



## The Effect of Performing Reading Activities with Critical Reading Questions on Critical Thinking and Reading Skills

Sefa YILDIRIM<sup>1</sup>

Yusuf SÖYLEMEZ<sup>2</sup>

<sup>1</sup>Agri Ibrahim Cecen University Faculty of Science and Letters, Department of History, Ağrı-Turkey

Email: [sefa.yildirim25@yandex.com](mailto:sefa.yildirim25@yandex.com)

<sup>2</sup>Agri Ibrahim Cecen University Faculty of Science and Letters, Department of Turkish Language and Literature, Ağrı-Turkey



( Corresponding Author)

### Abstract

The 21st century individual should be able to access information and critically evaluate and interpret it. What creates this obligation is the information bombing and political and commercial perception management brought about by virtual networks, the media and globalization. Therefore, critical thinking and its sub-component, critical reading, are becoming more and more important because they are the assistants of the individual who has to distinguish right from wrong and the truth from propaganda in life and texts. The aim of this study is to reveal the effect of performing reading activities with critical reading questions developed by the researchers on critical thinking and reading skills, and to pave the way for further research in this area. Study sample consisted of 232 students of Ağrı Ibrahim Çeçen University in the academic year of 2016-2017. Participants were recruited using random sampling technique. This was a mixed design study. The qualitative dimension of the study was based on a screening model. Data were collected using document review and interview methods, and were analyzed using content analysis. The quantitative dimension of the study was based on a quasi-experimental model. Data were collected using a Critical Thinking Self-Evaluation Form and a Critical Reading Scale (pre-test-post-test) before and after a 7-week application. Data were analyzed using a statistical software package. T-test and ANOVA were used for analysis. Results show that reading activities with critical reading questions have a statistically significant effect on students' critical thinking and reading skills. Qualitative data also support these results.

**Keywords:** Critical thinking, Critical reading, Critical reading questions, Critical reading activity.

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### Contents

1. Introduction .....	327
2. Method .....	330
3. Findings .....	330
4. Conclusion and Discussion.....	333
References.....	334

## 1. Introduction

A soul that thinks well and right is a stronger discoverer than a sophist.

Sophocles (Cited by, Kranz (1994))

Information is accumulating rapidly and access to it is becoming easier and easier in this constantly changing and developing world. This results in a shift in the direction of education from information carrier to a structure in which information is selected tested and interpreted. Therefore, thinking skills, language and communication skills and reading and comprehension skills are becoming more and more important.

### 1.1. Thinking and its Forms

Referring to "Noesis" in Greek, "cogitare" (cōgitātiō [cogito]) in Latin, "penser" in French and "tefekür" in Arabic, the concept of "thinking" is defined as the conscious manifestation of mental activities such as comparing, analyzing, synthesizing, suspecting, demanding, feeling, imagining, remembering, free association, connection and form comprehension within the process of learning in philosophical and content (Lewis, 1918; Kabağaç and Alova, 1995; Peters, 2004; Dogan, 2005; Nişanyan, 2009; Çolak and Demircioğlu, 2010; Çelgin, 2011; Arı, 2013; Cevizci, 2013; Cankaya, 2014; Demirel, 2015; Söylemez, 2015; Budak, 2017; Sarikaya, 2018). Ruggiero also creates a three-dimensional thinking classification "reflective, creative, and critical" (Ruggiero, 2017).

Based on the conceptual definitions above, styles of thinking can be classified into several main categories (Akmoğlu and Dirioz, 2007; Güneş, 2012; Doğanay, 2015; Doganay and Tok, 2015; Söylemez, 2015; Sarikaya, 2017; Demirel, 2018):

- |                            |                               |
|----------------------------|-------------------------------|
| a) Induction thinking,     | l) Divergent Thinking,        |
| b) Deductive thinking,     | m) Convergent Thinking,       |
| c) Analytical thinking,    | n) Lateral Thinking,          |
| d) Analogous thinking,     | o) Transformational Thinking, |
| e) Systematic thinking,    | p) Integrative Thinking,      |
| f) Creative thinking,      | q) Hypothetical Thinking,     |
| g) Clinical thinking,      | r) Global Thinking,           |
| h) High-level thinking,    | s) Reflexive Thinking,        |
| i) Six thinking hats       | t) Omnipotent Thinking,       |
| j) Reflective thinking,    | u) Iconic Thinking,           |
| k) Metacognitive thinking, | v) Critical thinking          |

Another important point is the mental structure and activities of human being. Considering Gardner's statement that mental structures that will build the future are "disciplined, synthesist, creative, respectful and ethical minds" shows that critical thinking is crucial (Gardner, 2006; Sirin, 2012; Judkins, 2017).

