level. As seen, majority of the students (41.9%) had high level of test anxiety.

### *Correlation between Self-Regulation Skill and Test Anxiety Level of the 7<sup>th</sup> and 8<sup>th</sup> Grade Secondary School Students*

The findings obtained from the correlation analysis conducted to examine the relationship between the two variables of the study can be seen in Table 3.

Table 3  
*Correlation Analysis Results*

Self-Regulation	Test Anxiety		
	Pearson Correlation	Sig. (2-tailed)	n
Openness	-.396**	.000	234
Searching	-3.59**	.000	234
Total Mean Score	-.387**	.000	234

\*\* Correlation is significant at the 0.01 level (2-tailed).

A negative, significant and moderate level correlation was obtained between test anxiety levels and self-regulation skills of the students [ $r = -.387$ ;  $p < .05$ ]. The correlation between students' test anxiety levels and *openness* [ $r = -3.96$ ,  $p < .05$ ] and *searching* [ $r = -3.59$ ;  $p < .05$ ] sub-dimensions were found to be at moderate level, significant and negative.

#### ***The Prediction of Test Anxiety Level by Self-regulation Skill of 7<sup>th</sup> and 8<sup>th</sup> Grade Secondary School Students***

The findings related to the prediction of test anxiety level by self-regulation skill of the students are presented in Table 4.

Table 4  
*Simple Linear Regression Analysis between Variables*

	<i>B</i>	<i>SHB</i>	$\beta$	<i>t</i>	<i>P</i>
Constant	77.18	2.98	-	25.86	.00
1-Test Anxiety Level	-.50	.00	-.38	-6.38	.00

$n=234$ ,  $R=.38$ ,  $R^2=.14$ ,  $p<.01$

It was obtained that students' self-regulation skill explained 14% of the total variance in test anxiety [ $R=.387$ ,  $R^2=.149$ ,  $p < .05$ ]. In other words, 14% of the change in test anxiety level can be explained by self-regulation skill.

#### ***Relationship between the Self-Regulation Skills and Test Anxiety Levels of the 7<sup>th</sup> and 8<sup>th</sup> Grade Secondary School Students in Gender Groups***

It was also examined whether there was relationship between the two variables in gender groups, and the findings are given in Table 5.

Table 5  
*Pearson Correlation Analysis for Self-Regulation Skills and Test Anxiety of Students in Gender Groups*

		Self-Regulation Skill	
Female	Self-Regulation	Pearson Correlation	1
		Sig. (2-Tailed)	
		N	128
	Test Anxiety	Pearson Correlation	-.269**
		Sig. (2-Tailed)	.002
		N	128
Male	Self-Regulation	Pearson Correlation	1
		Sig. (2-Tailed)	
		N	106
	Test Anxiety	Pearson Correlation	-.522**
		Sig. (2-Tailed)	.000
		N	106

\*\* Correlation is significant at the 0.01 level (2-tailed).

As seen, there was a negative and low-level significant relationship between the self-regulation skills and test anxiety level of secondary school students in the female gender group [ $r = -.269$ ,  $p < .05$ ]. In the male gender group, the relationship between the self-regulation skills and test anxiety level of secondary school students was at moderate level, significant and negative [ $r = -.522$ ,  $p < .05$ ].

***Relationship between the Self-Regulation Skills and Test Anxiety Levels of the 7<sup>th</sup> and 8<sup>th</sup> Grade Secondary School Students in Grade Groups***

The findings on the relationship between the self-regulation skills and test anxiety levels of the students in grade groups are given in Table 6.

Table 6  
*Pearson Correlation Analysis for Self-Regulation Skills and Exam Anxiety of Students in Grade Groups*

		Self-Regulation Skill	
7 <sup>th</sup> grade	Self-Regulation	Pearson Correlation	1
		Sig. (2-Tailed)	
		N	118
	Test Anxiety	Pearson Correlation	-.408**
		Sig. (2-Tailed)	.000
		N	118
8 <sup>th</sup> Grade	Self-Regulation	Pearson Correlation	1
		Sig. (2-Tailed)	
		N	116

Test Anxiety	Pearson Correlation	-.371**
	Sig. (2-Tailed)	.000
	N	116

\*\* Correlation is significant at the 0.01 level (2-tailed).

