Relationship between Anxiety, Attitude, Test Motivation, and Exam Success Regarding Exam Question Types: An Investigation of Middle School Learners

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Abstract

The present study examined the relationship between anxiety about exam question types and students' attitudes, test motivation, and exam success. The sample was 121 middle school pupils aged 11 to 15 years in Sakarya, Turkey. Data obtained from scales on attitude, anxiety, and test motivation were analyzed using Pearson correlation coefficients and regression analyses. The findings indicate that anxiety about exam question type was significantly negatively related to attitude, test motivation, and exam success. Moreover, attitudes about question type were significantly positively related to test motivation and exam success, and test motivation was also significantly positively related to exam success. Regression analysis results showed that students' anxiety about exam question types was predicted by their attitudes and exam success but was not predicted by test motivation.

Keywords: Anxiety, Attitude, Exam question types, and Test motivation.

Introduction

A person plays an important role in developing herself, her country, and the world with the knowledge she acquires through education. In addition to creating better living standards for individuals through improving productivity, education creates knowledgeable, skilled manpower, which is considered the engine of economic growth and contributes positively to economic development (Sothan, 2019). When considered from this perspective, it can be seen that the main thing people get from education is knowledge. The knowledge we acquire through education plays a major role in our future lives and helps us understand events much more easily (Brew et al., 2021). However, gaining knowledge, attitudes, values, and skills through education is not a simple task but rather a long, difficult journey throughout life (Tadese et al., 2022). Educational institutions play an important role in this journey (Idris et al., 2012). Accordingly, students are expected to spend most of their time studying and to graduate with good academic results. The success of the education provided in educational institutions is evaluated as a criterion based on the academic performance of students (Brew et al., 2021).

Students' academic performance is deeply concerned with students, parents, teachers, and administrators in Turkey and many other countries. Although academic performance is sometimes known as school readiness, academic success, or school performance, these terms are generally used synonymously. It is generally agreed that 'academic performance' should be used for university students, and 'school performance' should be used for elementary and secondary students (Lamas,

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2015). Academic performance or achievement is the degree to which a student, a teacher, or an institution achieves short-or long-term educational goals and is measured by continuous evaluation and grade point average (GPA) (Talib & Sansgiry, 2012). Assessment is a crucial part of any educational program, and its forms can range widely from general examinations to detailed performance tasks such as written or audiovisual projects (Wiggins & McTighe, 2005). Exams used to evaluate academic performance are an integral part of many educational programs and have an important place in the overall GPA. They represent the most common evaluation method used in education systems and academic institutions (Pour-Mohammadi & Abidin, 2011a, 2011b).

Exams have many applications and evaluation options, allowing educators to present different types of questions when evaluating academic performance (Zeidner, 2004). In this context, educators can create five question types: open-ended, multiple-choice, true-false, short-answer, and matching, based on course objectives, assignments, or other course materials. The results for these question types can be affected by many factors, and it is essential to determine the factors that affect students' academic performance on exams and the components of these factors.

Ability is not the only factor affecting academic exam performance; there are also many cognitive and psychological factors (Hambleton et al., 1991). These can be listed as test attitude, test anxiety, exam skill, and guessing tendency. It is thought that each has a different impact on performance in exams (Dodeen, 2009) and that each also affects factors such as test motivation. Researchers have found that the factors affecting student attitudes toward an exam are test anxiety, test motivation, the difficulty of exam questions, environmental factors, the importance of the exam, future effects, application of the exam, and family environment (Neemati et al., 2014; Rasul & Bukhsh, 2011; Smith, 1997). It is important to determine the components that positively or negatively affect these factors, which affect performance on exams. The most important of these components is the exam format or question types. Determining student attitudes and concerns regarding exam question types can be especially effective in revealing the causes of test anxiety and, therefore in developing positive examination attitudes and motivation. For this reason, this study investigated whether secondary school students' anxiety and attitudes toward exam question types contribute to test motivation and success.

