

## Testing the Bidirectional Relationship Between Reading and Writing Skills

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### Abstract

Reading and writing have an essential place in the social life of individuals as well as in school learning. In this study, bidirectional relationships between reading and writing skills have been examined after gender and socio-economic level of students have been controlled. The participants in this study were 240 fifth-grade students from 10 primary schools in four different districts of Ankara in Turkey. A text was chosen to evaluate students' comprehension and writing skills, and an achievement test that includes questions relating to the text was developed. Analytic and holistic rubrics were used to evaluate the students' reading and writing skills. Hierarchical multiple linear regression analysis was conducted to reveal the bidirectional relationship between reading and writing skills. The results indicated that reading and writing skills are important predictors of each other and support the possibility of a bidirectional relationship between two variables. One possible explanation for this is that reading and writing skills influence each other. Researchers, practitioners, and parents may need to target both reading and writing skills to best help poor readers become proficient.

**Keywords:** Language Skills, Reading, Writing, Bidirectional Relationships, Hierarchical Multiple Regression

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## INTRODUCTION

Language has an essential role in developing individuals' mental skills, communicating with others, expressing feelings and thoughts, and acquiring information. The development of language skills is based on four basic skills (reading, listening, speaking, and writing) that interact with each other. An individual's ability to communicate correctly, openly, and effectively depends on the development of these four basic skills. When language is examined in terms of comprehension and expression, activities related to comprehension are reading and listening while activities related to expression are speaking and writing (Sever, 1998). To understand one's own language, individuals should successfully perform listening and reading activities. To express oneself, an individual needs to perform speaking and writing properly (Çaycı & Demir, 2006). Since these four basic skills interact with each other, education is the key to gaining these skills. Listening and speaking can also be obtained outside of school to some extent but reading and writing skills are acquired through formal education in the first stages of primary education (Belet & Yaşar, 2007).

### Reading Skills

Developing information technologies have provided incentive to gain knowledge and highlighted the importance of text-based learning (Broer, et al., 2002). Reading is one of the ways of learning and includes physiological, cognitive, and affective aspects such as analyzing and evaluating the emotions and thoughts in the text (Sever, 1998). Reading is a skill that involves not only the vocalization of symbols of the relevant language but also the processes of making meaning. The primary purpose of reading a text is to understand the thought that is given in the text; therefore, comprehension must be realized after reading. Reading involves the process of adding meaning to the thoughts that are intended to be given in a text, and it also includes the processes in which the reader is active. In this respect, reading and comprehension are connected by the cause-effect relationship (Wilkinson & Son, 2011). In this case, one of the primary conditions for the realization of learning is reading comprehension. Therefore, the reading skill is essential not only for the language course but also for the realization of learning in other areas. Related research indicates that individuals' reading comprehension skills are closely related to success in many different areas, such as problem-solving (e.g., Grimm, 2008; Ulu, et al., 2016), mathematics (e.g., Göktaş & Gürbütürk, 2012; Willcutt et al., 2013), or in the field of science (e.g., Durgun & Önder, 2019; Hall et al., 2014).

Reading should also be considered in the context of economic development in the long run. Economists have demonstrated the relationship between reading skills and economic growth through different models. Schwerdt and Wiederhold's (2019) research showed that reading skills were one of the most important predictors of economic growth. The researchers emphasized that the relationship between these two variables has become more powerful than ever. Inevitably, individuals who have reached a sufficient level in terms of reading will have higher success in the later stages of education, and they will have a positive effect on the national economy. It is also known that individuals with underdeveloped reading skills are more likely to leave school early or be unemployed (Lundetræ, 2011; OECD, 2010).

Considering the importance of reading in terms of both individual and social development, school systems are expected to educate individuals who are competent in reading skills. Therefore, the level of students' reading skills and discovering how to develop them effectively have always been important research topics. Globally, especially today when there is economic competition, countries are implementing a range of large-scale assessments to evaluate their students' reading skills. The Programme for International Student Assessment (PISA) carried out by the Organisation for Economic Co-operation and Development (OECD) and the Progress in International Reading Literacy Study (PIRLS) carried out by the International Association for the Evaluation of Educational Achievement (IEA) can be cited as examples. These assessments present scientific data for the attending countries so they can make decisions to improve their educational policies. In addition to cognitive assessments concerning students' reading skills, detailed information regarding factors that affect learning including school resources, students' attitudes, teaching practices, and home environment is acquired

in these periodical assessments. Although criticism of international measurement practices continues to increase, these practices do have a significant effect on education systems (e.g., Breakspear, 2012). Through these measurement practices, detailed scientific data relating to reading skills are presented to the participating countries. By using large-scale data sets, countries can regulate and revise their education programs.

In related literature, studies regarding the relationship between reading skills and socioeconomic level, learning strategies, and affective characteristics such as attitude, self-efficacy, or other language skills have stood out. For example, in the study by Reilly et al. (2019), gender differences were examined in reading and writing achievement over three decades in the United States using data taken from the National Assessment of Educational Progress. It was found that the differences between genders were small-to-medium for reading, and medium-sized for writing, and were stable over time. Also, Solheim and Lundstrøm (2018) studied gender differences by examining PISA and PILRS data for reading. Their results showed that the magnitude of the gender differences depended on text type, item format, aspects of reading, and implementation.

Many studies have revealed a high correlation between students' socioeconomic levels and academic success (Sirin, 2005). For instance, in the studies conducted based on data collected through PISA (Gulleroğlu et al., 2014; Giambona & Porcu, 2015; Shala & Grajčević, 2018; Yıldırım, 2012), it was indicated that students' reading skills improve in line with the parents' level of education and that factors such as the number of books at home, a personal room, internet connection, and computers have a positive impact on students' reading skills.

Learning strategies and methods are other variables used by researchers to examine the relationship between reading and writing. Belet and Yaşar (2007) determined the effectiveness of learning strategies on reading comprehension and writing skills using an experimental model. According to their findings, reading comprehension skills and writing skills in the Turkish course were developed using learning strategies. The study by Jian (2016) investigated students' reading strategies and comprehension of illustrated texts. It was found that high-ability young readers had specific capabilities in reading comprehension and their comprehension was monitored. Maltepe and Güntekin (2017) also studied the effect of learning strategy (the mind map technique) on reading and writing skills at the fifth grade. It was found that using the mind map technique increased students' reading comprehension and writing achievement.