### 1.2. Critical Thinking and Reading

"Critical thinking is the art of thinking about your thinking while you are thinking in order to make your thinking better. Critical thinking has three interwoven phases: Analyzing thinking, evaluating thinking and improving thinking."

(Paul and Elder, 2016).

In this context, it can be argued that critical thinking, which is a high-level thinking process, is the art of learning to think in the best way. Derived from the combination of the words "kriticos" (κριτικός) and "kriterion" (κρίτηριον) in Ancient Greek and "criticus" in Latin, the word "critical" etymologically implies the development of [discerning judgment based on standards] according to Paul and Elder (Lewis, 1918; Kabağaç and Alova, 1995; Çelgin, 2011; Galetto, 2014; Nosich, 2016; Paul and Elder, 2016).

Some of the features of critical thinking are that it has certain standards, it is reflective, and logical and realistic (Marshall, 2005; Kurnaz, 2007; Kurnaz, 2013; Platon, 2015; Nosich, 2016; Paul and Elder, 2016; Baillargeon, 2017; Budak, 2017; Ruggiero, 2017). According to Paul and Elder (2016) critical thinking consists of three main perspectives: analytical, evaluative and creative. Therefore, critical thinking can be defined as evaluating, thinking objectively, creating standards to determine the true value of something, and using those standards.

Critical reading, which plays a key role in the development of basic language skills, can be defined as making an inference by reasoning, questioning, evaluating, and eventualizing a text and reaching a conclusion (Adalı, 2010; Adalı, 2011; Söylemez, 2015; Prosperity, 2016; Scott, 2017). Another key point of critical reading is that it can make significant contributions to the formation of a democratic society.

### 1.3. Language and Thinking

Many scientists from ancient times to the present have expressed that there is a strong connection between "thought" and "language."

To name but a few, Platon and Aristoteles address two important concepts; internal and external speech. Platon defines internal speech, that is, thinking, as "the dialogue of the soul with itself." (Cited by Altinors (2016)).

On the other hand, Augustine asserts that thinking is faster than speaking, and therefore, the task of language is to draw attention to the truth. Descartes also expresses similar views and argues that the inattentive and careless use of language is the greatest obstacle to sound reasoning (Altinors, 2016). Chomsky's remarks on this issue is "...human language should directly reflect the characteristics of human intellectual capacities, that language should be a direct mirror of mind in ways in which other systems of knowledge and belief cannot" (Chomsky, 2018).

Many philosophers and experts view language and speech as the acting out of perceptions and feelings

Many philologists, educators, philosophers and experts are known to put forward many conceptual, functional, linguistic, philological and philosophical judgments, opinions, theories and hypotheses about the functions of language. In this context, it can be stated that language is used as a means of conveying information, raising emotional awareness, putting forward and shaping ideas, ordering, manipulating, directing and explaining objects,

events and phenomena (Corballis, 2003; Ozdemir, 2013; Dessalles *et al.*, 2014; Söylemez, 2015; Sarikaya, 2016; Baillargeon, 2017).

It can therefore be stated that there is a one-to-one connection between "language" and "thinking", and that the functions that develop depending on these two phenomena are unique to human beings.

It is also important to improve critical listening, reading and visual reading skills in the development of critical thinking. People should develop critical comprehension skills to critically perceive facts, events and expressions while exchanging information, to make accurate, reliable and valid judgments, and to make reliable assessments of the process of acquiring knowledge and information.

