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A Model Explaining Reading Anxiety: Sleep Deprivation, Social-Emotional Learning Skills, And Reading Attitudes[1]

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Abstract

This study was conducted to understand how the reading anxiety experienced by fourth-grade primary school students was explained by sleep deprivation, social-emotional learning skills, and reading attitudes by using a hierarchical regression model. The sample group of the study, which was conducted using a correlational screening model, consisted of 331 fourth-grade students, including 51.4% females (170 subjects) and 48.6% males (161 subjects). Data collection tools were the "Reading Anxiety Scale" developed by Çeliktürk and Yamaç (2015), the "Sleep Deprivation Scale for Children and Adolescents" developed by Kandemir et al. (2021), the "Social-Emotional Learning Skills Scale" developed by Coryn at al. (2009) and adapted to Turkish by Arslan and Akın (2014), and the "Reading Attitude Scale for Primary School Students" developed by McKenna and Kear (1990) and adapted to Turkish by Kocaarslan (2016). With the data collected with these scales, first, the prerequisite analyses necessary for regression analysis and then a hierarchical regression analysis were performed. According to the analysis results, it was determined that the established regression model explained reading anxiety. According to the results obtained in the first model, it was seen that sleep deprivation explained .11 (ΔR^2=11) of the variance in students' reading anxiety in the first model and that social-emotional skills explained .18 (ΔR^2=18) of the variance in students' reading anxiety in the second model. The findings were discussed in light of the literature and considering the limitations of the research. Finally, recommendations were made to researchers, practitioners, and program developers according to the research results.

Keywords: Reading anxiety, sleep deprivation, social-emotional learning, reading attitude, regression

Okuma Kaygısını Açıklayan Bir Model: Uyku Yoksunluğu, Sosyal Duygusal Öğrenme Becerileri ve Okuma Tutumu

Özet (Türkçe)

Araştırmada, ilkokul dördüncü sınıf öğrencilerinin yaşadığı okuma kaygısının uyku yoksunluğu, sosyal duygusal öğrenme becerileri ve okuma tutumu ile birlikte nasıl açıklandığını hiyerarşik regresyon modeli ile anlaşılması amaçlanmıştır. İlişkisel tarama modeliyle yapılan araştırmanın örneklem grubunu %51,4'ü kız (170 kişi), %48,6'sı ise erkek (161 kişi) öğrenci olmak üzere 331 öğrenci dördüncü sınıf öğrencisi oluşturmaktadır. Araştırmada veri toplama araçları olarak Çeliktürk ve Yamaç (2015) tarafından geliştirilen "Okuma Kaygısı Ölçeği", Kandemir vd. (2021) tarafından geliştirilen "Çocuk ve Ergenler için Uyku Yoksunluğu Ölçeği", Coryn vd. (2009) tarafından geliştirilmiş, Arslan ve Akın (2014) tarafından Türkçe' ye uyarlanmış "Sosyal Duygusal Öğrenme Becerileri Ölçeği", McKenna ve Kear (1990) tarafından geliştirilen ve Türkçe'ye Kocaarslan (2016) tarafından uyarlanan "İlkokul Öğrencileri İçin Okuma Tutumu Ölçeği" kullanılmıştır. Bu ölçekler ile toplanan verilerle, regresyon analizi için gerekli olan ön koşul analizleri yapılmış ve daha sonra hiyerarşik regresyon analizine geçilmiştir. Analiz sonuçlarına göre, kurulan regresyon modelinin okuma kaygısını açıkladığı belirlenmiştir. Birinci modelde elde edilen sonuçlarına göre, birinci modelde uyku yoksunluğunun öğrencilerin okuma kaygısına ilişkin varyansın .11'ini (ΔR^2=11) açıkladığı, ikinci modelde sosyal duygusal becerilerin öğrencilerin okuma kaygısına ilişkin varyansın .18'ini (ΔR^2=18) açıkladığı görülmüştür. Araştırma bulguları alan yazın literatürü göre ve araştırmanın sınırlılıkları dikkate alınarak tartışılmıştır. Son olarak makalenin sonuçlarına göre araştırmacılara, uygulamacılara ve program geliştiren uzmanlara önerilerde bulunulmuştur.

