

The Relationship between Secondary School Students' Epistemological Beliefs and Critical Reading Levels

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ABSTRACT

This study attempts to depict the secondary school eighth grade students' epistemological beliefs and their critical reading in terms of several variables and to examine the relationship between them. Descriptive and relational survey models were used within the scope of the study. The population of the study consisted of the secondary school eighth grade students studying in Istanbul. The participants were selected by convenience sampling method. The study deployed personal information form, scientific epistemological belief and critical reading scales. Descriptive statistics, multivariate analysis of variance (MANOVA) and correlation analysis were used during data analysis. The study results concluded that the eighth grade students' epistemological beliefs and their critical reading levels were at a moderate level. While no significant difference was identified across the students' epistemological beliefs in terms of their gender, academic achievement, socio-economic level and book reading, a significant difference was noted across their critical reading levels in terms of gender, academic achievement and book reading, but that was not the case for their socio-economic level. The results of the research have useful implications for teachers. While teachers develop students' epistemological beliefs in the teaching environment, they will also develop their critical reading skills.

Key words: Epistemological Belief, Critical Reading, Pupils, Turkey

INTRODUCTION

Knowledge, education and thinking have been the cornerstones of life in each period that humanity has experienced since the early ages. Education and knowledge have turned into 'power' in today's society. Physical properties were considered as power in previous years, but today it is of great importance to enjoy the source of knowledge and to use it in an appropriate way. Correct use of knowledge is merely possible with education (İşlekeller, 2008, p. 1). Education is a concept that enables the systematic delivery of knowledge, and the environments that are boosted with knowledge are organized and constructed through education. Knowledge is also one of the most remarkable phenomena and/or factors that mobilize, support, provide continuity and mediate the learning process, which is among the elements of education (Yılmaz, 2009, p. 176). Thereby, the connection of the phenomenon of knowledge with learning and education is framed according to the environment and conditions. An individual substantiates his/her own unique and special learning action by acquiring knowledge. In this regard, the objective of education should be raising individuals who can think freely with different perspectives, who question, solve problems, and who are at peace with themselves and with their environment (Karadeniz, 2006,

p. 4). This close link between education and knowledge constitutes the basis for many research areas as education structures knowledge channels and knowledge prepares educational environments, which constitutes the essence of all educational activities.

Epistemology is the theory of knowledge structured on what knowledge is. The concepts of "knowing" and "knowledge", referring to the term epistemology, have been the limelight of philosophy for centuries and even the most significant feeding source. Besides, the concept of epistemology deals with the structuring and evaluation of knowledge and beliefs about how knowledge will be verified (Yılmaz, 2009, p. 182), as well as examining, researching and questioning the nature, source, boundaries, reliability, validity and ways of obtaining and transferring knowledge (Demir & Acar, 1997, p. 80).

The concept of knowledge is salient in numerous disciplines, one of which is educational sciences and in this context, new approaches are propounded with the needs of the 21st century. These needs and beliefs will continue to be addressed along with the characteristics of the changing generation. Epistemology is a dynamic field that can both affect the field of education and that can be affected by the educational process (Demir & Akınoğlu, 2010, p. 75), and epistemological beliefs are also far-reaching for lifelong learning with

their effect on the knowledge-acquisition process, especially in education (Hofer, 2001, p. 361).

Many researchers (Kitchener, 1983; Schoenfield, 1983) regard epistemological belief as a context in which learning takes place, and in their studies on epistemological beliefs, they stated that these beliefs could improve or limit the quality of learning outcomes, learners' motivational beliefs, learning strategies and the scope of knowledge. Accordingly, studies on beliefs about the nature of knowledge and knowing have dramatically increased in recent years. Initially, researchers focused on individuals' thoughts and beliefs about the source and nature of knowledge (Perry, 1968). In the 1990s, the focus of the subject expanded to include individuals' beliefs about learning, namely, the speed and ability to learn. Thus, the set of beliefs regarding the source of knowledge, the nature of knowledge, learning, learning speed and learning skill were labelled with a more inclusive term "epistemological beliefs system". A step further of this definition has spawned a broader field of study, "personal epistemology" and "personal learning" (Hofer, 2004; Kardash & Scholes, 1996; Schommer & Walker, 1997).