The relationship between reading skills and affective characteristics such as attitudes towards reading, interest, and habits has been addressed in many studies (e.g. Lau, 2018; Preece & Levy, 2018; Steensel et al., 2019). In these studies, it was emphasized that affective characteristics, along with other areas, had positive correlation with reading skills.

The results of studies examining the relationship between reading skills and the other language skills such as writing and listening support the idea of a positive relationship among all language skills and emphasize the fact that reading skills are important in terms of improving other language skills (e.g., Cheng and Matthews, 2016; Juriati et al., 2018).

### **Writing Skills**

Today, rapidly developing technology and the digital world require greater interpersonal communication and, as a result, the use of written expression has increased rapidly. Writing is a narrative skill gained through formal education, and it is directly related to the listening, speaking, and reading skills (Ministry of National Education of Turkey (MoNE), 2019). Writing is the most difficult and complex of the four skills that constitute basic language education (Bryne, 1988; Eryaman, 2008), because writing is directly related to thinking, and it requires the use of high-level skills. Composing a text is the process of putting ideas in order and involves both cognitive and social behaviors. As such, writing skills are the last link in the four basic language skills (Göçer, 2014).

Writing activities implemented within the scope of a mother-tongue curriculum aim to gain a certain level of expression that will help students to facilitate their daily life. In daily life, there are many situations in which people have to write articles in different contexts such as petitions, short messages, e-mails, CVs, or accident reports to various institutions. In addition, writing skills improve students' mental skills such as thinking development, editing information, effective use of language, and communication (MoNE, 2019). Given that writing involves different thinking processes, it is inevitable that it will influence individuals' academic or business success. Accordingly, different studies showed that individuals' success in different fields was closely related to writing skills (Graham & Perin, 2007; Lan et al., 2011). Therefore, the development of the writing skill has become one of the main objectives that students should gain starting with the first year of primary education. The development of this skill is an educational activity that should be carried out within the framework of an educational program.

### **The Present Study**

School learning is based mainly on activities involving comprehension and written expression. Therefore, comprehension and written expression skills play an essential role in many courses in the education process. The development of an individual's reading comprehension skills enriches his/her vocabulary, and this affects the individual's writing and speaking skills. It enables the individual to write and speak better and more effectively (Sever, 2004). Reading and writing have an essential place in the social life of individuals as well as in school learning. Schools are expected to educate individuals who develop themselves, know their place and importance in society, understand what they read, and express their feelings and thoughts in writing. It is expected that a student in the fifth grade of primary school will be able to summarize an article consisting of 200-300 words and explain what is experienced and observed in a few paragraphs (Kavcar et al., 2002). The ability of individuals to use these basic skills effectively depends on the acquisition of these skills starting in primary education. However, studies showed that Turkish students at different levels from primary education to higher education had difficulty in reading comprehension and in expressing themselves in writing (TEDMEM, 2016). This situation indicates that there are important problems in reading comprehension and writing skills in schools.

It is essential to develop students' reading and writing skills, and to understand the nature of these two skills, it is crucial to establish the relationship between them. To serve this aim, statistically-appropriate techniques should be used when examining the relationships between variables. For instance, in non-experimental research design, the relationship between the two variables can be influenced by other unknown variables (confounding variable) and the resulting relationship can lead to skewed results. In this case, these variables should be handled with different approaches. One of these approaches is to statically control of the variables (Frölich, 2008). Cheema and Galluzzo (2013), for example, emphasized that the inconsistency between the results of previous research on mathematics achievement is due to demographic characteristics such as gender, ethnicity, or socioeconomic level not being factored in, and stressed the necessity of controlling of demographic characteristics to interpret the results correctly.

Many studies demonstrated that girls perform better than boys in terms of reading skills. For example, according to PIRLS 2011 and 2016 data, in many participating countries, female students' average reading skill scores were higher than males (Mullis et al., 2012; Mullis et al., 2017). Similarly, according to PISA 2009 results, there is a 43-point difference between male and female students in terms of the average score of reading skills (OECD, 2010). The results of the research showed that there were also differences in favor of girls in terms of writing skills (e.g., Camarata & Woodcock, 2006; Scheiber et al., 2015). However, there were also research findings that showed no significant differences between girls and boys in terms of writing skills (e.g., Çetin, 2012; Jones & Myhill, 2007). Studies in which reading and writing skills were handled in the context of socioeconomic level indicators showed that students with high socioeconomic levels had better reading and writing performance (e.g., Araújo & Costa, 2015; Loh & Krasen, 2015; Yıldırım, 2012). Many studies have focused on the direct and indirect effects of socioeconomic characteristics on student performance

(e.g., Gülleroğlu et al., 2014; Puglisi et al., 2017; Şirin, 2005). In Turkey, there is no such a study examining the relationship between reading and writing after some variables are statically controlled. Therefore, in the study, the gender and socioeconomic level of students were factored in while examining the bidirectional relationships between reading and writing skills. The predictive power of reading and writing skills was examined.

## METHOD

The research employs a correlation survey model to determine the relationship between the variables and make predictions (Tabachnick & Fidel, 2007).

### Sample of the Study

A total of 240 fifth-grade students from 10 primary schools in four different districts of Ankara in Turkey participated in the study. These schools were chosen using the convenience sampling method, considering ease of implementation and accessibility. Of the students in the study group, 51.7% are girls and 48.3% are boys.

### Data Collection

#### Choosing the Reading Text

A text was chosen to evaluate students' comprehension and writing skills and an achievement test that includes questions relating to the text was developed. The choice of texts is a critical step in evaluating student achievement. The students comprehend the text based on the topic, prior knowledge, and the level of difficulty (Mullis et al., 2009). Therefore, students' developmental levels, interests, recognition of the words in the text, and grade are also taken into consideration when choosing the text. In addition, it was necessary to have well-written text with enough depth and difficulty to prepare an adequate number of questions. The level of legibility and difficulty of the chosen text were examined for this purpose.