Anahtar Kelimeler: Okuma kaygısı, uyku yoksunluğu, sosyal duygusal öğrenme, okuma tutumu, regresyon

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Introduction

Reading, which has an important place in human life, is a process of constructing meaning that involves the interaction between the reader and the writer, where prior knowledge is used as a language skill (Akyol, 2012). It also has a very notable place in learning activities. According to Oyeleye and Odunayo (2020), reading is the gateway to academic development and has a role in making a difference in students' strong reading skills, academic performance, career development, and personal success. For this reason, reading is the cornerstone of all kinds of learning activities and is a carrier skill that forms the basis of many skills in academic processes (Ball & Blachmen, 1991). According to Shala (2013), reading has significance in terms of extracurricular development, and reading skills are related to academic success and social competencies. Cognitive skills, such as comprehension, vocabulary acquisition, and fluency, are not enough to develop reading skills, which have an important place in an individual's school and out-of-school life. In other words, reading activity does not only include cognitive skills. Reading also has an affective dimension that is critical in terms of reading skills (Oyeleye & Odunayo, 2020). One of the affective aspects of reading that attracts the attention of researchers studying this skill is reading anxiety (Zhou, 2017). Anxiety is an expected consequence of psychological distress that occurs as a result of the perception of a potentially dangerous event (Larson et al., 2016). According to Chakraborty (2022), it is a complex psychological construct that can emerge in various forms and degrees of severity and is the response of the body to an environmental stimulus that requires attention. This response is characterized by a series of biochemical changes such as an increase in adrenaline and a decrease in dopamine levels that work to increase our awareness of the perceived threat. Spielberger (1966) divides anxiety into two groups: trait and state anxiety. While trait anxiety is a more stable and persistent type that is associated with personality traits, state anxiety is a temporary one experienced by the individual in situations perceived as threatening (Özgüven, 2007). State anxiety has been the subject of many studies with several school-related variables, such as exam anxiety, school anxiety, and math anxiety (Bozkurt, 2012; Ekşi, 1998; Zbornik & Wallbrown, 1991).

Reading anxiety, which is an important variable of the research, is a type of state anxiety that includes both cognitive and physical responses developed toward the act of reading (Zbornik, 2001). According to Goldston et al. (2007), reading anxiety is seen in situations where the act of reading is mandatory. It is an important reading problem or difficulty that students face (Oyeleye & Odunayo, 2020). It may lead to adrenaline release, trembling hands, sweating, headaches, stomach aches, increased respiratory rate, feeling of an overwhelming fear, feeling of helplessness, fear of being evaluated, fear of failure, inadequacy, and expectation of being devalued (Çevik et al., 2019; Jalongo & Hirsh, 2010, Zhou, 2017). Some studies have shown that reading anxiety is one of the main factors that hinder the learning process (Barzegar & Hadidi, 2016; Jafarigohar & Behrooznia, 2012; Shoa, 2014). According to Eysenck et al. (2007), reading anxiety is a condition that complicates the use of academic skills, hinders the use of reading strategies, and prevents the student from utilizing prior knowledge in the reading process. In a study by Yamaç and Çeliktürk Sezgin (2018) on fourth-grade primary school students, it was determined that reading anxiety significantly affected reading comprehension skills. Esen-Aygün (2021) claimed that fourth-grade students' reading anxiety strongly affected their reading comprehension skills. Similarly, Macdonald et al. (2021) reported that reading anxiety negatively affected the reading skills of students in the fourth and fifth grades. High-level reading anxiety is an affective characteristic that will make it difficult for short-term memory, which contributes to comprehension, to work (Shoa, 2014). According to Onovughe (2012), there is a positive relationship between students' academic success and reading skills, and a one-unit decrease in the level of reading anxiety will increase a student’s academic success by 9%.

Another notable variable used in the study to explain the causality of reading anxiety is sleep deprivation. According to Guyton (1996), sleep is a process that develops spontaneously, that is reversible as a result of interaction with external stimuli, and in which temporary unconsciousness is experienced. Sleep deprivation occurs when the body delays sleeping (Terman & Terman, 2005). According to Yetkin and Aydın (2014), an individual experiencing sleep deprivation may show some symptoms, such as irritability, anxiety, loss of attention, lack of control, and lack of energy during the day. There are studies in the literature indicating that sleep-related problems negatively affect the learning process (Carskadon 2002; Wang & Fan, 2023). In a study conducted by Wolfson and Carskadon(1998), it was determined that students who did not experience sleep deprivation had higher learning motivation, reading comprehension levels, and course grades than those who did. According to Walker (2005), sleep deprivation, which is effective in the coding and retention of information, is a condition that negatively affects the learning process before and after sleep. A review of the literature indicated that there were no studies addressing the relationship between sleep deprivation and reading anxiety. However, there were some studies handling the relationships between anxiety, exam anxiety, and sleep problems (Dewald et al., 2014; Wang & Fan, 2023). In a study conducted by Wang and Fan (2023), it was found that there was a strong positive relationship between students' academic stress and academic success and their sleep quality. In the same study, a similar level of relationship was observed between students' learning burnout and sleep quality. In a study conducted by Qin et al. (2022), a positive relationship was detected between primary school students' learning burnout and anxiety and sleep deprivation. Wolfson and Carskadon (1998) stated that sleep deprivation affected reading skills.