In the forthcoming years, some researchers developed and changed the ideas and concepts built by Perry (1968). For instance, Kitchener, King, Wood, and Davison (1989), having developed the "epistemological reflective judgment" model, noted that students go through a set of stages about how they validate knowledge, and each of these stages reflects their beliefs about how certain knowledge is and how knowledge is gained. Epistemological beliefs (those about the nature of knowledge and learning) have been linked to comprehension, meta-comprehension, and interpretation of information in various studies (Kitchener & King, 1981; Schommer, 1998; Songer & Linn, 1991). In 1990, 22 years after Perry, Schommer proposed that personal epistemology be reconceptualized as a system. Schommer-Aikins and Easter (2006, p. 412) clarified that epistemological belief includes beliefs about the nature of knowledge and learning, beliefs about the structure of knowledge, the stability of knowledge, the source of knowledge, the speed of learning and the ability to learn.

Epistemological beliefs may differ across students' interests (Paulsen & Wells, 1998), and they also affect students' motivation, cognition, and academic performance (Bruning et al., 1995; Hofer & Pintrich, 1997). Students with advanced epistemological beliefs know how to learn knowledge and which strategy to use, how to investigate the accuracy of information and how to use higher-level thinking skills (Geçgel et al., 2020, p. 480). In parallel with this study, Paulsen and Wells (1998), in their study, asserted the role of epistemological beliefs in learning.

The structure of the information age we live in has created the need for an individual to learn, question, grasp and search more, and to filter the readings more than usual (Çifçi, 2006, p. 55). In light of these explanations, critical reading has been a frequently emphasized concept during the education and instruction process. Therefore, critical reading is a detailed, analytical and careful reading act based upon a sense of curiosity. It is the efforts of individuals to find the

truth by comparing what they learn through reading with their own knowledge and experience in conjunction with the activities of setting forth new knowledge from these efforts (Çifçi, 2006, p. 57). Schommer (1994) noted that individuals with mature belief disposition read critically and believe that knowledge can change. Those who think vice versa believe everything easily and cannot look at knowledge with a critical eye, as they do not query knowledge. Epistemological belief studies play a significant role in students' learning, problem solving, critical analysis of situations and critical thinking. In order for "critical thinking", as one of these elements, to take place, schools should carry out activities that will raise awareness towards critical reading from an early age.

Critical reading method involves identifying the points the reader agrees or disagrees in the text. Moreover reading comprehension, the reader evaluates the text and develops recommendations for the text or identifies contradictions about the text. In addition, the definitions also gain importance in terms of the text's accuracy, truth, logic, consistency, etc. Arıcı (2012) considers critical reading as an ideal reading style. In this activity, which he considers an ideal way of reading, the brain absorbs, records and questions the text. In the critical reading method, the reader interacts with the author and the text. If critical thinking is a requirement for the development of intellectual abilities (higher-level thinking skills), which is the most essential requirement of the 21st century, then critical reading method is one of the most important outputs of this.

Critical reading requires dealing with a text in an in-depth and complex way. Today, teaching critical reading is adjourned based upon the literature. Because Piaget thought that children would not be able to perform some kind of reasoning until the age of 11-12. No time was spent on teaching critical reading since the focus was on basic reading skills. However, students need to think and read critically, especially starting from the age of 11 in order to ensure active participation in the world. Children, who are acquired multiple perspectives, begin to question the habits of the mind and take heart to think. In their hypotheses, Schommer-Aikins and Hutter (2002) commented that critical thinking could be linked to epistemological beliefs. In the past, critical thinking was delineated into "general thinking dispositions" and these thinking dispositions include: (i) to question and be curious, (ii) to pose problems and probe, (iii) to think broadly and flexibly, and to reason, (iv) to organize planning and thinking, and (v) to devote effort and time to think. As can be seen, these five dispositions give clues about how learning will take place and how knowledge will increase in this context. However, Hofer and Pintrich (1997) removed the dimensions related to learning from the model by modifying Schommer's epistemological belief model. Thus, they were interested in how the individual evaluated knowledge claims s/he encountered in daily life. Accordingly, the individual can see whether a piece of knowledge is true or not by observing or welcoming what lies in his mind as true; s/he will be able to search the evidence and expert opinions and evaluate the knowledge by using the logic filter.