#### 1.4. Concept of Mythology and "A Short History of Myth"

*"We need myths that will help us to identify with all our fellow-beings, not simply with those who belong to our ethnic, national or ideological tribe. We need myths that help us to realize the importance of compassion, which is not always regarded as sufficiently productive or efficient in our pragmatic, rational world. We need myths that help us to create a spiritual attitude, to see beyond our immediate requirements, and enable us to experience a transcendent value that challenges our solipsistic selfishness. We need myths that help us to venerate the earth as sacred once again, instead of merely using it as a 'resource.' This is crucial, because unless there is some kind of spiritual revolution that is able to keep abreast of our technological genius, we will not save our planet" (Armstrong, 2005).*

Mythology [μυθολογία, ας, ή] is a verbal and written form of art. It derives from the combination of the words "mythos" (μῦθος, ος, ό) meaning narration, story, fairy tale, *legend*, word, news, rumor, or story in Greek and "logos" (λόγος, ος, ό) meaning word, maxim, reason, intelligence, speech, explanation, rumor, proverb, fable or judgment. In addition, some experts have used this word with the meaning of fable [fabul/a-ae], story, fantasy, novel, literature and fiction (Lewis, 1918; Longman-Metro Great English Turkish-Turkish Dictionary, 1993; Kabağaç and Alova, 1995; Nişanyan, 2009; Öztürk, 2009; Seyidoglu, 2010; Çelgin, 2011; Baillargeon, 2017). When myths first came out, people perceived these literary products as real stories or facts. However, in the last two centuries, modern societies have begun to regard mythological works as falsely believed works of imagination and deformation of reality due to technological advancements and resulting new scientific perspectives. Today, social science experts such as clergy, historians, literati, sociologists, psychologists and ethnologists generally consider mythological works as primitive beliefs, rituals and sacred traditions. In essence, myths or written works can be regarded as literary works of art or knowledge not because they carry scientific facts but because they have direct or indirect influence on human nature, mood, and even on the future prospects of societies.

Perhaps partly serving as a guiding role in seeking for an answer to the mystery of existence and the mystery of life and its truth, mythology can be said to consist of works and rituals bringing back the joy of living and giving solace to those facing death and eternal loss, and feeling frustrated regarding future (Armstrong, 2005; Rosenberg, 2006; McCants, 2012).

In today's scientific culture, God and mythological elements are often not considered much. But it should not be forgotten that the mythological artifacts are the products of people's enormous imagination. Many of the elements that people developed in their imagined world thousands of years ago, such as traveling to the Moon or to Mars, or traveling in space to communicate with God or Gods, or using various plants and materials to combat evil spirits or to heal sicknesses were the foundation of the technology that we have today. In this context, it can be argued that the important benefits of myths are that they carry meaningful knowledge, trigger imagination and provide an opportunity to deeply analyze and synthesize some psychological and sociological problems that an individual or society may encounter (Armstrong, 2005; Rosenberg, 2006; Seyidoglu, 2010; McCants, 2012).

In conclusion, mythology can develop and strengthen the perspectives of people, just like science and social sciences.

Given these characteristics of mythology, it was decided that the book titled "A Short History of Myth" by Armstrong (2005) would be evaluated and included in the application process because it has a suitable topic and knowledge in terms of critical reading. The work consists of 7 chapters and 106 pages. The chapters are:

1. What is a Myth?
2. The Paleolithic Period: The Mythology of the Hunters (c. 20000 to 8000 BCE)
3. The Neolithic Period: The Myth of the Farmers (c. 8000 to 4000 BCE)
4. The Early Civilizations (c. 4000 to 800 BCE)
5. The Axial Age (800 to 200 BCE)
6. The Post-Axial Age (c. 200 BCE to c. 1500 CE)
7. The Great Western Transformation (c. 1500-2000 AD)

#### 1.5. Application Process

A literature review was conducted and the characteristic of critical reading and the scales developed in this area were examined in order to generate critical reading activities. A Critical Reading Activity Questionnaire consisting of 52 items was prepared. Twelve experts were consulted to determine the content validity of the items. The data were analyzed using Lawshe's Content Validity Ratio (CVR) Method and those with low CVR scores were removed from the questionnaire (Lawshe, 1975).