If students taking the same exam perform differently, the types of questions that make up the exam content might have resulted in different performances. Exam question types can influence test takers' learning strategies and styles, test anxiety, test attitude, and motivation when students are biased toward other types of exam questions (Benjamin et al., 1981; Birenbaum & Feldman, 1998; Kılıç & Çetin, 2018; Pehlivan, 2011; Reteguiz, 2006; Önder, 2008; Zeidner, 1987). Therefore, the main concern in designing and developing exam question types should be to minimize the effects of these factors on academic performance.

Test anxiety is related to academic evaluation anxiety that arises from the fear of failure (Horwitz & Young, 1991) and is specific to the situation students experience in an exam or an evaluation in the classroom environment (Putwain, 2008). Test anxiety occurs when students believe that their cognitive abilities, motivation, and social competence are not sufficient to cope with the exam (Zeidner, 2010). It is believed that test anxiety is caused by factors such as exam techniques, format (exam question types), environment, clarity of rules, length of the exam, and time limits (Young, 1999). It is thought that exam format or question types have an important place in the formation of exam anxiety. Different types of

questions may cause different anxieties and attitudes. Therefore, the negative emotions that students show toward question types can be defined as exam question-type anxiety. The opposite situation is the attitude toward exam question types. Both situations affect students' anxiety and attitudes toward an exam and therefore their exam motivation and performance. Performance on an achievement test is the result of the interaction between prior knowledge, information-processing speed, and test motivation. In this respect, test motivation can be considered a special form of success motivation (Rheinberg, 1995). Research has reported that a well-motivated student performs better in assessment situations (Harlen & Crick, 2003; Pintrich & Schunk, 2002).

Test motivation does not depend only on the motivation, expectations, and personal characteristics of the student taking the exam. It also varies depending on the importance of the exam and the student's familiarity with the question types (Baumert & Demmrich, 2001). This variability in test motivation, especially in national and international large-scale assessments, significantly affects students' academic performance and future career plans. Considered from this perspective, it is important to determine the factors affecting test motivation. In this study, it was hypothesized that students' anxiety and attitudes toward exam question types would affect their test motivation and exam success. Thus, the study investigated whether there was a significant relationship between anxiety, attitudes, test motivation, and exam success toward exam question types of students and investigated also whether attitude, test motivation, and exam success predicted anxiety.

Method

Participants

A quantitative descriptive research method was used to examine the relationships between anxiety about exam question types and the attitudes, test motivations, and academic achievement of secondary school students. The sampling method was purposeful. The sample consisted of 121 students aged 11-15 years. The scales were applied to students in the second semester of the 2022-2023 academic year.

Measures

Anxiety, attitude, test motivation scales related to exam question type, and exam success scores were used to measure the relationships between variables. The scales are presented in Table 1.

Table 1

Distribution of Items in the scales

Scales	Developer	Items	Degree	Cronbach's Alpha
Anxiety about exam question types	Hensen, C. & Barbera, J. (2019)	4	from 0 to 10 score	.80

Attitude about exam question types	Kurbanoğlu, N. İ. & Olcaytürk, M. (2023)	10	5 Likert-scale	.83
Test motivation	Sundre & Finney (2002), Kurbanoğlu & Takunyacı (2017)	10	5 Likert-scale	.74

Preparation of the Anxiety Scale Regarding Exam Question Type

A modified version of the ASCIv2 was used to measure students' anxiety (Hensen & Barbera, 2019). The ASCIv2 administered in the experiment was operationalized for all exam question types. Therefore, the frame of reference of the scale was altered by changing "This experiment is…" from the original to "When solving the questions was…" The scale is comprised of semantic differential questions. A semantic differential question contains a spectrum between two polar opposite words such as 'relaxed' and 'tense.' Thus, the original five-point semantic differential scale consists of four items (Nervous/Calm, Relaxed/Tense, Anxious/Unconcerned, and Apprehensive/At ease). This scale is numbered from 0 to 10. The variety of the scale allowed the students to select anywhere along the spectrum. No changes were made to this scale, which consists of four items.

Exam Success and Data Collection Process

To measure exam success, Light, Sound, and Simple Machines units in the textbooks were selected. Ten key concepts in the introduction part of the selected units were determined. For each of the concepts, five different types of questions (open-ended, multiple-choice, short-answer, true-false, and matching) were prepared. From these questions, five exam achievement tests (EATs) consisting each of 10 questions of one of the five types were prepared. Five question types related to the same concept in an EAT are given as examples in Table 2.