Although “good reading” is fundamental for success in all courses in general, it is crucial to gain and maintain critical reading skills in the long run. The purpose of ordinary readings is to be knowledgeable with the basic meaning of the text. On the other, critical reading aims to make judgments about how the text will work. In this regard, it is indispensable to train students in analysis, interpretation, evaluation, critical awareness, critical thinking and critical language awareness in order to achieve standards and achievements in international exams such as PISA, PIRLS, TIMSS and national exams like LGS. To exemplify, “PISA includes texts in the format of continuous, discontinuous, mixed and plural texts whose types vary across description, narration, explanation, discussion, and instruction. Considering readers’ approaches to ‘accessing and remembering, gathering and interpreting information, reflecting and evaluating their own thoughts’, the measurement system provides the reader with personal, public, educational and professional texts” (PISA, 2015). The goal of PISA is to be able to use the knowledge and skills gained in basic courses when and where necessary, to analyze problems in various situations, to be able to reason, and to present satisfactory results (Batur et al., 2019, p. 599).

The eighth grade is the most important period of secondary school in terms of an exam and exam anxiety in Turkey. During this period, students are literally bombarded with information. The developing and changing world of knowledge introduces people to an invention or discovery at any time. With this digital age, the nature of knowledge is also changing. Hence, the issue of what to teach and how it should be taught affects education, and it will continue to do so. The assumptions that technology platforms almost de-institutionalize learning have suggested that the way knowledge is represented also changes. Therefore, it is of utmost significance to indicate how students acquire knowledge, how they learn to use it and how they evaluate and interpret. Considering the relationship between *critical reading* and *knowledge* about what, how much and how we will know, it is extrapolated that not every text is read for criticism, just as each text is correct and there is a reading action for the text. However, the student acts by questioning the assumptions, claims, meaning or value of the text in a critical reading. Thus, it is meaningful to identify the students’ epistemological beliefs, that is, their acceptance towards knowledge, in terms of education and training environments. It can be said that students’ epistemological beliefs show their view of the world. For this reason, researching students’ epistemological beliefs is an extremely important issue. Likewise, it has become an important issue for students to have critical reading skills. As a matter of fact, when the curricula in Turkey are examined, it is seen that there are activities aimed at improving students’ critical reading skills.

Current studies were carried out on the secondary school students’ critical reading levels in Turkey (Akar, 2007; Akyol, 2011; Dal, 2012; Orhan, 2007; Özensoy, 2011; Özönat, 2018; Potur, 2014; Sadioğlu & Bilgin, 2008; Ünal, 2006). The relevant literature also covers some studies conducted with primary school students (Akar et al., 2016; Altunsöz, 2016; Okur, 2019; Yalçıntaş, 2014; Yılmaz & Ertem, 2020);

however, the literature review was selective since the participants in this study were secondary school 8th grade students. As stated in the studies of Mut and Gelişli (2021, p. 96), the preference reason of the 8th grade students was that this grade embodies critical reading skill and the highest level of reading skills within the 2019 Turkish Curriculum. Besides, many of the similar studies used such variables as the education status of the parents, the number of books or magazines read, the duration of daily book reading, television and internet access time. Therefore, two variables apart from gender were identified as academic achievement and socio-economic level in this study. The researchers assumed that a high level of critical reading would increase academic achievement, and thus one of these variables was noted as ‘academic achievement’.

Along with the studies on the primary and secondary school students’ critical reading situations, the related literature includes those related to their epistemological beliefs (Aydın & Geçici, 2017; Balantekin, 2013; Boz et al., 2011; Duran & Mıhladı, 2014; Evcim, 2010; Gülsoy et al., 2015; Kaplan & Çavuş, 2016; Topçu, Yılmaz-Tüzün, 2009; Yesilyurt, 2013). However, considering the literature in Turkey, there is no such a study specifically published on the relationship between the secondary school students’ epistemological beliefs and their critical reading levels. This situation was considered an important gap in the literature. The present study is expected to contribute to the literature in this respect. In particular, the result concerning a significant relationship between students’ critical reading levels and their epistemological beliefs will be a feedback for teachers. Thus, teachers will also develop students’ epistemological beliefs with the activities they will design for critical reading in teaching environments. It may be wise to mention that the study results will be an important feedback for both teachers and curricula. Because activities and suggestions for developing critical reading skills will be included in the curriculum in the event of a relationship between critical reading and epistemological belief. It can be assumed that if activities prepared for developing critical reading skills are included in the curriculum, the students’ epistemological beliefs can also improve. In this respect, the current study is predicted to be an original study, and it will make a great contribution to the relevant literature.