Table-1. Content Validity Ratio Scores of Critical Reading Activities

Item	Appropriate	Revise	Remove	CVR
1.	8	1	3	<b>0.33</b>
2.	11		1	0.83
3.	11		1	0.83
4.	12			1.00
5.	11		1	0.83
6.	9		2	<b>0.50</b>
7.	12			1.00
8.	11		1	0.83
9.	9	1	2	<b>0.50</b>
10.	12			1.00
11.	12			1.00
12.	9	1	2	<b>0.50</b>
13.	12			1.00
14.	7	1	4	<b>0.17</b>
15.	12			1.00
16.	12			1.00
17.	12			1.00
18.	11		1	0.83
19.	11		1	0.83
20.	7	3	2	<b>0.17</b>
21.	12			1.00
22.	11	1		0.83
23.	9	1	2	<b>0.50</b>
24.	12			1.00
25.	11		1	0.83
26.	8		4	<b>0.33</b>
27.	12			1.00
28.	12			1.00
29.	9	2	1	<b>0.50</b>
30.	12			1.00
31.	10	2		0.67
32.	7		5	<b>0.17</b>
33.	12			1.00
34.	12			1.00
35.	12			1.00
36.	9	1	2	<b>0.50</b>
37.	12			1.00
38.	12			1.00
39.	12			1.00
40.	7	2	3	<b>0.17</b>
41.	12			1.00
42.	10		2	0.67
43.	12			1.00
44.	12			1.00
45.	7		5	<b>0.17</b>
46.	12			1.00
47.	10		2	0.67
48.	12			1.00
49.	7	1	4	<b>0.17</b>
50.	11		1	0.83
51.	12			1.00
52.	12			1.00

Source: Author' field work.

In Lawshe's Content Validity Ratio (CVR) Method, the lower limit for 12 experts is .56 (Lawshe, 1975). Table 1 shows that the content validity scores of items, 1, 6, 9, 12, 14, 20, 23, 26, 29, 32, 36, 40, 45 and 49 were lower than < .56, and therefore, they were removed from the questionnaire.

Participants (experimental group) were told about the critical reading process consisting of 38 items and were given the questions in written form. The application was performed in a classroom environment and lasted for 5 weeks. 7 experts (3 from the field of Turkish Language and Literature, 2 from the field of Turkish education and 2 from the field of history education) were consulted to construct 3 texts to be used in the application. At the end of the application, participants were asked to read "A Short History of Myth" by Armstrong (2005) critically in 2 weeks. An achievement test (N 232) was conducted to find out if students read the book, and those with a score below 60 (out of 100) were not included in the study. The statistical data of the achievement test were not included in the study as they were not considered directly relevant to the research topic.

The researchers were not involved in the lecture but they observed and analyzed the answers that students gave to the questions in the course environment (5 weeks) and in the application held at home (2 weeks). However, students' answers were neither interfered with nor scored. Throughout the process, the instructor who was teaching the course only answered the questions regarding what the items of the questionnaire meant posed by students.

A pre-test was carried out before the application started. At the end of the 7th week, a post-test was conducted and the data collection was completed. Data were analyzed and the study was finalized in week 10. The results of the study were shared with the teaching staff and students on request, but no personal data was shared with the third parties.

The central question of the study is as follows:

What is the effect of reading activities with critical reading questions on critical thinking and reading skills?

The sub-questions of the study are as follows:

1. What are students' critical thinking pre-test and post-test results?
2. What are students' critical reading pre-test and post-test results?
3. Do students' critical thinking post-test results differ by gender?
4. Do students' critical reading post-test results differ by gender?
5. Do students' critical thinking post-test results differ by learning style?
6. Do students' critical reading post-test results differ by learning style?
7. Do students' critical thinking post-test results differ by department?
8. Do students' critical reading post-test results differ by department?
9. Do students' critical thinking post-test results differ by high school type?
10. Do students' critical reading post-test results differ by high school type?
11. Do students' critical thinking post-test results differ by age?
12. Do students' critical reading post-test results differ by age?
13. What are students' views of the lecture given using reading activities with critical reading questions?

## **2. Method**

The research was based on explanatory mixed design, which is a mixed research method. Mixed design research has two dimensions, quantitative and qualitative. Depending on the objective and structure of research, one of these dimensions may be concentrated on more or repeated more than once. This study concentrated more on quantitative dimension, and qualitative data were collected to support quantitative findings and to accurately describe the process.

Semi-experimental design with pre-test and post-test was used in the quantitative dimension of the study,

Qualitative data were collected using document review and interview techniques in order to explain quantitative data.