The next variable addressed in the study is social-emotional learning skills used to explain reading anxiety. Social-emotional learning, which has become a significant gain of the education system in recent years, refers to the development process of many skills, such as individuals' recognition and management of their own emotions, having effective communication skills, awareness of positive and negative personality traits, being sensitive to others' needs, and being able to act responsibly and ethically (Elias & Moceri, 2012; Körler, 2011). Coryn et al. (2009) addressed the requirements that supported these skills by providing the source of students' social-emotional skills in three sub-dimensions, namely task definition, peer relations, and self-regulation. Task definition, in other words, a sense of duty, is related to students' awareness of their responsibilities and the ability to make decisions in line with there sponsibilities (Totan & Kabasakal, 2011). Peer relations, which is the second sub-dimension of social-emotional learning skills, include students' communication and experiences with their circle of friends. Peer relations have an effective role in individuals' cognitive and problem-solving skills (Reitz et al., 2014). In addition, they have a noteworthy place in students' academic success and psychosocial development (Mclane, 1998). According to Risemberg and Zimmerman (1992), self-regulation, the third sub-dimension of social-emotional learning skills, is defined as developing strategies to achieve determined goals and being able to control the effects of these strategies. According to Cohen (1999), social-emotional learning skills have a significant place in solving many social and emotional problems, such as facilitating interpersonal relationships, ensuring lifelong learning, supporting academic success, resolving conflicts, and expressing emotions effectively. A stated by Carter (2016), students' social-emotional skills should be strengthened so that they can develop holistically and increase their academic success. It has been stated in the literature that social-emotional learning skills are an important factor in reading skills and anxiety management (Elias, 2004; McLeod & Boyes, 2021; Polychroni et al., 2024; Yu, Yu, and Tong, 2023). According to Elias (2004), students' language and reading skills have a positive correlation with their social-emotional learning skills. Similarly, in a study conducted by Esen-Aygün and Taşkın (2017), a positive relationship was detected between students' social-emotional learning skills and Turkish and mathematics

courses. However, they pointed to a negative relationship between social-emotional learning skills and different situational anxiety levels in the learning process. Students' academic stress decreases with the development of social-emotional learning skills (Çelik, 2015). According to McLeod and Boyes (2021), educational programs based on social-emotional learning skills such as self-awareness and self-management are functional for students experiencing exam anxiety. There were no studies on the relationship between reading anxiety, which is the affective dimension of reading, and social-emotional learning skills in the literature.

According to some studies in the literature, reading attitude is an important variable used to explain reading anxiety (Baki, 2017; Dursun & Özenç, 2019; Hussein & Csíkos, 2023). It expresses the individual's views, beliefs, feelings, and thoughts toward reading (Agustiani, 2017). Reading and individuals' attitudes toward reading are equally important (Tunnell et al., 1991). According to Aronson et al. (2004), attitude consists of emotional, behavioral, and mental elements. The emotional aspect of the reading attitude is what individuals feel when they perform the act of reading. The behavioral domain constitutes the act of reading when appropriate reading conditions are provided for individuals. The individual's beliefs and thoughts toward the act of reading make up the cognitive aspect of the reading attitude (Özbay & Uyar, 2009). Individuals who develop a positive attitude toward reading have the habit of reading, and those who develop a negative attitude toward it generally avoid it (Hagan, 2013). In other words, whether the reading attitude of individuals is positive or negative is effective in the sustainability of the act of reading. With a similar approach, Altun et al. (2022) stated that the attitude of individuals toward reading also affected their academic performance, continuity of reading, and reading choices. According to Alexander and Filler (1976), reading attitude is an element that increases or decreases reading effectiveness and starts developing when the child's reading experience begins. Accordingly, reading attitude starts to be structured as strongly positive or negative in the primary school period when the reading experience begins. The literature focuses on the relationships between reading attitude and variables, such as reading comprehension, reading self-efficacy, perception of creative reading, and academic success (Bayraktar, 2017; Rachmajanti & Musthofiyah, 2017; Yurdakal, 2019; Çevik et al., 2023). There were studies in which reading attitude and reading anxiety, which are related to the affective areas of reading, were addressed together. Reading attitude has mostly been associated with second language learning. There was limited research on reading during the primary school period when the reading experience begins and progresses intensively (Aykut, 2023; Brantmeier, 2005; Hussein & Csíkos, 2023). Eysenck et al. (2006) detected a positive relationship between reading attitudes and reading anxiety and reported that students who had positive thoughts and feelings about reading activity experienced less anxiety while reading. However, these results should be investigated extensively in the primary school period when the reading experience begins and turns into a strong responsibility. It can be said that the reading experience in the fourth grade, which is the last grade of primary school, is higher than in other grades of primary school, considering the number of courses and subject content (Kuru & Taş, 2024; MEB, 2018). According to Kuru and Taş (2024), the course content in the program is measured with tests starting from the fourth grade. Therefore, it can be said that the increase in the number of courses and their content is a difficulty that fourth-grade students must overcome and that their reading potential must be fully used to cope with these challenges. It has been explained in the relevant sections above that reading anxiety is very important in having a high level of reading potential and reading skills. In the fourth grade, where the reading experience is intense, a better understanding of reading anxiety, which is likely to affect reading potential, will be useful in terms of preventive studies. On the other hand, Tonka and Bakır (2020) claimed that the highest reading anxiety in middle school was in the fifth grade. The middle school period is when reading skills are tested at school and national levels, and the number of exams increases. The fourth grade, which is the last grade of primary school, is when