The readability and appropriateness of the text to the educational level can be determined using various calculations (Gobbledegook formula, Gunning-Fog Index formula, ARI formula, Flesh reading Ease Score, Ateşman formula, Çetinkaya formula, etc.). Therefore, to evaluate the appropriateness of the text used, the readability of the text for Turkish was examined using both the calculations developed by Ateşman (1997) and by Çetinkaya (2010). While Ateşman's formula informs us about the difficulty of readability, Çetinkaya's formula provides information in terms of suitability for grade. According to Ateşman's (1997) and Çetinkaya's (2010) calculation, the text was medium difficulty and suitable for the fifth grade so that students could independently read the selected text in the classroom.

Finally, in the selection of the text, three experts in Turkish language education and two Turkish language teachers were asked to examine the text in terms of the criteria mentioned above. Based on the expert opinions and calculations, it was decided to use a real story as a text. It was called Satı Kadın, after the first woman member of the Turkish Parliament, and the story told about her first encounter with Mustafa Kemal Atatürk, the founder of the modern Turkish Republic. A paragraph from the text was given as an example:

*“In the hot summer season of 1934, we were on the road to Kızılcahamam. We were with Atatürk in a closed, covered car. The villagers had come out along the way and on the roadside, students were lined up with their teachers. The village headman and peasants, men and women alike, were together...”*

#### Reading Comprehension and Writing Test

After selecting the appropriate reading text, open-ended questions were developed to evaluate the comprehension and written expression skills of the students. The questions were prepared by taking into consideration the comprehension processes used within the scope of PIRLS and the current fifth-grade Turkish curriculum. PIRLS's classification of comprehension processes is described from simple thinking to complex thinking (Mullis et al., 2009):

1. Finding (interpreting) thoughts that are not clearly explained in the text
2. Associating the events in the text with personal information and experience
3. Examining and evaluating the content and language of the text

Furthermore, the MoNE (2019) fifth-grade Turkish curriculum was examined, and it was also taken into consideration that the questions included the gains related to writing skills in the curriculum. To this end, five competencies were measured in accordance with the purpose of the research. These are given below:

1. Applying writing strategies.
2. Using capital letters and punctuation correctly.
3. Revising the writing.
4. Using consonants correctly when they write.
5. Writing coherently and using the appropriate linking words

To ensure the content and appearance validity of the developed achievement test, we consulted three experts in the field of Turkish language education, two Turkish language teachers, and three assessment and evaluation experts to receive their feedback on the difficulty, comprehensibility, and measurability of the questions. Three open-ended questions measuring different thinking processes were used in the research.

#### *Holistic Grade-Scoring Rubric for Assessing Reading Comprehension*

To evaluate students' reading comprehension performances, a holistic rubric was prepared for each question. The following steps were taken into consideration in developing the rubric (Kutlu et al., 2017).

1. Scoring of students' answers from “fully correct answer” to “partially correct answer”,
2. The students identify “false” and “meaningless” answers that cannot be associated with the text
3. Writing a description of the content corresponding to each score and including examples of possible responses,
4. Defining behavior codes and looking at the distribution of students according to their responses.

The difficulty level and the thinking processes of the questions determined based on expert opinion were taken into consideration when scoring student responses. Thus, the first two questions were evaluated over 15 and the last question over 20 points. The highest score that students can get from the achievement test is 50. In the next step, the definitions of response behaviors corresponding to the scores for each question are clearly written. The opinions of the two Turkish language teachers were taken on the adequacy and appropriateness of these definitions and the scores corresponding to

the definitions. Some adjustments were made to the definitions in line with expert opinions. To understand the inter-rater reliability of the rubric, 50 students were randomly selected among the students who participated in the study. The responses of these students were scored independently of the two raters. Intra-class correlation coefficients were calculated for each question using the Two-Way Mixed-Effects Model and presented in Table 2.

**Table 2. Intra-class correlation of questions**

Questions	Intraclass Correlation
Question 1	0.808**
Question 2	0.946**
Question 3	0.911**

\*\* p<0.00

When Table 2 is examined, it is seen that the intra-class correlation coefficient calculated for each question is above 0.80. The rubrics used to score each item are perfectly reliable (Shrout, & Fleiss, 1979). Pearson correlation coefficient was calculated for the raters' reliability of the total scores for the three items and presented in Table 3.

**Table 3. Pearson correlation coefficients between raters' scores**

Question 1	Rater 1
Rater 2	0.595**
Question 2	Rater 1
Rater 2	0.870**
Question 3	Rater 1
Rater 2	0.836**

\*\* p<0.00

When Table 3 is examined, there is a moderate (0.595) relationship between the scores for Question 1, while a high-level relationship was obtained for Question 2 (0.870) and Question 3 (0.836). This shows that the raters made consistent evaluations (Koo & Li, 2016).

This holistic rubric, developed to mark students' responses for the relevant test questions, was used. An instance of the rubric used to calculate students' scores on reading comprehension is presented in Table 4.

Example question: Please identify two of Satı Kadın's personal qualities mentioned in the text. How do these qualities help Satı Kadın when she becomes a deputy?

**Table 4 Holistic rubric for question1 to evaluate student's reading score**

Behaviour Identification Code	Answers	Score
	Fully Correct Answer	
10	The student writes two of Satı Kadın's personal qualities as mentioned in the text and states how each quality helped her. Example answer: Two of Satı Kadın's personal qualities mentioned in the text are "courage and self-confidence." These qualities help Satı Kadın in the following ways: Courage: Lets her speak her mind without being afraid. Confident/Self-confidence: Lets her believe that her ideas are correct.	15
	Partially Correct Answer	
11	The student writes both of Satı Kadın's personal qualities as mentioned in the text but only states how one of them helped her. Example answer: She is courageous and hospitable. As she is courageous, she can speak her mind without being afraid of anyone.	10
	The student writes only one of Satı Kadın's personal qualities mentioned in the text and states how	

13	this quality helped her. Example answer: Confident/Self-confidence: Lets her believe her ideas are correct.	7
15	The student writes down two of Satı Kadın's qualities but does not state how they helped her. Example answer: She is courageous and clever.	5
17	The student writes down one of Satı Kadın's qualities but does not state how this helped her. Example answer: She is courageous. She is talkative.	2
	Wrong Answers	
31	The student writes down qualities that do not help Satı Kadın when she becomes a deputy. Example answer: Brunette / good /a woman.	0
32	The student lists qualities of Satı Kadın not mentioned in the text. Example answer: She is a helpful and hard-working woman.	0
50	Blank	0
	Other Answers	0
60		0

Following this holistic rubric, the maximum score a student can receive is 15 and the minimum score is 0. The student's partially correct responses also varied between 2 and 10 points depending on the accuracy of the answer.