### **2.1. Population and Sample**

The study population consisted of students of the Departments of History and of Turkish Language and Literature of the faculty of science and literature of Ağrı İbrahim Çeçen University in the academic year of 2016-2017. The study sample consisted of 232 students (equal number of students from the two departments) recruited using random sampling technique. There were no courses on critical thinking and critical reading offered by the university, therefore, no control group was included in the study. Only pre-test-post-test was applied to the experimental group. It was determined that 169 data on critical thinking and 197 data on critical reading were suitable for evaluation.

### **2.2. Data Collection**

Document review and interview techniques were used to collect data in the quantitative dimension of the study. Document review involves the analysis of materials that contain information about facts or phenomena aimed to be investigated (Yıldırım and Şimşek, 2000). A semi-structured interview form developed by researchers was used to find out students' views of the critical reading application. In this technique, the researcher prepares the interview questions in advance, however, he/she provides participants with partial flexibility during the interview and allows questions to be rearranged and discussed (Ekiz, 2013).

The quantitative data of the study were grouped under the headings of critical thinking and critical reading. Data on critical thinking were collected using the critical thinking self-assessment form developed by Kurnaz (2007) while data on critical reading was collected using the critical reading scale developed by Söylemez (2015). The scale developed by Söylemez (2015) was tested at a graduate level and with a sample (N 137) not included in the original study. Cronbach Alpha, Spearman-Brown and Guttman were found to be 0.89, 0.843 and 0.897, respectively. These values were close to those of the original scale (Cronbach Alpha 0,854, Spearman-Brown 0,837, Guttman 0,847). Since all internal consistency coefficients were greater than 0.80, we can state that the reliability of the Critical Reading Scale was high (Ozer and Dönmez, 2013; Sevim, 2014).

### **2.3. Data Analysis**

Quantitative data were analyzed using a statistical software package according to descriptive statistical methods while qualitative data were analyzed using content analysis. The qualitative data were used to describe quantitative data.

## **3. Findings**

Two types of qualitative data were found. The first one was concerned with critical reading, which was obtained using document review method, and formed the basis of the experimental part of the research. Based on this information, activity questions about critical reading were generated. 52 activity questions were submitted to the experts. The questions were analyzed using Lawshe's Content Validity Ratio Method, and those with low content validity scores were removed from the questionnaire (Lawshe, 1975). The final version of the questionnaire consisted of 38 questions:

1. What is the significance of the text I read?
2. Can I read this text critically and how ready do I feel about it?

3. What should I research about the book/what parts of it do I have information about?
4. What information in the book does not agree with my information?
5. What information provided by the book do I need to verify by referring to information sources?
6. What are field-specific concepts in the book? Which of them were explained enough?
7. What is the problem or phenomenon in the text? To what extent did the author explain it?
8. What is the main theme of the text?
9. What are the secondary themes of the text?
10. How has the connection between the main theme and secondary themes been established?
11. What are the cause-and-effect relationships that I have found in the text and have the relationships been established correctly?
12. What are the relationships between the text and other texts and have the relationships been established correctly?
13. Can a relationship be established between the images and the topic of the text?
14. Did I detect anything related to association in the text? If so, what are they?
15. Does the text contain overt/covert commercial/propaganda? If so, what are they?
16. What kind of pattern do I obtain if I classify the information given in the text according to the degree of importance?
17. Do I find the ideas and their bases in the text convincing? Which ones do I not find convincing and how can I be sure about it?
18. Is the text based on truth or fiction?
19. Does the text include solution recommendations? Which ones did I test to be valid and what kind of result did I obtain?
20. What is the main argument of the author of the text? Is it valid?
21. What is the purpose of the author?
22. How has the formal logic on which the text is based been formed?
23. Did I detect an inconsistency in the text?
24. If the text contains a logical fallacy, how did it affect the general structure? What kind of conclusion did it reveal?
25. What are my predictions regarding the text? What are my new predictions besides the ones I found an answer to?
26. How well was I with my predictions and where did I do wrong?
27. What kind of result did I come up with based on the information provided by the text?
28. What are the clear, consistent, logical or unethical information that I have found in the text and why did the author provide them?
29. Is the information in the text reliable, current and valid?
30. What did I find out in the text about the author's beliefs and prejudices?
31. To what extent is the author's inferences related to the information he/she presents in the text?
32. What information that I obtained from the text do I try to apply in my life?
33. How and where do I share what I have learned from the text?
34. Who would be interested in what I have learned from the text and how can I construct a text that is relevant to them?
35. Which of the assessments that I have made regarding the text am I not sure of?
36. Did my prejudices and prior knowledge have a negative effect on my assessments regarding the text?
37. Did I evaluate the text objectively?
38. What mistakes did I make when making an assessment and how did they affect my inferences?