basic skills/early skills such as reading comprehension, decoding, and fluency are mastered, and these skills are expected to be used for other course outcomes (Chall & Jacobs, 1983). According to Macdonald et al. (2021), early interventions are important for later success and future potential in students who have difficulty in reading processes. Therefore, studies on reading anxiety in the fourth grade, which is the last step of the transition to middle school, will mean a preventive function for academic difficulties in the middle school period.
There was limited research into understanding the nature of reading anxiety that affected the reading process in the primary school period when students started reading and read quite intensively. In particular, causality studies on the exploration of fourth-grade primary school students' reading anxiety are quite limited. There were very few studies on the relationship between reading anxiety and some variables, such as sleep deprivation, social-emotional learning skills, and reading attitudes. Primary school students spend a significant portion of their twenty-four hours sleeping or are required to spend it sleeping. It is thought that children's need for sleep/sleep quality is very critical for their personal, social, and learning experiences. At the same time, emotional-social gains, which are as important as reading activity or academic gains in school life, contribute to the explanation of reading anxiety, which creates a strong causality for learning. Reflecting on all these, this study was conducted to understand how the reading anxiety experienced by fourth-grade primary school students was explained by sleep deprivation, social-emotional learning skills, and reading attitudes altogether by using a hierarchical regression model.

This section includes some explanations about the research method, characteristics of the study group, data collection tools, data collection process, and the data preparation process for analysis.

Research Model

The correlational screening model was employed in this study to reveal the relationships between the reading attitudes of fourth-grade primary school students and their reading anxiety, sleep deprivation, and social-emotional learning skills. This model tries to identify relationships between more than one variable and the degree of this relationship, if any (Karasar, 2009). Similarly, it reveals the effect or relationship between different quantitative variables through a correlation coefficient (Fraenkel et al., 2012). This study sought correlations between variables, and the covariance of existing variables and, if any, how it occurred were investigated. According to these definitions, since the correlational and predictive relationships between the students' reading anxiety, reading attitudes, sleep deprivation, and social-emotional learning skills were examined in the research, a correlational screening model was employed.

Participants

The convenience sampling method was employed in the study. This method is widely used in studies. Additionally, it is an economical method (Yıldırım & Şimşek, 2011). The sample of this study consisted of 331 fourth-grade students from five different primary schools located in the central county of Kırıkkale province. Of the participants, 51.4% were girls (170) and 48.6% were boys (161). Demographic data of the students included in the study are given in Table 1 below.

Table 1. The distribution of the demographic data of the research group

Schools	Variables	Categories	N	%	Mean	sd
A School	Gender	Girls	19	35.2	10.05	.49
		Boys	35	64.8		
	Age	9	5	9.3		
		10	41	75.9		
		11	8	14.8		
B School	Gender	Girls	45	58.4	10.22	.62
		Boys	32	41.6		
	Age	9	8	10.4		
		10	44	57.1		
		11	25	32.5		
C School	Gender	Girls	59	54.6	10.34	.58
		Boys	49	45.4		
	Age	9	7	6.5		
		10	57	52.8		
		11	44	40.7		
D School	Gender	Girls	35	53	10.23	39
		Boys	31	47		
	Age	9	5	7.6		
		10	41	62.1		
		11	20	30.3		
E School	Gender	Girls	12	46.2	10.30	.78
		Boys	14	53.8		
	Age	9	5	19.2		
		10	8	30.8		
		11	13	50		

Data Collection

The Reading Anxiety Scale

This scale was developed by Çeliktürk and Yamaç (2015) for elementary and middle school students. It consists of 29 five-point Likert-type items. Its validity study was conducted with 410 students from the fourth and fifth grades. A single-factor 29-item structure was obtained as a result of an exploratory factor analysis (EFA). Cronbach's alpha coefficient of the scale was found as .95 as a result of a confirmatory factor analysis (CFA) including 220 fourth- and fifth-grade students. The fit values of the scale were $x^2/df=2.2$, RMSEA=.076, SRMR=.055, CFI=.97, and NFI=.95.

The Reading Attitude Scale

This scale was developed by McKenna and Kear (1990) for elementary school students to measure their reading attitudes and it was adapted to Turkish by Kocaarslan (2016). It consists of 20 four-point Likert items. The Spearman-Brown reliability coefficient was 0.83, the Guttmann split-half coefficient was 0.83, and Cronbach's alpha, indicating the internal consistency of the scale, was 0.88. As a result of the item-total correlation analysis and 27% lower-upper group comparisons, conducted to determine the predictive power of the total score

and discriminative power of the items, it was concluded that the items on the scale were adequate in terms of these features.