Table 2

Five Different Question Types Belonging to the Same Concept

Key concept: different reflection	
Types of questions	Questions
Open-ended	**Question:** Define diffuse reflection and explain how it occurs? **Reply:**……
Multiple-choice	**Question:** Hakan saw his image when he looked at the basin filled with water while the water was still. Later, when he lightly touched the edge of the container with his hand and made the water ripple, a blurry image appeared.

	What property of light can explain Hakan's blurry image? a) Linear reflection b) Diffused reflection c) Spreading in all directions d) Uniform reflection	
Short-answer	**Question:** If the light ray hits the rough surface …… is reflected.	
True-false	**Question: (…..)** If the light ray hits the rough surface, it is reflected diffusely.	
Matching	**Question:** Reflection occurring as a result of the light ray hitting the rough surface (…..)	A) Diffused Reflection B) Opaque Substance

Units within the scope of the EATs were processed by the researcher by the plan. Students were told that there would be an exam after completing each unit. Students were not given information about the types of questions that would be asked in the exam. During the exam time, an EAT consisting of 10 open-ended questions about 10 key concepts was administered for 20 minutes. Immediately after the exam, the Attitude, Anxiety, and Test Motivation scales were applied to determine the students' attitudes, anxiety, and motivation toward the open-ended question type. The procedure was repeated for the multiple-choice, short-answer, true-false, and matching EATs.

Data Analysis

The relationships between variables were determined with the Pearson correlation coefficient, and whether exam question type attitude, test motivation, and exam success predicted anxiety about exam question types was investigated with regression analysis.

Findings

The data were examined in terms of normality and regression assumptions before data analysis. It was determined whether the data were suitable for the regression assumptions and whether they showed normal distribution by examining the normal distribution graph, kurtosis, skewed, and VIF values. The findings are demonstrated in Table 3 and Figure 1.

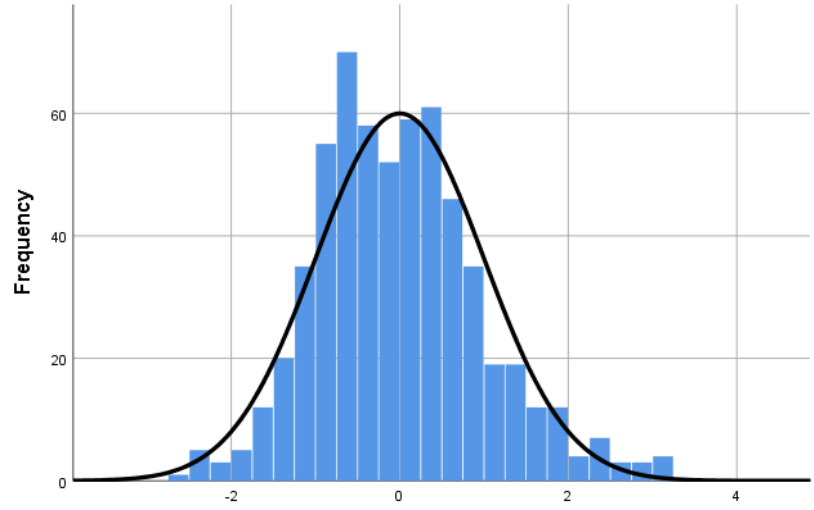
Table 3

Descriptive Statistic and Regression Assumption

Variables	N	Min.	Max.	$\bar{X}$	SD	Skewness	Kurtosis	VIF
Anxiety about exam question types	600	.00	400.00	14.30	109.41	;	-.758	
Attitude about exam question types	600	10.00	50.00	32.52	7.26	-.130	-.083	1.123
Test Motivation	600	10.00	50.00	33.91	6.19	-.469	.864	1.095
Exam success	600	0	100	61.01	29.21	-.473	-.740	1.136

Figure 1

Normal Distribution Curve



As can be seen in Table 3 and Figure 1, the data were suitable for the analysis with normality and regression assumptions. Thus, the relationships between the variables (anxiety about question type, attitude, test motivation, and exam success) were examined with the Pearson correlation coefficient, and whether attitude, test motivation, and exam success predicted anxiety was investigated with regression analysis. The results of correlation and regression analyses are shown in Tables 4 and 5.