The second type of qualitative data was collected using a semi-structured form. It was divided into sub-themes.

1. Have you ever participated in this kind of activity before?  
95% of participants stated that they had never had a similar lecture before while 5% think that they had a similar lecture before.  
P (participant) 21 stated "I have read looking for answers to pre-determined questions before" while P 123 stated "I have had lectures involving activities before." P 85 "once our teacher showed us a movie and asked us to criticize the negative parts of it." Although participants had similar lectures, they did not have a lecture systematically concentrated on thinking skills and searching for answers to questions and aimed at understanding and analyzing any kind of text.
2. Have you ever had a lesson in high school or college involving critical thinking or critical reading?  
Although 1% and 7% of participants stated that they had a lecture involving critical thinking or critical reading in high school and college, respectively, they did not give any explanatory information.
3. What were the challenges of the activities?  
Almost all participants stated that they had a hard time during the process, which was personally observed by the researchers and the lecturers as well. The thematic classification of the challenges for participants was *Questions and answers, Evaluation, Text Analysis, Author and Time*. Participants had difficulty understanding the questions (32%) in the *Questions and answers* section mainly because they had not had been asked similar questions before (81%). Finding the right answer (77%) and being sure of the answer (24%) were the other two challenges for participants. Some participants read the text a few times to overcome this problem (65%) while some others gave up thinking that they would not be able to accomplish the task (3%).  
In the *Evaluation* section, participants stated that they had difficulty establishing evaluation criteria (57%), identifying their own evaluation mistakes (14%) and making sure of their evaluations (38%). This shows that the students did not make frequent evaluations and that even if they did, they did not use some certain criteria and did not control the process.

In the *Text Analysis* section, participants stated that they had difficulty revealing the general meaning of the text (22%) and detecting the problems in the text (43%). Most participants (61%) stated that they especially had difficulty in terms of intertextuality.

In the *Author* section, participants stated that they had difficulty understanding the purpose of the author (32%) and confirming the evidence he/she provided (19%).

In the *Time* section, participants stated that they had difficulty in time management (71%). It may be due to the fact that they were not accustomed to the process and had to read the text over and over again.

4. What do you think are the effects of the lecture on your thinking system?

Participants stated that the lecture helped them raise their awareness on *approaching a subject systematically* (41%), *seeing through the deep structure of a text* (67%), *recognizing a problem and producing a solution* (49%), *questioning information* (87%) and *breaking down prejudices* (39%).

Quantitative data were analyzed using a statistical software package.

**Table-2.** Comparison of Critical Thinking Pre-Test and Post-Test Scores

	Mean	N	t	p
<b>Critical thinking pre-test</b>	73.66	169	3.190	.002
<b>Critical thinking post-test</b>	78.21	169		

Source: Calculated from the primary data.

T-test shows a statistically significant difference between pre-test and post-test mean scores of participants ( $t = 3.190$ ;  $p = .002 < .05$ ) in favor of the post-test, indicating that there was a significant increase in participants' post-application critical thinking scores.

**Table-3.** Comparison of Critical Reading Pre-Test and Post-Test Scores

	Mean	N	t	p
<b>Critical reading pre-test</b>	86.08	197	2.272	.024
<b>Critical reading post-test</b>	89.91	197		

Source: Calculated from the primary data.

T-test shows a statistically significant difference between pre-test and post-test mean scores of participants ( $t = 2.272$ ;  $p = .024 < .05$ ) in favor of the post-test, indicating that there was a significant increase in participants' post-application critical reading scores.

Participants' statement that the lecture helped them raise their awareness on *approaching a subject systematically* (41%), *seeing through the deep structure of a text* (67%), *recognizing a problem and producing a solution* (49%), *questioning information* (87%) and *breaking down prejudices* (39%) also confirms the increase in critical thinking and critical reading post-test scores. P 68 stated "Apparently I used to believe everything I saw on social media without questioning it. From now on, I will evaluate every information according to what I have learned in this lecture." P 128 stated "I understand that judging people and ideas by criteria rather than by prejudices will yield a more accurate result. Let us not let our prejudices blind us!" P 17 stated "Every text has a visible and invisible meaning that I have to figure out, and I realized that many truths come out of it when I figure it out." Participants' statements show that they have recognized the importance of critical reading and therefore critical thinking skills and that they have developed them to some extent. Given the fact that an important feature of critical thinking is to *put it into practice and to turn it into a habit*, participants' statements become more meaningful.