The Sleep Deprivation Scale

The "Sleep Deprivation Scale for Children and Adolescents," developed by Kandemir et al. (2021), consists of 17 four-point Likert-type items. Exploratory and confirmatory factor analyses were employed for the validity and reliability studies of the scale. There were 201 individuals aged between 8 and 17 with an average age of 12.37 in the exploratory factor analysis, and the confirmatory factor analysis included 254 subjects aged between 8 and 17, with the average age being 11.87. The Kaiser-Meyer-Olkin (KMO) value was .94, Bartlett's test result was $\chi 2=1833.03$, and Cronbach's alpha internal consistency value was .94. According to the result of the confirmatory factor analysis, chi-square/degree of freedom (254.94/ 65) was 3.92, RMSEA value was .07, and RMR was .027. The fit coefficients for the model were determined as CFI=.94, GF3=.91, AGFI=.91, IFI=.96, NFI=.94, and TLI=.97. The lowest score that can be obtained from the scale is 15 and the highest is 60. As the scores on the scale decrease, sleep deprivation decreases, as well, and as the scores increase, sleep deprivation increases, too.

The Social-Emotional Learning Scale

This scale was developed by Coryn et al. (2009). It was adapted to Turkish by Arslan and Akın (2014). It has 20 five-point Likert-type items and three sub-dimensions, namely 'task definition,' 'peer relations,' and 'self-regulation.' Three hundred elementary school students were included in the adaptation process of the scale. The correlation value for the language validity of the scale varied between .72 and .95. The confirmatory factor analysis (CFA) indicated that the fit of the three-dimensional structure was quite adequate. Fit indices of the scale were RMSEA=.05, NFI=.96, CFI=.98, AGFI=.90, IFI=.98, RFI=.95, and GFI=.92. The internal consistency coefficient for the reliability of the scale was estimated to be .90, and the test-retest coefficient was .71.

Data Collection Process and Preparation of Data for Analysis

The research was related to the author's doctoral thesis, and the study was conducted after an ethics committee approval was obtained within this scope. The research data were collected by the researcher. The study data were collected by the researcher. During the data collection process, the researcher entered the classroom, introduced herself to the students, and provided information about the purpose of the scale and how to fill it out. It was emphasized that the process was not an exam, their data would not be shared with anyone, and that feelings and thoughts could be easily reflected while responding to the scale items. It took an average of one class hour (40 minutes) to fill out the scale. The data collected in the study, which aimed to explain students' reading anxiety with reading attitudes, sleep deprivation, and social-emotional learning skills, were entered into the SPSS software and then the data set was prepared for the analysis process. According to Tabachnick and Fidell (2001), normality, multicollinearity, and linearity analyses should be performed before regression analyses. Accordingly, these analyses were performed before moving on to the main statistics of the study. After the frequency distributions of the research data were examined, the Mahalanobis distances of the data collected from each student were studied. According to the results of the examination, to achieve a significance level of .01, two data sets with a Mahalanobis value above the chi-square value in the ratio of the number of independent variables were removed from the analysis, and

the data set was re-recorded. In addition, the Z values of each student were examined, and one data set was found to have an extreme value, which was not within the range of +3 and -3. The data of this subject was also removed from the data set, and the data were re-recorded. After the outlier and extreme value analyses, linearity analysis, which is another prerequisite for regression analysis, was carried out between variables. According to Tabachnick and Fidell (2001), there should be a linear relationship between dependent and independent variables before regression analysis. Accordingly, the correlation analysis results were examined to determine the linearity between variables and it was found that the correlations were at the level of .05. This showed that there was no linearity problem. The same analysis indicated that the correlations among variables varied from -.20 to .45 (Table 1). According to Büyüköztürk (2011), a correlation value of >.80 indicates a multicollinearity problem. So, it can be said that there was no multicollinearity problem between the variables of the study. Normality of data is another prerequisite for regression analysis (Tabachnick & Fidell, 2001). The skewness and kurtosis values of the study were examined to identify it. The results of the analysis are given in Table 2.

Table 2. Descriptive analysis values of the variables

Variables	Kurtosis	Skewness
Reading anxiety	.76	-.14
Sleep deprivation	.29	-.43
Social-emotional skills	-.80	.92
Reading attitudes	-1.09	1.29
Total		

As seen in Table 2, the skewness scores varied from -.14 to 1.29, and the kurtosis values were between -1.09 and .76. According to Bai and Ng (2005), values between +3 and -3 show normality of data. According to the results of the analysis, it can be said that the research data did not have a normality problem. After these analyses, hierarchical regression analysis was carried out to explain to what extent reading anxiety was explained by the independent variables. The findings from the analysis are given in the results section of the study.