According to Table 6, there was a negative and moderate level significant relationship between the self-regulation skills and test anxiety level of secondary school students in the 7<sup>th</sup> grade student group [ $r = -.408$ ,  $p < .05$ ]. In the 8<sup>th</sup> grade student group, a moderate level significant negative correlation was obtained between the self-regulation skills and test anxiety level of secondary school students [ $r = -.371$ ,  $p < .05$ ].

## Discussion

The findings showed that the majority of the students (60.7) had a high level of self-regulation skill. In addition, it was found that the self-regulation levels of the students were at good level for “*openness*” and “*searching*” sub-dimensions. In this sense, it is seen that students are open to gaining new information, asking for help from others, and they make research for reaching their goals in the learning process at good level. Furthermore, in general, it can be said that students direct and organize their own learning processes in line with the goals they set at moderate level. Similarly, in the study conducted by Stanikzai (2020), university students were found to have high level of self-regulation. On the contrary, Pascua (2022) and Karahan (2012) found that high school students exhibited moderate level of self-regulated learning skill. Bennet (2004) concluded that self-regulation has a role in improving critical thinking skills as well as achievement ambition for secondary school students. In a study conducted by Tzohar-Rozen and Kramarski (2014), the positive effect of secondary school students’ self-regulation skills on problem solving, motivation and emotions was determined. Self-regulated learners are aware of the difficulties and limitations they may encounter in their own learning, set personal goals for themselves, use strategies appropriate for these goals, and motivate themselves throughout the learning process (Zimmerman, 2008). In this sense, it can be said that students in the study group are able to set learning goals, pursue and regulate these goals, monitor and evaluate their own learning process. Additionally, it can be argued that they are aware of their own learning process. Camahalan (2006) concluded that educational activities, in which students are given the opportunity to learn and choose self-regulated learning strategies, positively affect students’ self-regulated learning levels and academic achievement. Self-regulation skill is one of the skills that individuals are expected to have to cope with the changes experienced in the 21<sup>th</sup> century. Therefore, secondary school students should be taught about how to organize the learning process. Teachers should also design the learning environment in a way to promote self-regulation skill for better academic achievements of the students.

The findings indicated that majority of the students (41.9%) exhibited high level of test anxiety. In the literature, there are some studies with different findings. For example, Gurses et al. (2010) found that test anxiety levels of secondary school students were at moderate level. Capulcuoglu and Gunduz (2013) stated that since the Turkish education system is exam-oriented, both families and students allocate more time and money for academic success, and therefore students have high level of test anxiety. Azizi and Seddiqi (2019) found that most of the secondary school students had severe test anxiety level. Barik and Barman (2019) obtained the finding that secondary school students had moderate level of test anxiety. Alemu and Feyssa (2020) concluded that few secondary school students had severe test anxiety while most of them had moderate level of test anxiety. The anxiety to be experienced in the exam-induced situation will invite the failure of the person rather than bringing success to the person. Anxiety brings success to one's life up to a certain level. However, excessive anxiety and stress will prevent the use of existing knowledge at the time of the exam. Then it becomes clear that test anxiety is considered as a negative factor that prevents the student success. Therefore, teachers should help students to cope with anxiety they experience for the tests and examinations.

The findings related to the third sub-problem of the study indicated a moderate level significant negative relationship between the test anxiety levels and self-regulation skills of the students [ $r = -.387$ ]. In addition, as a result of simple linear regression analysis, it was obtained that students' self-regulation skill explained 14% of the total variance in test anxiety [ $R = .387$ ,  $R^2 = .149$ ,  $p < .05$ ]. In other words, 14% of the change in test anxiety level can be explained by self-regulation skill. Therefore, it can be argued that when students' self-regulation skill increases, their test anxiety levels will decrease. Based on this, it is seen that this finding supports the argument that having self-regulation skills will affect the test anxiety. Because of test anxiety, students may not always be able to regulate their own learning. High test anxiety may result in difficulties in regulation the learning process (Pintrich & Schunk, 1996). As a result, in the learning environments students should be encouraged to be self-regulated learners, which will decrease their test anxiety level.