### **Preparation of Analytic Rubric for Evaluation of Written Expression**

To evaluate the writing skills of the students, the analytic rubric developed by Author 1 and Author 2 (2019), was used. The following criteria were used:

1. Content: Relationship of words, sentences, idioms, etc. with content
2. Discourse: Use of idioms, transition words, and explanations to enrich the speech
3. Clarity: Repetition of words and thoughts, clear explanations
4. Spelling Rules: Compliance with spelling rules, correct spelling, and separation of words
5. Use Context-Appropriate Language: Use of appropriate language for a given task based on context
6. Grammar: Suffixes, appropriate use of verbs and subject pronouns.

For each criterion, the performance level was scored from 1 (entry level) to 4 (fully successful). A student with a score of 4 showed exactly the expected performance in the relevant criterion whereas 1 point means that the students showed poor performance. Students can earn a maximum 24 points and a minimum 6 points for each question. For three questions, the students are thus expected to score from 18 to 72.

For the validity of the relevant scoring rubric, expert opinion was obtained on the appropriateness of the criteria and the adequacy of the definitions; the rate of agreement between the expert opinions varied between 87% and 100%. Correlation coefficients between raters ranging from 0.617 to 0.919 were calculated as proof of reliability in different text types (Bilican-Demir & Yıldırım, 2019). Within the scope of the research, inter-rater agreement was calculated for the reliability of the rubric. The responses of 50 randomly selected students were scored by two raters and the calculated intraclass correlation coefficients are given in Table 5.

**Table 5. Intra-class correlation coefficient between raters**



Questions	Intraclass Correlation
Question 1	0.829**
Question 2	0.890**
Question 3	0.727**

\*\*p<0.00

Table 5 shows that the correlation coefficients are over 0.70, which means that the analytic rubric used to score each problem is highly reliable (Shrout, & Fleiss, 1979). Pearson correlation coefficients between raters were also calculated and shown in Table 6.

**Table 6. The correlations among the raters**

Question 1	Rater 1
Rater 2	0.707**
Question 2	Rater 1
Rater 2	0.800**
Question 3	Rater 1
Rater 2	0.573**

\*\*p<0.00

According to Table 6, the correlation coefficients for Question 1 (0.707) and Question 2 (0.800) are sufficient, while the correlation coefficient calculated for Question 3 (0.573) is moderate. However, this does not prevent the raters from scoring on their own (Koo & Li, 2016).

The analytic rubric, which was developed to score students' responses for the relevant test questions, was used. For the instance of this rubric, please see Appendix 1. In addition, a Student Information Questionnaire was prepared to collect students' demographic information. In the questionnaire, students were asked their gender, their parents' education level, and the number of books at home as these are considered to be indicators of the socioeconomic level variable. This information is important for the reading comprehension and writing skills. In the process of developing the questionnaire, two experts in Turkish language teaching were asked about the suitability and comprehensibility of the questions for the research purpose.

Research data were collected by the researchers with the permission of the Turkish teachers in the practice classes. During a one-hour session, students were given the test including the reading text and relevant questions. During the application, they were asked to read the text carefully and answer the questions as best they could. A questionnaire was given to collect the students' demographic information before applying the text and questions. Data regarding students' gender, parents' educational background, and the total number of books at home were collected using the questionnaire. Parents' educational background and the number of books at home were used as an indicator of students' socio-economic status. These two variables, which changed in accordance with these implementations, were also used in this study.

### Data Analysis

Hierarchical multiple linear regression analysis was conducted to reveal the relationship between the students' reading comprehension and writing skills and to determine how much these variables predict each other. In the model, the gender and socio-economic level were kept constant.

In addition, for each analysis, the regression assumptions of linearity, homoscedasticity, and normality of residuals were assessed and met. Excessive multicollinearity among the predictors was not evident, with no inter-item correlations exceeding  $r = 0.50$  and all VIF values  $< 10$ .

## FINDINGS

First, the indicators relating to students' gender and socioeconomic levels were taken into consideration to investigate the extent to which the written expression can predict reading comprehension skills. The results of hierarchical multiple regression analysis are given in Table 7.

**Table 7. Results of regression analysis of reading comprehension performance when students' gender and socioeconomic level variables are taken into consideration**

Variables	B	$\beta$	t	p
Gender	3.079	0.176	3.107	0.002
Education level of mother	0.643	0.084	1.461	0.002
Education level of father	-0.081	-0.012	0.206	0.837
Number of books	-0.049	-0.007	-0.125	0.900
Writing performance	0.831	0.651	11.455	0.000
Constant	-20.317			0.000

$F_{(5, 234)} = 26.775$   $p < 0.001$   
 $R = 0.60$   
 $R^2 = 0.350$

According to Table 7, the hierarchical multiple regression model established to determine the extent to which writing comprehension predicts reading comprehension performance was found to be statistically significant. ( $F_{(5, 234)} = 26.775$ ;  $p < 0.01$ ). According to the results of the analysis, the multiple regression coefficient showing the relationship between the students' reading comprehension achievement scores and the variables in the model is  $R = 0.60$ . The correlation between reading comprehension and writing is positive and moderate ( $r = 0.59$ ). The variables explained for 36% of the total variance in students' reading comprehension performance. Most of the variance in reading comprehension achievement is explained by the success of writing in this model (0.357). In addition, students' writing scores are a statistically significant predictor of reading comprehension scores ( $p < 0.001$ ).

Pratt index (Pratt, 1987) was computed for examining the effect of the writing score on the reading comprehension score, and this shows the relative importance of the predictor in terms of the proportion of variance explained. This revealed that the writing score was the most important predictor of the reading comprehension score (Pratt index = 1.00). According to the standardized regression coefficient ( $\beta$ ), one-unit increase in student's writing performance leads to a 0.65-unit increase in reading comprehension performance when other variables are held constant. Table 8 shows the results of the hierarchical multiple regression analysis of the extent to which the students' writing scores are predicted by achievement in reading comprehension.