Findings

The findings obtained from the research are presented in tables considering the research questions. The descriptive analysis results for fourth-grade students' reading anxiety, sleep deprivation, social-emotional learning skills, and reading attitudes are given in Table 2.

Table 3. Descriptive analysis of the variables

Variables	The lowest	The highest	Mean	Sd
Age	9	11	10.22	.67
Reading anxiety	1	4.55	2.04	.79
Sleep deprivation	1	4	2.11	.70
Social-emotional skills	1	5	3.78	.70
Reading attitudes	1	4	3.16	.59

As seen in Table 3, mean scores were 2.04 for reading anxiety, 2.11 for sleep deprivation, 3.78 for social-emotional skills, and 3.16 for reading attitudes. When the average scores were compared, it was seen that the mean reading anxiety score, which is the dependent variable of the study, was at an average level. The mean scores for social-emotional skills and reading

attitudes were high. The results of the correlation analysis conducted following the descriptive analysis to evaluate the relationships between the variables are given in Table 3.

Table 4. Correlations between variables

Variables	**1**	**2**	**3**	**4**
Reading anxiety (1)	1			
Reading attitudes (2)	-,27**	1		
Sleep deprivation (3)	,34**	-,33**	1	
Social-emotional skills (4)	-,34**	,45**	-,20**	

When Table 4, which shows the relationships between the variables in the study, was examined, a significant negative relationship was found between reading anxiety and reading attitudes ($r = -.27$, $p < .01$) and social-emotional learning skills ($r = -.34$, $p < .01$). There was a significant positive relationship between reading anxiety and sleep deprivation ($r = .34$, $p < .01$). Reading attitudes variable was detected to have a significant negative relationship with sleep deprivation ($r = -.33$, $p < .01$) and a significant positive relationship with social-emotional skills ($r = .45$, $p < .01$). There was a significant negative relationship between sleep deprivation and social-emotional skills ($r = -.20$, $p < .01$). The correlations and linearity between the variables were evaluated with correlation analysis, and then hierarchical regression analysis was performed to find out the predictive effect of the correlations.

Table 5. Results of the Hierarchical Regression Analysis Performed to Reveal the Causes of Reading Anxiety

Model	***Variables***	***B***	***sd***	***Beta***	***df***	***t***	***p***	***VIF***	***Durbin - Watson***
1	*Constant*	1.25	.13		1/329	9.63			
	Sleep deprivation	.38	.06	.34		6.47	.01	1.00	
2	*Constant*	2.57	.27		1/328	9.56			
	Sleep deprivation	.31	.06	.28		5.50	.01	1.04	
	Socio-emotional skills	-.31	.06	-.28		-5.55	.01	1,04	1.77
3	*Constant*	2.76	.33		1/327	8.50			
	Sleep deprivation	.30	.06	.26		4.99	.01	1.13	
	Socio-emotional skills	-.29	.06	-.26		-4.61	.01	1.26	
	Reading attitudes	-.08	.08	-.06		-1.05	.30	1.36	
Model 1:	*R=.34*	*R²=.11*	*ΔR²= .11*	*F(1,329)= 41.81, p<.01*					
Model 2:	*R=.44*	*R²=.19*	*ΔR²= .18*	*F(1,328)= 38.17, p<.01*					
Model 3:	*R=.44*	*R²=.19*	*ΔR²= .18*	*F(1,328)= 25.82, p<.01*					

A hierarchical regression analysis was conducted to determine whether reading anxiety was explained by sleep deprivation, social-emotional skills, and reading attitudes. The results of the

analysis are given in Table 5. Sleep deprivation was included in the first model of the hierarchical regression analysis, social-emotional skills in the second model, and reading attitudes in the last model. According to Field (2009), the order in which the variables in this analysis enter the model is determined according to the findings of previous studies among the variables and the researcher's choices. The sleep variable is thought to be a predictor that is important for life and is quite critical in terms of the existence of the individual. Accordingly, the sleep deprivation variable was used as a basic predictor in Model 1 in the analysis. Social-emotional learning skills were included in the analysis in Model 2. Social-emotional learning skills start to develop before students' school life and they are one of the antecedent predictors. The reading attitude variable was included in the last model. Reading attitude, which starts to develop after sleep and social-emotional learning skills, is evaluated as the variable closest to reading anxiety in terms of order. Kayaalp et al. (2015) stated that the variables showing the highest correlation with the dependent variable could be included in the model first. Reflecting on these evaluations, a regression model was established and analyzed. According to the results, the first model was significant ($F(1,329)= 41.81$, $p<.01$) and sleep deprivation explained .11 of the variance in students' reading anxiety ($\Delta R^2=11$). Accordingly, students' sleep deprivation predicted their reading anxiety positively and significantly ($\beta=.34$, $t(329) = 6.47$, $p<.01$). In the second stage, students' social-emotional learning skills were included in the model. According to the analysis results, it was seen that the second model was also significant ($F(1,328) = 38.17$, $p<.01$) and that social-emotional skills explained .18 of the variance in students' reading anxiety ($\Delta R^2=18$). Students' social-emotional learning skills negatively and significantly predicted their reading anxiety during reading ($\beta=-.28$, $t(329) = -5.55$, $p<.01$). Students' reading attitude was included in the model in the third stage. According to the analysis, the third model was significant, too ($F(1,327)= 25.82$, $p<.01$). However, the reading attitude included in the analysis in the third model did not have a predictive effect on students' reading anxiety alone ($\beta=-.06$, $t(327) = -1.05$, $p>.05$).