This study is an attempt to identify the 8th grade secondary school students’ epistemological beliefs and their critical reading levels in terms of some variables and to examine their relationship. In service of this aim, answers to the following questions were sought:

1. What are the secondary school students’ epistemological beliefs and their critical reading levels?
2. Do secondary school students’ epistemological beliefs and their critical reading significantly differ across gender, academic achievement, socio-economic level, and book reading?
3. Is there a significant relationship between secondary school students’ epistemological beliefs and their critical reading?

METHOD

Research Design

The study utilized descriptive and correlation survey models based on research questions. Descriptive research is a type of research that is used to define an event addressed by the researcher or to make a real and complete description of the sample (Hocaoğlu & Akkaş-Baysal, 2020, p. 73). A cross-sectional survey model was used within the scope of the study. Fraenkel et al. (2014) outlined that data collection process takes a short time and the data are collected at once in this model. Özdemir (2014) stated that the characteristics of the investigated phenomenon are described as they exist in this survey model. This study was conducted with the use of this model since the data were collected in a short time and at once. In order to describe whether there is a significant difference between students' epistemological beliefs and critical reading levels in terms of gender, socio-economic level, academic achievement and reading status, a descriptive survey model was designed. The relational survey model was also used in the present study. Relational survey model is used to discover one or more characteristics of a group and at what level the characteristics differ (Özdemir & Dođruöz, 2020, p. 73). As this study aims to discover at what level the epistemological beliefs and critical reading levels of the secondary school eighth grade students differed together, the relational survey model was preferred.

Participants

The participants of the study consisted of 478 secondary school eighth grade students studying in Istanbul. Some of the data collection tools were not filled in a qualified way and 72 data collection tools were removed. The participants were selected by a convenience sampling method, which is one of the non-probabilistic sampling methods. This sampling method requires that participants who are close, easy to access and based on the voluntary principle be included in the study (Yıldırım, 2019, p. 75). In this study, the eighth grade students who were easily accessible by the researchers due to the Covid 19 outbreak participated in the study. In Turkey, face-to-face training was held with only eighth grade students for a short time in the fall semester of the 2020-2021 academic year. For this reason, only the eighth graders were included in the study. It is known that gender, socio-economic level, academic achievement and reading status have an effect on students' epistemological beliefs and critical reading skills. Therefore, these variables were examined in the study. Academic scoring in Turkey is made out of 100 points. For this reason, in this study, academic scoring was made according to the scoring in the Turkish education system. The socio-economic level variable was expressed as low, medium and high. Students were asked to choose one of these variables according to their own perceptions. Table 1 depicts demographic information regarding the participants.

As in Table 1, among the participants, 49% are female students and 51% are male students. Table 1 also displays that they have mostly a middle socio-economic level variable

Table 1. Demographic information regarding the participants

Gender	<i>f</i>	%
Female	198	49
Male	208	51
Socio-economic level		
Low	22	6
Middle	352	86
High	32	8
The Status of Book Reading		
Yes	223	55
No	183	45
Academic Achievement		
0-44	3	1
45-54	20	5
55-69	52	13
70-84	137	34
84-100	194	47
Total	406	100

(68%), they read books (55%) and their academic achievement is mostly between 85 and 100 (47%).