**Table 8. Results of multiple regression analysis of writing performance when students' gender and socioeconomic level variables were held constant**

Variables	B	$\beta$	t	p
Gender	-4.678	-0.342	-7.065	0.000
Education level of mother	-0.744	0.123	-7.065	0.019
Education level of father	0.093	0.017	0.328	0.744
Number of books	-0.162	-0.028	-0.581	0.562
Reading Comprehension Performance	0.432	0.552	11.455	0.000
Constant	36.579			0.000

$F_{(5, 234)} = 25.830$   $p < 0.01$   
 $R = 0.678$   
 $R^2 = 0.46$

The hierarchical multiple regression model, which was established to determine the variables predicting students' writing achievement scores, was found to be statistically significant ( $F_{(5, 234)} = 25.83$ ;  $p < 0.01$ ). Accordingly, the multiple regression coefficient showing the relationship between the students' writing scores and the variables included in the model is  $R = 0.68$ . Together, the variables explain 46% of the variance in students' writing scores. While the students' gender and socioeconomic status indicators contribute to 16% of the variance, 30% is explained by the writing achievement. In addition, students' writing achievement scores were a statistically significant predictor of reading comprehension achievement scores ( $p < 0.01$ ). When other variables are held constant, a one-unit increase in reading comprehension success increases written expression performance by 0.55 units. The reading comprehension achievement score is the most important predictor of written expression achievement score (Pratt index = 0.69).

## **DISCUSSION, RESULTS, AND RECOMMENDATIONS**

The study investigated how the comprehension and writing skills of fifth-grade students predict each other. At the same time, the gender and socioeconomic level were statistically kept under control. The findings of the study showed that reading comprehension and writing achievement scores were important predictors of each other. According to the study, it was determined that the students with high writing scores had higher reading comprehension scores and the students with high reading scores had higher writing scores. It is not possible to separate and measure the elements based on language skills. If an individual has a high level of ability in language learning, s/he will be successful in all aspects of language (Hughes, 1990). Many findings show significant and strong relationships between reading and writing skills (e.g., Fitzgerald & Shanahan, 2010; Juriati et al., 2018). Furthermore, some studies examined whether reading has an influence on writing or whether there are bidirectional influences between them (e.g., Abbott et al., 2010; Shanahan & Lomax, 1988).

The findings of this study indicated that some common and similar characteristics are involved in the development of reading and writing skills. When looking from a theoretical perspective, both reading and writing use the same cognitive, linguistic, and discourse resources to some extent. The models for reading and writing have the same constituent components playing a role in the cognitive processes of reading and writing (Schoonen, 2019). Fitzgerald (1992) stated that there are four different types of information that an individual must use when reading and writing. These are metaknowledge, domain knowledge about substance and content, knowledge about universal text attributes, and procedural knowledge and skill to negotiate reading and writing. During reading and writing, individuals are known to reconstruct or compose a series of messages by activating very different processes (such as creating schemes, predicting, constructing meanings, or using strategies to obtain information, etc.). Thus, individuals actively use their previous knowledge in their minds during reading and writing (Shanahan, 1984). The development of one skill naturally supports the other skill due to the activation of a series of similar and common cognitive processes and structures. The relevant research findings support the idea that transfer of information is used during writing or reading and that these two skills have common cognitive processes.

The meaningful and strong relationship between reading and writing skills can also be explained by the presence of other variables that mediate this relationship (Shanahan, 1984). For example, individuals' reading skills are supported by vocabulary (Stæhr, 2008). In other words, limited word knowledge causes individuals to have inadequate reading skills (Beck et al. 1982). In this respect, vocabulary is one of the best-known predictors of reading skill (Beck & McKeown, 1991). The development of an individual's reading comprehension skills enriches his/her vocabulary. This also affects the individual's writing skills and allows him to write better and more effectively. In addition, it was seen that students' word recognition skills improved with writing activities (Santa & Høien, 1999) and that word merging activities during writing supported reading skills (Straw, & Schreiner, 1982). It is known that individuals with advanced writing skills have a rich vocabulary (Sever, 2004).

According to the findings of the research, when the mutual effects of reading and writing skills are taken into consideration, it may be suggested that a common teaching program is developed and used that enables the development of these two skills together instead of waiting for the development of reading skills. In Turkey, the time allocated for Turkish classes is six hours per week. Teachers allocate this workload as follows: two hours for readings; two hours for writing and two hours for language and expression. These interrelated structures are discussed separately in the classroom. In the classroom, in particular, teachers might engage in activities for common thinking processes (e.g., phonemic segmentation) for the development of these two skills, rather than focusing on reading and writing skills separately. Students can read aloud or play rhythmic games.

By reducing the number of reading texts in Turkish textbooks and increasing their quality, students can be given writing exercises based on the subjects of the texts. In this way, students' reading comprehension and writing skills can be improved. Developing reading comprehension and writing skills is highly relevant to providing regular and accurate feedback to students. It would be appropriate for teachers to use scoring that requires the use of a multi-grade scoring key, and to give feedback to students at different levels of response, considering their level of learning.

Research shows that wealth of vocabulary contributes positively to the development of both reading and writing skills. Plans should be made for the development of vocabulary in children from an early age. Reading texts should be selected to include new words that will improve students' vocabulary. Teachers should be able to emphasize new words in lessons and enable students to associate them with various case studies.

### **Study Limitations**

Some limitations of this study should be considered when interpreting the findings. First, the data set is cross-sectional. Since this study is not an experimental model, it is not correct to talk about the causal effect of the relationships between reading and writing skills. However, some possible variables were statistically controlled. These two skills can be measured in more detail with variables not covered in this study using a multiple reading (i.e., word recognition, sentence comprehension, passage comprehension) and writing measures (i.e. Syntactic complexity and qualitative and quantitative measures of spelling and organization) approach. Parental education levels were statistically checked as an indicator of students' socioeconomic levels. In other studies, it is important to use more representative and detailed indicators for the socioeconomic level to demonstrate the validity of the relationship between the two skills. In addition, when examining the relationship between these two variables, researchers should consider common moderate variables such as IQ or verbal ability.