Conclusion and Discussion

In the present study, in which the reading anxiety experienced by fourth-grade primary school students was tried to be explained by sleep deprivation, social-emotional learning skills, and reading attitudes, significant correlations were found between reading anxiety and independent variables. There was a significant positive relationship between sleep deprivation, which is the main independent variable of the study, and reading anxiety. At the same time, the regression model indicated that the correlations between the variables turned into a predictive relationship. It is possible to say that the variable that most strongly affected students' reading anxiety was sleep deprivation. When the literature was examined, no studies into the relationships between sleep deprivation and reading anxiety were found. However, there were studies in the literature on the examination of the relationships between students' learning and success experiences and their sleep experiences (Wolfson & Carskadon, 1998; Dewald et al., 2014; Wang & Fan, 2023). For example, Wolfson and Carskadon (1998) claimed that students who were not deprived of sleep had higher learning motivation, reading comprehension levels, and academic success than those who were. In a study conducted by Qin et al. (2022), a positive relationship was found between primary school students' learning burnout, anxiety, and sleep deprivation. The quality of sleep is very important in information processing by short-term memory and the retention of information (Walker, 2005).

According to Torun Yazıhan and Yetkin (2018), sleep is a factor that strengthens or weakens individuals' cognitive processes, such as learning, memory, coding, retention, and understanding. Reading skills cover cognitive processes, such as comprehension, association, and memory (Zbornik, 2001). Therefore, sleep-deprived students are likely to experience

anxiety during reading activities, which are related to some cognitive processes, e.g., word recognition, comprehension, and fluency. Randazzo et al. (1998) supported this assessment in their study. They found that students between the ages of 10-14 who slept less than five hours had more difficulty in performing tasks requiring metacognitive skills, such as abstract thinking, verbal creativity, comprehension, and memory, and that they were more anxious. Stickgold et al. (2000) stated that sleep-deprived students had more difficulty in tasks related to cognitive skills requiring visual discrimination than students who were not. Reading activity is not only a psychomotor behavior but also includes cognitive processes in which symbols that require a lot of visual discrimination are combined and recalls (retention of information stored in memory) that include prior knowledge are made. When the short-term memory (working memory), which begins to analyze stimuli coming to the mind and processes prior knowledge, weakens, the reading process is also affected, thereby leading to reading anxiety (Macdonald et al., 2001). Hershner and Chervin (2014) stated that sleep deprivation was a condition that affected working memory. Stichgold (2005) similarly stated that students who were stuck in the RAM and NRAM 2 stages of sleep and could not move on to the stages representing sleep depth had problems with skills requiring verbal competence. It was also stated in the same study that these students had problems with short-term memory, that is, working memory. Therefore, as Macdonald et al. (2001) stated, students who begin to have difficulties in working memory may experience anxiety while reading.

One of the noteworthy results of the study was that social-emotional learning skills created causality for reading anxiety. In the study, students' social-emotional learning awareness was seen as a feature that reduced their reading anxiety. There were no studies in the literature that directly supported this result of the study. However, there were some studies showing a positive relationship between primary school students' reading skills and social-emotional learning skills (Alkhateeb, 2014; Connor, 2016; Elias, 2004; Esen-Aygün & Taşkın, 2017; Messo, 2023) and studies indicating that social-emotional learning skills affected some types of state anxiety, such as test anxiety, math anxiety, and learning anxiety (Guntur & Purnomo, 2024; McLeod & Boyes, 2021; Polychroni et al., 2024; Yu et al., 2023). In the literature, a positive relationship was shown between students' language and reading skills and social-emotional learning skills (Elias, 2004). In a study conducted by Ortiz et al. (2012), it was found that when kindergarten and first-grade primary school students had high levels of social-emotional skills, their word recognition and reading comprehension skills also increased. In a study conducted by Jögi et al. (2021) on primary school students, it was claimed that social-emotional competencies (empathy, positive relationship, etc.) were positively correlated with reading skills and negatively with stress levels. According to Firdaus (2017), students' social-emotional skills strongly affected their reading skills. Trentacosta and Izard (2007) stated that students with high social-emotional competence had better interactions with their teachers and classmates and were more successful in participating in activities. This increases students' competence in reading activities and helps them feel more emotionally comfortable while learning. At the same time, students with high levels of social-emotional learning skills already had advanced verbal skills, like vocabulary and reading comprehension. Therefore, students with advanced verbal skills, like reading skills, will feel better while reading (Hofmann & Müller, 2021). Yu et al. (2023) reported that the scenarios that students encountered while reading were similar to those they came across in social environments. Therefore, competence in social interaction (comprehension, empathy, emotional regulation, etc.) will affect competence during reading. In a study conducted on fifth-grade students, Alkhateeb (2014) found that students' high levels of social-emotional skills were an important factor that reduced their reading anxiety. Similarly, McLeod and Boyes (2021) reported that self-awareness was a variable that reduced exam anxiety. Awareness of strengths and weaknesses can help children manage the anxiety they will experience by making realistic assessments of what they can do during reading, learning, and