Data Collection Tools

The study employed three data collection tools. All data collection tools used in the research were in Turkish. These were:

1. *Personal information form*: Personal information form was used in the study. This form was prepared by considering the experts' views and the studies in the literature. Personal information form includes questions related to the participants' gender, academic achievement, socio-economic level and their reading status.
2. *Scientific epistemological belief scale*: This study employed the "Scientific Epistemological Belief Scale", the Turkish adaptation of which was conducted by Acat et al. (2010). Confirmatory factor analysis was used during scale adaptation process. The tool was performed with 212 secondary school eighth grade students. The confirmatory factor analysis results revealed that the scale consisted of 5 factors and 25 items. The authority and accuracy factor consists of 9 items, the knowledge generation process factor consists of 6 items, the source of information factor consists of 4 items, and the reasoning and variability of knowledge factors consist of 3 items. The factor loads of the scale varied between .49 and .76. The factors of the scale explained 52.77% of the total variance. The reliability coefficient of the scale was identified to be .82 (Acat et al., 2010). While the scale was adapted by the researchers, confirmatory factor analysis was also performed. As a result of the analysis, it was determined that the fit indices were sufficient (Acat et al., 2010).
3. *Critical reading scale*: The "Critical Reading Scale" developed by Söylemez (2015) was also used within the

scope of the study. Exploratory and confirmatory factor analyses were used during scale development process. The scale was developed by administering it to 790 secondary school students. The exploratory factor analysis results suggested that the scale consisted of 4 factors and 33 items. The subject factor of the critical reading scale consists of 4 items, the text factor consists of 11 items, and the reader and author factors consist of 4 items. The factor loads of the scale ranged between .51 and .89. The factors of the scale explained 61.66% of the total variance. The reliability coefficient of the scale was determined as .85. The confirmatory factor analysis also showed the appropriateness of fit indices (Söylemez, 2015).

Necessary permissions were obtained from the researchers who developed the scales. Internal consistency coefficients of both scales were examined. While the Cronbach Alpha internal consistency coefficient of the epistemological belief scale was found to be .72, that of the critical reading scale was .88. Based upon these results, it is evident that the data set of both scales are reliable (Seçer, 2015).

Data Collection

The data were collected between 2-13/11/2020 during the fall semester of the 2020-2021 academic year. Necessary permissions were obtained and the decision of the ethics committee (Date: 11.11.2020, No: 98/2) was made in this regard. Besides, consent of the participants was ensured. The data collection tool was administered after distributing voluntary participation document to the participants. The data were collected at time intervals that would not adversely affect the secondary school students' learning process. Secondary school students filled in the personal information form and scale items in approximately 25 minutes. While collecting the data, the students were told that they could withdraw from the research if they wanted to. Ethical principles were respected at all stages of the research.

Data Analysis

The data were analyzed through use of a statistical package program. Descriptive statistics, multivariate analysis of variance (MANOVA) and correlation analysis were used during data analysis. Some assumptions must be met in order to use MANOVA. The first of these is to certify the univariate and multivariate normality of the data. The Kolmogorov Smirnov test was used to determine whether the univariate normality assumption was achieved or not. The test results indicated that the epistemological belief scale ($K-S=.04$, $p>.05$) and critical reading scale ($K-S=.02$, $p>.05$) demonstrated normal distribution. Afterwards, the multivariate normality was examined. Pallant (2010) proposed that the Mahalanobis distance value be examined and the extreme values be removed before the analysis. In this vein, Mahalanobis distance value was examined and seven extreme values were confirmed. These extreme values were removed from the data set before analysis. In order to use MANOVA, the following assumptions must be met: There must be no multiple linear connection between dependent

variables (Field, 2013) and that the homogeneity of variance-covariance matrices must be ensured (Tabachnick & Fidell, 2015). Analysis results verified that these two assumptions were met. The effect sizes of the analyses were also calculated and presented in the relevant tables. Green and Salkind (2013) noted that the effect size value (η^2) is evaluated as .01 small, .06 moderate and .14 large. In order to perform correlation analysis, both variables must be continuous and show normal distribution (Karagöz, 2017; Sungur, 2014). These two basic assumptions were met within the study. Participation levels can be expressed as low 0.00 to 1.66, moderate 1.67 to 3.32, and high 3.33 to 5.00.

FINDINGS

This section includes findings related to secondary school eighth grade students' participation levels in terms of epistemological beliefs and critical reading scales, whether students' epistemological beliefs and their critical reading levels differed across gender, socio-economic level, book reading and academic achievement and whether there is a relationship between these two variables.

Table 2 displays the eighth graders' participation levels regarding epistemological beliefs and critical reading scales.

Upon analyzing Table 2, secondary school eighth grade students were identified to have a "moderate" participation level regarding epistemological beliefs ($M=2.99$) and critical reading scales ($M=3.28$).