### **REFERENCES**

- Abbott, R. D., Berninger, V. W., & Fayol, M. (2010). Longitudinal relationships of levels of language in writing and between writing and reading in grades 1 to 7. *Journal of Educational Psychology*, 102, 281–298. doi:10.1037/a0019318.
- Araújo, L., & Costa, P. (2015). Home book reading and reading achievement in EU countries: The Progress in International Reading Literacy Study 2011 (PIRLS), *Educational Research and Evaluation*, 21 (5), 422-438. doi: 10.1080/13803611.2015.1111803
- Ateşman, E. (1997). Türkçede okunabilirliğin ölçülmesi. *DilDergisi*, 58, 71- 74.
- Ateş, S., Çetinkaya, Ç., & Yıldırım, K. (2014). Sınıf öğretmenlerinin yazma güçlükleri hakkındaki görüşleri. *International Online Journal of Educational Sciences*, 6(2), 475-493. Doi: 10.15345/ijoes.2014.02.018.

- Beck, I., & McKeown, M. (1991). Conditions of vocabulary acquisition. In R. Barr, M. L. Kamil, P. B. Mosenthal, & P. D. Pearson (Eds.), *Handbook of reading research* (pp.789–814). New York, NY: Longman.
- Beck, I., Perfetti, C., & McKeown, M. (1982). Effects of long-term vocabulary instruction on lexical access and reading comprehension. *Journal of Educational Psychology*, 74, 506–521. doi:10.1037/0022-0663.74.4.506
- Belet, Ş.D. & Yaşar, Ş. (2007). Öğrenme stratejilerinin okuduğunu anlama ve yazma becerileri ile Türkçe dersine ait tutumlara etkisi. *Eğitimde Kuram ve Uygulama*, 3(1), 69-86.
- Bilican-Demir & Yıldırım (2019). Yazılı anlatım becerilerinin değerlendirilmesi için dereceli puanlama anahtarı geliştirme çalışması. *Pamukkale Üniversitesi Eğitim Fakültesi Dergisi*, 47 ( ) , 457-473 . Retrieved from <https://dergipark.org.tr/en/pub/pauefd/issue/48574/588565>
- Breakspear, S. (2012). The policy impact of PISA: An exploration of the normative effects of international benchmarking in school system performance. *OECD Education Working Papers*, 71. Retrieved from <http://www.eunec.eu/sites/www.eunec.eu/files/attachment/files/5k9fdffr28.pdf>
- Broer, N. A., Aarnoutse, C. A. J., Kieviet, F. K., & Van Leeuwe, J. F. J. (2002). The effect of instructing the structural aspect of texts. *Educational Studies*, 28(3), 213-237.
- Camarata, S., & Woodcock, R. (2006). Sex differences in processing speed: Developmental effects in males and females. *Intelligence*, 34, 231–252.
- Cavkaytar, S. (2010). İlköğretimde yazılı anlatım becerilerinin geliştirilmesinde yazma süreci modelinden yararlanma. *Uluslararası Sosyal Araştırmalar Dergisi*, 3(10), 133-139. Retrieved from [http://www.sosyalarastirmalar.com/cilt3/sayi10pdf/cavkaytar\\_serap.pdf](http://www.sosyalarastirmalar.com/cilt3/sayi10pdf/cavkaytar_serap.pdf).
- Cheng, J., & Matthews, J. (2016). *The relationship between three measures of L2 vocabulary knowledge and L2 listening and reading*. *Language Testing*, 35(1), 3-25. doi:10.1177/0265532216676851
- Cheema, R.J., & Galluzzo, G. (2013). Analyzing the gender gap in math achievement: evidence from a large-scale US sample. *Research in Education*, 90(1), 98-112. doi: 10.7227/RIE.90.1.7
- Çaycı, B., & Demir, M. K. (2006). Okuma ve anlama sorunu olan öğrenciler üzerine karşılaştırmalı bir çalışma. *Türk Eğitim Bilimleri Dergisi*, 4(4), 437-456
- Çetin, M.E. (2012). İlköğretim sekizinci sınıf öğrencilerinin yazılı anlatım becerilerinin farklı değişkenler açısından değerlendirilmesi. *Turkish Studies- International Periodical For The Languages, Literature and History of Turkish or Turkic*, 7(1), 727-743.
- Çetinkaya, G. (2010). *Türkçe metinlerin okunabilirlik düzeylerinin tanımlanması ve sınıflandırılması* (Yayımlanmamış Doktora Tezi). Ankara Üniversitesi, Ankara, Türkiye.
- Durgun, E. & Önder, İ. (2019). The relationship of science achievement with reading comprehension, graphic reading, problem-solving skills in middle school seventh-grade students. *Journal of Individual Differences in Education* 1(1), <https://dergipark.org.tr/en/pub/jide/issue/45463/560395>
- Eryaman, M. Y. (2008). Writing, method and hermeneutics: Towards an existential pedagogy. *Elementary Education Online*, 7(1), 2-14.