exam processes. The significant relationship between self-regulation, which is an important dimension of social-emotional learning skills, and types of academic state anxiety reported in the literature is noteworthy (Ocak et al., 2022; Jerath et al., 2015; Guntur & Purnomo, 2024). In a study conducted on seventh- and eighth-grade students, Ocak et al. (2022) reported a negative correlation between self-regulation skills and exam anxiety. Guntur and Purnomo (2024) stated in their study that primary school students' mathematics anxiety negatively and significantly affected their self-regulation skills, which is a dimension of social-emotional learning skills. In the same study, it was stated that self-regulation skills were an important feature in managing a person's behavior and emotions. Individuals with self-regulation skills are aware of themselves and their competencies and can use these characteristics at the highest level in the learning/performance process (Zimmerman, 2002). According to these explanations, individuals with social-emotional learning skills will be aware of their reading competence while reading and will transfer their reading skills to the act of reading at the highest level, so their anxiety levels toward reading will decrease. According to Beck (1964), cognitions and beliefs control and regulate emotions. Therefore, a student who attributes positive meanings to his/her characteristics and reading skills will be able to manage the anxiety he/she will experience during the reading process.

One of the important results of the study was the correlation between students' attitudes toward reading and reading anxiety. Accordingly, although there was a correlation between reading attitude, which was included in the third stage of the model, and reading anxiety, this relationship did not turn into a predictive correlation in the model. There are several studies on the relationship between the two variables in the literature (Melanlıoğlu & Bıyık, 2022; Murray & Janelle, 2003). For example, Melanlıoğlu and Bıyık (2022) found a negative correlation between reading anxiety and reading attitudes. However, whether reading anxiety was predicted by reading attitudes was not examined in the study. There were limited studies in the literature conducted to understand the relationships between both variables. In the present study, in which we tried to explain the reading anxiety of primary school students, it was seen that the relationship between reading attitude and reading anxiety did not turn into a predictive relationship. In the study, the predictive effect of the relationships between sleep deprivation and social-emotional learning skills and reading anxiety was revealed in the regression model. However, the reading attitude variable was found to have an insignificant effect in the regression model. Therefore, the strong effect of sleep deprivation and social-emotional learning skills in the model may have suppressed the effect level of reading attitude. In other words, inadequate sleep and social-emotional learning skills were strong variables that suppressed reading attitude in students' reading anxiety.

Although the model we tried to explain the reading anxiety of primary school students with the regression model was confirmed in the research, some limitations were noted in the research process. The other these was that studies on the relationships between the concepts of the research were limited in the literature. This situation also led to a certain limitation to the discussion of the findings. Therefore, examining the relationships between the variables with different research models is very important in terms of testing the research findings in different studies. In the research, it was found that sleep and social-emotional learning skills predicted reading anxiety more strongly than reading attitudes. In the model established in the study, the combined effect of sleep deprivation and social-emotional learning skills seemed to have eliminated the effect of reading attitudes. Since this is a very important result, it will be important to test it in future research. At the same time, studies in the literature on the relationships between these concepts were quite limited at the primary school level. Therefore, there is a need for more information on how reading anxiety is affected by sleep deprivation and social-emotional skills at the primary school level, where the act of reading is most intense and the foundations of reading are laid. Another limitation was that the study was conducted at

the fourth-grade level. It would be important to examine reading anxiety and other variables in the study in terms of grade and school levels. The model developed by Coryn et al. (2009) for social-emotional learning skills was examined in the study. However, there were some other models, like the CASEL model, in the literature. Different social-emotional learning skills can also be used to understand the nature of reading anxiety in future research.

The results of the study are very valuable for the stakeholders of the education system, especially classroom teachers. Sleep and social-emotional skills are basic needs for individuals. Knowing that these skills are critical in educational activities such as reading, learning, and motivation will affect practitioners' approaches. Psycho-education on sleep health involving parents will be useful in reducing reading and learning anxiety. Reading anxiety can be reduced by creating an empathic atmosphere in the classroom where students can express themselves and develop positive social relationships and which support sociability. During the development process of policies and programs for the education system, it would be beneficial to take into account basic physiological needs such as sleep and basic psychological requirements like social-emotional skills.

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