Table 3 depicts one-factor MANOVA results related to whether secondary school eighth graders' epistemological beliefs and their critical reading levels significantly varied across their gender.

MANOVA was conducted to determine whether secondary school eighth graders' epistemological beliefs and critical reading levels significantly varied across their gender. Prior to the MANOVA analysis, preliminary analyzes were made to check the assumptions of linearity, normality, univariate and multivariate extreme values and multiple common linearity and no violations were observed. One of the basic assumptions of MANOVA analysis is the homogeneity of the diffusion matrix according to Box's M statistics. The analysis result suggested that this assumption was met ($F_{3, 2.80937}=1.671$, $p=.171$). A statistically significant difference was determined between the secondary school eighth graders' epistemological beliefs and their critical reading levels in terms of gender (Wilk's $\Lambda=.977$, $F_{(1, 393)}=4.65$, $p=.01$, partial eta square=.023). As is seen in Table 3, no significant difference was noted across the secondary school eighth grade students' epistemological beliefs in terms of their gender ($F_{1, 391}=.93$, $p>.05$), a significant difference was identified across their critical reading levels in favor of female students ($F_{1, 391}=4.22$, $p<.05$). Also, a low-level interaction was found between gender and epistemological beliefs along with critical reading levels (Green & Salkind, 2013).

One-factor MANOVA results regarding whether secondary school eighth graders' epistemological beliefs and critical reading levels significantly varied across their academic achievement were demonstrated in Table 4.

Table 2. The eighth graders' participation levels regarding epistemological beliefs and critical reading scales

Variables	n	M	SD	Max	Min	Level
Epistemological Belief	393	2.99	0.42	4.21	1.88	Moderate
Critical Reading	393	3.28	0.53	4.69	1.75	Moderate

Table 3. One-factor MANOVA results concerning gender variable

Dependent Variables	Gender	n	M	SD	df	F	p	η^2
Epistemological Belief	Female	194	2.97	0.42	1-391	0.93	0.33	0.00
	Male	199	3.01	0.43				
Critical Reading	Female	194	3.34	0.55	1-391	4.22	0.04*	0.01
	Male	199	3.22	0.50				

*p<.05

Table 4. One-factor MANOVA results concerning academic achievement variable

Dependent Variable	Academic Achievement	n	M	SD	df	F	p	η^2	Scheffe
Epistemological Belief	0-44 (A)	3	2.62	0.14	4-388	1.03	0.390	0.01	-
	45-54 (B)	19	3.02	0.48					
	55-69 (C)	50	2.92	0.46					
	70-84 (D)	134	2.99	0.43					
	85-100 (E)	187	3.01	0.40					
Critical Reading	0-44 (A)	3	2.77	0.41	4-388	10.30	0.000*	0.09	E>B
	45-54 (B)	19	3.01	0.36					E>C
	55-69 (C)	50	3.04	0.52					E>D
	70-84 (D)	134	3.19	0.51					
	85-100 (E)	187	3.44	0.52					

*p<.05

MANOVA was used to confirm whether secondary school eighth graders' epistemological beliefs and critical reading levels significantly differed across their academic achievement. Prior to the MANOVA analysis, preliminary analyzes were made to check the assumptions of linearity, normality, univariate and multivariate extreme values and multiple common linearity and no violations were observed. One of the basic assumptions of MANOVA analysis is the homogeneity of the diffusion matrix according to Box's M statistics. The analysis result verified that this assumption was met ($F_{12, 450.769} = 1.625, p = .082$). A statistically significant difference was recorded between the secondary school eighth graders' epistemological beliefs and their critical reading levels in terms of academic achievement (Wilk's $\Lambda = .889, F_{(4, 388)} = 5.85, p = .00$, partial eta square = .057). According to Table 4, no significant difference was noted across the secondary school eighth grade students' epistemological beliefs in terms of their academic achievement ($F_{4-388} = 1.03, p > .05$), while a significant difference was identified across their critical reading levels in favor of those having between 85-100 academic achievement ($F_{4-388} = 10.30, p < .05$). Besides, a low level of interaction was determined between academic achievement and epistemological beliefs, but a medium level interaction with critical reading levels.