- Fitzgerald, J. (1992). *Towards knowledge in writing: Illustrations from revision studies*. New York: Springer-Verlag.
- Fitzgerald, J., & Shanahan, T. (2000) Reading and writing relations and their development. *Educational Psychologist*, 35(1), 39-50. doi: 10.1207/S15326985EP3501\_5
- Frölich, M. (2008). Parametric and nonparametric regression in the presence of endogenous control variables. *International Statistical Review*, 76(2), 214-227. doi:10.1111/j.1751-5823.2008.00045.x
- Hall, S.S., Maltby, J., Filik, R.,& Kevin B. Paterson (2014). Key skills for science learning: The importance of text cohesion and reading ability. *Educational Psychology*, 36 (2), 191-215. doi: 10.1080/01443410.2014.926313
- Hughes, A. (1990). *Testing for language teachers*. (2<sup>nd</sup> Ed.). Great Britain: Bell and Bain Ltd.
- Göçer, A. (2014). *Yazma eğitimi*. Ankara: Pegem Akademi Yayıncılık.
- Grimm, K. J. (2008). Longitudinal associations between reading and mathematics. *Developmental Neuropsychology*, 33, doi.org/10.1080/87565640801982486
- Göktaş, Ö.,&Gürbüzürk, O. (2012). Okuduğunu anlama becerisinin ilköğretim ikinci kademe matematik dersindeki akademik başarıya etkisi. *Uluslararası Eğitim Programları ve Öğretim Çalışmaları Dergisi (IJOCS)*, 4(2), 52-66.
- Graham, S., & Perin, D. (2007). A meta-analysis of writing instruction for adolescent students. *Journal of Educational Psychology*, 99, 445–476.
- Gülleroğlu, D., Bilican-Demir, S.,& Demirtaşlı, N. (2014). Türk öğrencilerinin PISA 2003-2006-2009 dönemlerindeki okuma becerilerini yordayan sosyo ekonomik ve kültürel değişkenlerin araştırılması. *Ankara Üniversitesi Eğitim Bilimleri Fakültesi Dergisi*, 47(2), 201-222.
- Karaman, K. (2010). Küreselleşme ve eğitim. *Journal of World of Turks*, 2(3), 131–144.
- Jian, Y.C. (2016). Fourth graders' cognitive processes and learning strategies for reading illustrated biology texts: Eye movement measurements. *Reading Research Quarterly*, 51(1), 93-109. doi: 10.1002/rrq.125
- Juriati, D. E., Ariyanti, A., & Fitriana, R. (2018). The correlation between reading comprehension and writing ability in descriptive text. *Southeast Asian Journal of Islamic Education*, 1(1), 01-14.
- Jones, S. M., & Myhill, D. A. (2007). Discourses of difference? Examining gender difference in linguistic characteristics of writing. *Canadian Journal of Education*, 30, 456e482. <http://www.jstor.org/stable/20466646>.
- Loh, E. K. Y., & Krashen, S., (2015). Patterns in PIRLS performance: The importance of liking to read. *Asian Journal of Education and e-Learning*, 3(1), 1–6.
- Karatay, H.,& Kartallıoğlu, N. (2016). Yabancı dil olarak türkçe öğrenme tutumu ile dil becerileri edimi arasındaki ilişki. *AİBÜ Sosyal Bilimler Enstitüsü Dergisi*, 16 (4), 203-213.
- Kavcar, C., Oğuzkan, F., & Sever, S. (2002) *Türkçe öğretimi: Türkçe ve sınıf öğretmenleri için*. Ankara: EnginYayınevi.
- Kutlu, Ö., Doğan, C. D.,& Karakaya. İ. (2017). *Ölçme ve değerlendirme: Performansa ve portfolyoya dayalı durum belirleme*. Ankara: Pegem Akademi Yayıncılık.

- Lan, Y., Hung, C., & Hsu, H. (2011). Effects of guided writing strategies on students' writing attitudes based on media richness theory. *TOJET: The Turkish Online Journal of Educational Technology*, 10(4), 148-164.
- Lau, K.T. (2018). Hong Kong senior secondary students' reading motivation and classical Chinese reading comprehension, *Reading and Writing*, 32, 4, 963-982. doi: 10.1007/s11145-018-9897-7.
- Lundetræ, K. (2011). Does parental educational level predict drop-out from upper secondary school for 16- to 24-year-olds when basic skills are accounted for? A cross country comparison. *Scandinavian Journal of Educational Research*, 55, 625-637. doi:10.1080/00313831.2011.555925
- Maltepe, S. & Gültekin, H. (2017). Bir zihin haritası tekniğinin ortaokul öğrencilerinin okuduğunu anlama ve yazma becerilerine etkisi. *HAYEF: Journal of Education*, 14(2), 79-92.
- MoNE. (2019). *İlk öğretim türkçe dersi öğretim programı (ilkokul ve ortaokul, 1-8.sınıflar)*. Retrieved from <http://mufredat.meb.gov.tr/Dosyalar/20195716392253-02-T%C3%BCrk%C3%A7e%20C3%96%C4%9Fretim%20Program%C4%B1%202019.pdf>
- Memiş, M. (2019). Türkçeyi ikinci dil olarak öğrenenlerin okuduğunu anlama yeterliklerinin eşdeğerliği. *Ondokuz Mayıs Üniversitesi Eğitim Fakültesi Dergisi*, 38 (1), 253-265. Retrieved from <https://dergipark.org.tr/pub/omuefd/issue/46119/521301>
- Mullis, I. V. S., Martin, M. O., Kennedy, A. M., Trong, K. L. & Sainsbury, M. (2009). *PIRLS 2011 Assessment Frameworks*. Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College
- Mullis, I.V.S., Martin M.O., Foy, P., & Drucker, K.T. (2012). *PIRLS 2011 international results in reading*. Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.
- Mullis, I. V. S., Martin, M. O., Foy, P., & Hooper, M. (2017). *PIRLS 2016 International Results in Reading*. Retrieved from Boston College, TIMSS & PIRLS International Study Center Retrieved from <http://timssandpirls.bc.edu/pirls2016/international-results/>
- OECD. (2010). *PISA 2009 results: What students know and can do - Student performance in reading, mathematics and science* (Vol. I). Paris: OECD Publishing. doi:10.1787/9789264091450-en
- Puglisi, M. L., Hulme, C., Hamilton, L. G., & Snowling, M. J. (2017). The home literacy environment is a correlate, but perhaps not a cause, of variations in children's language and literacy development. *Scientific Studies of Reading*, 21(6), 498-514. doi:10.1080/10888438.2017.1346
- Children's Language and Literacy Development, *Scientific Studies of Reading*, 21(6), 498-514. doi:10.1080/10888438.2017.1346660
- Pratt, J. W. (1987). Dividing the indivisible: Using simple symmetry to partition variance explained. In T. Pukkila and S. Puntanen (eds.), *Proceedings of the Second International Conference in Statistics* (pp. 245-260). Tampere, Finland: University of Tampere.
- Preece, J., & Levy, R. (2018). Understanding the barriers and motivations to shared reading with young children: The role of enjoyment and feedback. *Journal of Early Childhood Literacy*, 146879841877921. doi:10.1177/1468798418779216