**Table-4.** Comparison of Critical Thinking and Critical Reading Scores by Gender

	Gender	N	Mean	t	p
<b>Critical thinking</b>	Male	82	77.41	.671	.503
	Female	87	79.01		
<b>Critical reading</b>	Male	105	89.66	.219	.847
	Female	92	90.16		

Source: Calculated from the primary data.

There is a statistically significant difference in neither critical thinking ( $t = .671$ ;  $p = .503 > .05$ ) nor critical reading ( $t = .219$ ;  $p = .847 > .05$ ) mean scores between male and female participants, indicating that critical thinking and critical reading skills do not differ by gender.

P 70 stated "I want to be a mother in the future and I think it is my job to teach my kids to question and understand life and to ask questions." P 8 stated "I think that girls as well as boys should develop this skill because only then can we build a good society." P 161 stated "I believe that parents should teach their children not to believe everything they hear. That is what I will do, but of course first I have to improve myself." Participants' statements show that they do not take a sexist view on this matter. The lack of a statistically significant difference in post-test scores between male and female participants indicates that not only students in coeducation system but also individuals can develop critical thinking and reading skills.

**Table-5.** Comparison of Critical Thinking and Reading Scores by Learning Style

	Learning Style	N	Mean	t	p
<b>Critical thinking</b>	Formal	93	80.31	1.939	.054
	Evening	76	76.11		
<b>Critical reading</b>	Formal	99	91.32	1.402	.163
	Evening	98	88.50		

Source: Calculated from the primary data.

There is a statistically significant difference in the mean scores of neither critical thinking ( $t = 1,939$ ;  $p = .054 > .05$ ) nor critical reading ( $t = 1.402$ ;  $p = .163 > .05$ ) between participants receiving formal education and those receiving evening education, indicating that critical thinking and critical reading skills do not differ by learning style even though there is a difference in university admission scores between students receiving formal education and those receiving evening education.

**Table-6.** Comparison of Critical Thinking and Reading Scores by Department

	Department	N	Mean	t	p
<b>Critical thinking</b>	Department of Turkish Language and Literature	89	79.22	.002	.963
	Department of History	80	77.20		
	Total	169	78.21		
<b>Critical reading</b>	Department of Turkish Language and Literature	98	91.41	1.378	.242
	Department of History	99	88.41		
	Total	197	89.91		

Source: Calculated from the primary data.

Although the mean critical thinking and critical reading scores of Turkish language and literature students are higher than those of history students, there is a statistically significant difference in the mean scores of neither critical thinking ( $t=.002$ ;  $p=.963 > .05$ ) nor critical reading ( $t=1,378$ ;  $p=.242 > .05$ ) between them.

P 33 stated “A literary teacher should be able to teach how to read between the lines of a text.” P 98 stated “I now believe that I should learn to judge historical events accurately and without prejudice to become a good history teacher. If I can ask the right questions, my students can find the right answers.” P 2 stated “This is the first time I have tried to determine the purpose of an author and look for consistency and reliability in his texts. from now on, I will do this all the time and I will teach this to my students as well.” These statements show that literary and history students have a positive attitude towards this matter. The lack of statistically significant difference in post-test scores between literary and history students indicates that they all can develop critical thinking and reading skills. However, both departments are in the field of social sciences, therefore, we cannot generalize this finding to other fields and departments.

ANOVA test results show no statistically significant difference in the mean scores of critical thinking ( $F=1,400$ ;  $p=.245 > .05$ ) and critical reading ( $F=1,017$ ;  $p=.387 > .05$ ) between participants who graduated from Anatolian, vocational, regular and religious vocational high schools, which may be due to the fact that even though those schools have different curricula, the education they offer is based on similar principles.