Table 5 shows one-factor MANOVA results related to whether secondary school eighth graders' epistemological

beliefs and critical reading levels significantly varied across their socio-economic levels.

MANOVA was used to identify if secondary school eighth graders' epistemological beliefs and critical reading levels significantly differed across their socio-economic level. Prior to the MANOVA analysis, preliminary analyzes were made to check the assumptions of linearity, normality, univariate and multivariate extreme values and multiple common linearity and no violations were observed. One of the basic assumptions of MANOVA analysis is the homogeneity of the diffusion matrix according to Box's M statistics. The results pinpointed that this assumption was met ($F_{6, 27527.559} = 1.737, p = .108$). MANOVA analysis results revealed a statistically significant difference between the secondary school eighth graders' epistemological beliefs and their critical reading levels in terms of socio-economic level (Wilk's $\Lambda = .968, F_{(2, 393)} = 3.138, p = .06$, partial eta square = .01). As observed in Table 5, the secondary school eighth grade students' epistemological beliefs ($F_{2, 390} = 1.23, p > .05$) and critical reading levels ($F_{2, 390} = 2.08, p > .05$) were free from any significant difference in terms of their socio-economic level. Moreover, a low level of interaction was found between socio-economic level and epistemological beliefs as well as critical reading levels. One-factor MANOVA results regarding whether secondary school eighth graders' epistemological beliefs and their critical reading levels significantly varied across book reading were shown in Table 5.

Table 5. One-factor MANOVA results concerning socio-economic level variable

Dependent Variable	Socio-Economic Level	n	M	SD	df	F	p	η^2	Scheffe
Epistemological Belief	Low	21	3.12	0.54	2-390	1.23	0.29	0.00	-
	Middle	341	2.99	0.40					
	High	31	2.93	0.53					
Critical Reading	Low	21	3.05	0.62	2-390	2.08	0.12	0.01	-
	Middle	341	3.29	0.51					
	High	31	3.32	0.66					

*p<.05

Table 6. One-factor MANOVA results concerning book reading variable

Dependent Variables	Book Reading	n	M	SD	df	F	p	η^2
Epistemological Belief	Yes	216	3.00	0.40	1-391	0.08	0.770	0.00
	No	177	2.99	0.45				
Critical Reading	Yes	216	3.39	0.52	1-391	22.40	0.000*	0.06
	No	177	3.14	0.51				

*p<.05

MANOVA was used to identify whether secondary school eighth graders' epistemological beliefs and their critical reading levels significantly differed across book reading variable. Prior to the MANOVA analysis, preliminary analyzes were made to check the assumptions of linearity, normality, univariate and multivariate extreme values and multiple common linearity and no violations were observed. One of the basic assumptions of MANOVA analysis is the homogeneity of the diffusion matrix according to Box's M statistics. The analysis results indicated that this assumption was not met ($F_{3, 1.02738} = 4.079, p = .007$). Akbulut (2011) stated that if this assumption is violated, the Pillai's Trace test should be taken into account instead of the Wilk's Lamda test. Considering this recommendation, the value of Pillai's Trace test was analyzed in this study. As a result of MANOVA, a statistically significant difference was found between the secondary school eighth graders' epistemological beliefs and their critical reading levels in terms of book reading variable (Pillai's Trace=.067, $F_{(1, 393)} = 13.91, p = .00$, partial eta square=.067). According to Table 6, no significant difference was found between the secondary school eighth grade students' epistemological beliefs in terms of reading book variable ($F_{1, 391} = .08, p > .05$), while a significant difference was noted between the critical reading levels in favor of those who read books ($F_{1, 393} = 22.40, p < .05$). In addition, a low level of interaction was determined between book reading and epistemological beliefs, and a moderate level interaction with critical reading levels.

The relationship between the secondary school eighth graders' epistemological beliefs and their critical reading was examined and presented in Table 7.

The correlation analysis result showed a moderate level, positive and significant relationship ($r = .481, p < .01$) between the students' epistemological beliefs and their critical reading (Tuna, 2016). This paves the way for the fact that secondary school students' critical reading levels will increase if their epistemological beliefs increase.