Table 4

The result of Correlation Analysis

Variables	Anxiety about exam question types	Attitude about exam question types	Test Motivation	Exam success
Anxiety about exam question types	1			
Attitude about exam question types	-.476**	1		
Test Motivation	-.186**	.225**	1	
Exam success	-.276**	.291**	.248**	1

p<.01**; *p*<.05*

As can be seen in Table 4, anxiety about question type was significantly negatively related to question type attitude (r = -.476, p<.01), test motivation (r = -.186, p<.01), and exam success (r = -.276, p<.01). Attitudes about question type were significantly positively related to test motivation (r = .225, p<.01) and exam success (r = .291, p<.01). Also, test motivation was significantly positively related to exam success (r = .248, p<.01).

Table 5

The result of Regression Analysis

Independent Variable	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	R^2
	β	Std. Error	β			
(Constant)	415.987	25.175		16.524	.000	.25
Attitude about exam question types	-6.375	.566	-.423	-11.262	.000	
Test motivation	-.999	.656	-.056	-1.523	.128	
Exam success	-.521	.142	-.139	-3.679	.000	

Dependent Variable: students' anxiety about exam question types

As can be seen in Table 5, anxiety about exam question types was predicted by question type attitude (β = -.423, p<.001) and exam success (β = -.139, p<.001) but was not predicted by test motivation (β = -.056, p>.05).

Discussion

This study examined the relationships between middle school students' anxiety about exam question types and their attitudes, test motivation, and exam success. Whether attitude, test motivation, and exam success predicted anxiety was also investigated. The findings demonstrate that anxiety about question type was significantly negatively related to attitude, test motivation, and exam success. Also, attitudes about question type were significantly positively related to test motivation and exam success, and test motivation was significantly positively related to exam success. The results suggest that when teachers provide students with their preferred question types, their anxiety decreases, and their test motivation and exam success increase. The regression analysis results revealed that question type attitude and exam success could predict anxiety about question type, while test motivation did not predict anxiety about question type. Therefore, there is a strong relationship between exam success and anxiety and attitude toward question type.

In Turkey, as well as in other countries, exams are widely used in evaluating students' education processes, career selection, and job-finding processes (Dodeen, 2009; Kubiszyn & Borich, 2003; Kumandaş & Kutlu, 2014; Popham, 1999). Evaluating each student with the same exam prevents students from revealing their differences, prioritizing their interests and abilities, and preventing differences in exam type preferences among students. In this case, it is not the students' individual differences that are considered but the number of questions they answer correctly. Learning is a unique practice that includes different methods for everyone. In this context, prioritizing individual differences in learning activities is effective in students' exam question type preferences (Birenbaum & Rosenau, 2006). For this reason, teachers should ask questions while evaluating student learning, considering students' differences. Studies have shown that there are differences in the perceptions, attitudes,

preferences, and concerns of students taking the exam towards exam question types (Benjamin et al., 1981; Birenbaum & Feldman, 1998; Kılıç & Çetin, 2018; Önder, 2008; Pehlivan, 2011; Reteguiz, 2006; Zeidner, 1987). Additionally, it has been found that student success in exam question types differs (Beller & Gafni, 2000; Bridgeman & Lewis, 1994). From this perspective, considering the individual differences of the students taking the exam, it can be said that students' anxiety and attitudes towards question types, and therefore their test motivation and exam success, are different.

As a result, this study determined that students' anxiety about exam question types was negatively related to their exam question type attitudes, test motivation, and exam success. This result is similar to those of studies where exam question type preferences are different (Birenbaum & Feldman, 1998; Dodeen, 2009; Entwistle & Entwistle, 1991; Entwistle & Tait, 1995; Scouller & Prosser, 1994; Struyven et al., 2005; Zeidner, 1987). The results of this study may shed light on the investigation of other factors related to students' exams.

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