**Table-7.** Comparison of Critical Thinking and Critical Reading Scores by High School

	High School	N	Mean	F	p
<b>Critical thinking</b>	Anatolian High School	56	80.32	1.400	.245
	Vocational High School	30	78.20		
	Regular High School	62	79.11		
	Religious Vocational High School	21	75.21		
	Total	169	78.21		
<b>Critical reading</b>	Anatolian High School	66	93.71	1.017	.387
	Vocational High School	34	87.47		
	Regular High School	72	90.76		
	Religious Vocational High School	25	87.70		
	Total	197	89.67		

Source: Calculated from the primary data.

95% of participants stated that they had never had a similar lecture before while 99% stated that they had not had a lesson on critical thinking or critical reading in high school, which may account for why there was no statistically significant difference in post-test scores between participants in terms of high schools from which they graduated.

**Table-8.** Comparison of Critical Thinking and Critical Reading Scores by Age

	Age	N	Mean	F	p
<b>Critical thinking</b>	17-25	164	65.13	3.374	.025
	26-34	3	73.43		
	35-43	2	96.07		
	Total	169	78.21		
<b>Critical reading</b>	17-25	187	94.63	1.348	.263
	26-34	6	99.32		
	35-43	4	75.78		
	Total	197	89.91		

Source: Calculated from the primary data.

ANOVA test results show that the mean critical thinking scores of participants differ by age ( $F = 3.374$ ;  $p = .025 < .05$ ). According to Post Hoc analysis, there is a statistically significant difference in the mean critical thinking scores between 17-25 and 35-43 age groups, and 26-34 and 35-43 age groups. This indicates that critical thinking skills improve with age. However, the mean critical reading scores of participants do not differ by age ( $F= 1.348$ ;  $p=.263 > .05$ ), suggesting that the sample is homogeneous in terms of learning critical reading skills.

#### 4. Conclusion and Discussion

While the modern world has removed the burden of carrying knowledge from the shoulders of people to machines and virtual networks, it has brought with it the necessity of advancing our comprehension and thinking

skills to the highest level. Critical reading, which is one of the sub-dimensions of critical thinking, is also an important high-level thinking skill. For this reason, this experimental study was carried out

Since it was not appropriate to provide students with all critical reading steps at once, they were translated into questions for students to look for answers. These questions, 3 texts and 1 book were determined based on expert opinion. Critical Thinking Self-Evaluation Form and Critical Reading Scale were applied as pre-test before application (7 weeks) and post-test after 7 weeks. At the end of the application, a semi-structured interview form was used to elicit information on participants' views.

The result of the analysis of the findings showed that there was a statistically significant difference in critical thinking and reading scores in favor of the post-test, indicating that reading activities with critical reading questions yielded results similar to those reported by previous studies and that those activities had a positive effect on critical thinking and reading skills (Özensoy, 2011; Topçuoğlu and Sever, 2013). Participants are of the opinion that lessons involving reading activities with critical reading questions have a positive effect especially on their *awareness on approaching a subject systematically, seeing through the deep structure of a text, recognizing a problem and producing a solution, questioning information and breaking down prejudices.*

Participants experienced some difficulties during the lessons, which was not only observed by the researchers but also stated by the participants themselves. The subjects that they had difficulties were: *Understanding the questions and finding the correct answers, Evaluation, Text analysis, Determining the purpose of the author, Confirming the evidence he/she provides, and Time management.*

Similar to the results of previous studies, the mean critical thinking and reading scores of participants did not differ by gender, type of high school and department (Akar, 2007; Gulveren, 2007; Hamic, 2007; Zayif, 2008; Şen, 2009; Topçuoğlu and Sever, 2013; Özdemir, 2017). There are, however, some studies reporting that female students' critical thinking is better than that of male students (Yildirim, 2005; Gulveren, 2007; Zayif, 2008). The mean critical thinking scores of participants differed only by age. However, no qualitative data was available to explain this. Akar (2007); Kurim (2002) and Gulveren (2007) reported that age was a factor, however, younger participants were found to have higher critical thinking scores than older participants in this study.

In conclusion, the reading activities were found to be effective in developing critical thinking and reading skills. The lack of a statistically significant difference in post-test scores in terms of gender, department and high school is consistent with the results of many studies. The lack of a statistically significant difference in post-test critical reading scores between age groups is also consistent with the results of other studies while the statistically significant difference in post-test critical thinking scores between age groups in favor of older age groups is inconsistent with the results of other studies.

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