Considering the relationship between self-regulation skills and test anxiety in gender groups, negative significant relationship was found in both male and female gender groups. A low correlation was found in the female gender group, while a moderate relationship was found in the male gender group. Therefore, it can be said that while there will be a low level of decrease in test anxiety depending on the increase in self-regulation skill of the female students, there will be moderate level of decrease in test anxiety depending on the increase in self-regulation skill of the male students. Based on this, it can be argued that self-regulation and test anxiety levels differ for male and female

students. In the literature, there are some studies with the results that female students are more anxious about exams than male students (Bacanlı & Surucu, 2006; Putwain, 2007; Legese, 2014; Aydın, 2017; Rani, 2017; Sarı et al., 2017, Alemu & Feyssa, 2020; Torrano et al., 2020). On the contrary, Barik and Barman (2019) found that male secondary school students were more anxious about their tests than female students. Additionally, in some studies (Yenilmez & Ozabacı, 2003; Yenilmez & Ozbey, 2006), no significant gender differences were obtained. Evidently, the findings related to gender differences in text anxiety lack consistency, which may be resulted by different characteristics of the participants and the contexts in which the studies were conducted. However, the relevance of the findings is that gender is a significant variable in terms of the relationship between the self-regulation skill and test anxiety.

When the relationship between the two variables in grade groups was analyzed, a moderate significant negative relationship was obtained in both 7<sup>th</sup> and 8<sup>th</sup> grade groups. In the 7<sup>th</sup> grade student group, there was a negative and moderate level significant relationship between the self-regulation skills and test anxiety level of secondary school students [ $r = -.408$ ,  $p < .05$ ]. Similarly, in the 8<sup>th</sup> grade student group, a moderate level significant negative relationship was obtained between the self-regulation skills and test anxiety level of secondary school students [ $r = -.371$ ,  $p < .05$ ]. Therefore, it is concluded that when 7<sup>th</sup> grade and 8<sup>th</sup> grade students' self-regulation skill increases, their test anxiety level decreases.

## Conclusions

Results of this study confirmed the existence of significant relationship between test anxiety and self-regulation skill of secondary school students. Moreover, the majority of the students exhibited high level of self-regulation and test anxiety. Consequently, the current study addressed research gaps in the existing literature. The relationship between self-regulation skill and test anxiety level of secondary school students was indicated in the study. Therefore, this study has strengthened the idea that students' test anxiety level can decrease by making preparation for the tests and exams and taking more responsibility in the learning process. Therefore, this research can shed light for teachers who desire to bring test anxiety level of the students to an optimum level. In addition, the current study has gone some way towards enhancing our understanding on students' self-regulation and test anxiety. Lastly, the obtained findings may help teachers for adjusting the learning environment in a way to decrease test anxiety and to increase self-regulation of the students.

## Recommendations

Based on the results of the study, it is recommended that students should be encouraged to be prepared for the test and examinations should be provided with the required guidance to handle and cope with the test anxiety. Additionally, some guidance, academic counseling and advising programs should be activated in secondary schools especially before the examinations. So, they can develop confidence and therefore have lower test anxiety. Considering the importance of self-regulation in the learning process, students should be given more opportunities to take the responsibility of their learning, so their self-regulation skill may increase.

This study lacks information regarding the factors affecting test anxiety and self-regulation. In the further studies, the factors affecting test anxiety and self-regulation among secondary school students can be conducted. This study is also limited to 234 students studying at a state school in Türkiye. Students studying at other grades can be included to support the generalization of the results of the current study.

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