- Reilly, D., Neumann, D. L., & Andrews, G. (2019). Gender differences in reading and writing achievement: Evidence from the National Assessment of Educational Progress (NAEP). *American Psychologist*, 74(4), 445–458. doi:10.1037/amp0000356
- Raimes, A. (1983). *Techniques in teaching writing*. Oxford: Oxford University Press.
- Santa, C., Høien, T. (1999). An assessment of early steps: A program for early intervention of reading problems. *Reading Research Quarterly*, 34(1), 54-79. doi: 10.1598/RRQ.34.1.4
- Sever, S. (1998). Dil ve iletişim: Etkili yazılı ve sözlü anlatım. *Ankara Üniversitesi Eğitim Bilimleri Fakültesi Dergisi*, 31, 51-66.
- Sever, S. (2004). *Türkçe öğretimi ve tam öğrenme*. (4. baskı). Ankara: Anı Yayıncılık.
- Shanahan, T., & Lomax, R. (1988). A developmental comparison of three theoretical models of the reading-writing relationship. *Research in the Teaching of English*, 22,196-212.
- Shanahan, T. (1984). Nature of the reading-writing relation: An exploratory multivariate analysis. *Journal of Educational Psychology*, 76(3), 466–477. doi:10.1037/0022-0663.76.3.466
- Schoonen, R. (2019). Are reading and writing building on the same skills? The relationship between reading and writing in L1 and EFL. *Reading and Writing*, 32(3), 511-533. doi: 10.1007/s11145-018-9874-1.
- Sirin, S. R. (2005). Socioeconomic status and academic achievement: A meta-analytic review of research. *Review of Educational Research*, 75(3) 417-453. doi:10.3102/00346543075003417
- Schwerdt, G., & Simon Wiederhol, S. (2019). A macroeconomic analysis of literacy and economic performance. Retrieved from [http://www.dataangel.ca/docs/A%20Macroeconomic%20Analysis%20of%20Literacy\\_February2019.pdf](http://www.dataangel.ca/docs/A%20Macroeconomic%20Analysis%20of%20Literacy_February2019.pdf)
- Shrout, P. E., & Fleiss, J. L. (1979). Intraclass correlations: Uses in assessing rater reliability. *Psychological Bulletin*, 86(2), 420–428. doi:10.1037/0033-2909.86.2.420
- Solheim, O. J., & Lundstrøm, K. (2018). Can test construction account for varying gender differences in international reading achievement tests of children, adolescents and young adults? – A study based on Nordic results in PIRLS, PISA and PIAAC. *Assessment in Education: Principles, Policy & Practice*, 25(1), 107-12.
- Scheiber, C., Reynolds, M. R., Hajovsky, D. B., & Kaufman, A. S. (2015). Gender differences in achievement in a large, nationally representative sample of children and adolescents. *Psychology in the Schools*, 52, 335–348. doi:10.1002/pits.21827
- Steensel, R., Oostdam, R., & Gelderen, A. (2019). Affirming and undermining motivations for reading and associations with reading comprehension, age and gender. *Journal of Research in Reading*, 42 (3-4), 504-522. doi: 10.1080/0969594X.2016.1239612
- Straw, S.B., & Schreiner, R. (1982). The effect of sentence manipulation on subsequent measures of reading and listening comprehension. *Reading Research Quarterly*, 17(3), 339-352
- Stæhr, L. S. (2008) Vocabulary size and the skills of listening, reading and writing, *The Language Learning Journal*, 36(2), 139-152. doi: 10.1080/09571730802389975



- Tabachnick, B. G., & Fidel, L. S. (2007). *Using multivariate statistics*. Massachusetts: Allyn & Bacon, Inc.
- TEDMEM. (2016). *OECD yetişkin becerileri araştırması: Türkiye ile ilgili sonuçlar*. Ankara: Türk Eğitim Derneği Yayınları. Retrieved from <https://tedmem.org/yayin/oced-yetiskin-becerileri-arastirmasi-turkiye-ile-ilgili-sonuclar>
- Tok, R., & Erdoğan, O. (2017). İlkokul 2., 3. Ve 4. Sınıf öğrencilerinin yazma becerilerinin incelenmesi, *YYÜ Eğitim Fakültesi Dergisi (YYU Journal Of Education Faculty)*, 14(1), 1003-1024. doi: 10.23891/efdyyu.2017.37
- Ulu, M., Tertemiz, N., & Peker, M . (2016). Okuduğunu anlama ve problem çözme stratejileri eğitiminin ilköğretim 5. Sınıf öğrencilerinin rutin olmayan problem çözme başarısına etkisi. *Afyon Kocatepe Üniversitesi Sosyal Bilimler Dergisi*, 18 (2),303-340. Retrieved from <https://dergipark.org.tr/tr/pub/akusosbil/issue/31333/341932>
- Ungan, S. (2007). Yazma becerisinin geliştirilmesi ve önemi. *Erciyes Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 23, 461-472. Retrieved from [http://sbedergi.erciyes.edu.tr/sayi\\_23/sayi\\_23.htm](http://sbedergi.erciyes.edu.tr/sayi_23/sayi_23.htm)
- Wilkinson, I. A. G.,& Son, E. H. (2011). A dialogic turn in research on learning and teaching tocomprehend. In M.L. Kamil. P.B. Rosenthal, P. D. Pearson, & R. Barr (Eds.), *Handbook of reading research: Volume IV (pp. 359-387)*. New York: Routledge.
- Willcutt, E. G., Petrill, S. A., Wu, S., Boada, R., DeFries, J. C., &Olson, R. K.(2013). Comorbidity between reading disability and math disability: concurrent psychopathology, functional impairment, and neuropsychological functioning. *J. Learn. Disabil.* 46, 500-516. doi: 10.1177/0022219413477476
- Koo T. K. & Li, M. Y. (2016). A guideline of selecting and reporting intraclass correlation coefficients for reliability research. *Journal of Chiropractic Medicine*,15(2), 155-163.
- Yıldırım, Ö. (2012). *Okuduğunu anlama başarısıyla ilişkili faktörlerin aşamalı doğrusal modellemeyle belirlenmesi (PISA 2009 Hollanda, Kore ve Türkiye karşılaştırması)*. Yayınlanmamış doktora tezi, Ankara Üniversitesi, Ankara.