Table 7. Correlation analysis results

Variables	Epistemological Belief	Critical Reading
Epistemological Belief	1	-
Critical Reading	0.481*	1

N=399, *p<0.01

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

This study aims to identify the relationship between secondary school eighth grade students' epistemological beliefs and their critical reading, and to reveal whether their epistemological beliefs and critical reading levels significantly differed across some variables.

The results suggested that the eighth grade students' epistemological beliefs and their critical reading were at a moderate level, which is a significant result of our study. The fact that secondary school eighth grade students' critical reading levels and their epistemological beliefs were not found to be at a high level is considered as a negative outcome by researchers. Especially in the 21st century, the main objective of education is to raise individuals who do not accept knowledge as it is, who question the knowledge obtained, who examine it with a critical eye, and who confirm the accuracy of information with different sources. Based on this result of the study, the participants may be said to be inadequate in questioning the information and analyzing it critically.

The study results showed a significant difference between the critical reading levels of the 8th grade students in terms of *gender* in favor of female students, but no such a difference was identified across their epistemological beliefs in terms of *gender*. This means that female students read the texts much more critically. This can also be explained by the characteristics of the Turkish social structure. To illustrate, girls spend more time at home and prefer to read books compared to boys, which may be the reason for this difference.

Some studies on critical reading concluded a significant difference in favor of female students (Akar et al., 2016; Akyol, 2011; Çam, 2006; Özmutlu et al., 2014; Yalınkılıç & Çelik, 2011). There are various reasons why female students have higher critical reading skills, which require in-depth examination rather than superficial learning. In their study, Akar et al., (2016, p. 12) found that female students read more books than male students did. Likewise, Demir and Kan (2017) also noted a significant difference in favor of female students. Özdemir (2017, p. 48), on the other hand, indicated that there has been no difference in terms of gender in some studies in recent years, and that the curricula implemented since the 2005 academic year may have led to this result. He even favored this situation with the view that girls read more books than boys did.

The fact that there was no significant difference between the epistemological beliefs of the students in terms of gender may be due to the fact that gender is not the one that results in a significant difference across epistemological beliefs. Because an epistemological belief is a concept that appears to be gender-neutral and shaped by the characteristics of the student's family, home environment, and close environment in pre-school education process. Therefore, studies (Hofer & Pintrich, 1997) do not refer to gender related belief, but of personal epistemological belief. Similar studies are available in the literature that support this result (Gülsoy et al., 2015; Schommer, 1993). The related literature also includes studies that were in contrary to this result (Balantekin, 2013; Cano, 2005; Işık, 2012; Trautwein & Lüdtke, 2007). In some of the studies, epistemological beliefs were found to significantly differ across gender in favor of female students (Balantekin, 2013; Işık, 2012), while a significant difference was obtained in favor of male students (Meral & Çolak, 2009). This may be due to the fact that different scales were used in the studies that were conducted in different studies.

Within the scope of the study, a statistically significant difference was found in terms of *academic achievement* as a result of the common interaction between the secondary school students' epistemological beliefs and their critical reading levels. No significant difference was noted across the secondary school eighth grade students' epistemological beliefs in terms of their academic achievement, while a significant difference was identified across their critical reading levels in favor of those having between 85-100 academic achievement. Based upon this result, it can be interpreted that academic achievement is not an effective variable on epistemological beliefs, and it can also be said that academic achievement cannot be the only or indispensable criterion in the activities of the student regarding his/her knowledge. Many studies were carried out showing that epistemological beliefs are effective in learning and hence a relationship with academic achievement (Hofer, 2000; Ricco et al., 2010; Sadiç & Çam, 2015; Uysal, 2010). Although the literature involves studies on epistemological beliefs, a limited number of studies were conducted to investigate its relationship with academic achievement (Özbay, 2016, p. 29). In a study conducted with the sixth graders, Kızılgüneş (2007) outlined that epistemological beliefs had an indirect effect

on academic achievement. Tüken (2010) signified that the 8th grade students with high academic achievements were more developed in all dimensions of epistemological beliefs. Uysal (2010), in his thesis on 6th, 7th and 8th grades, concluded that the students' epistemological beliefs directly affect their academic achievement. Similarly, Evcim et al. (2011) and Yeşilyurt (2013) put forward a significant relationship between secondary school students' epistemological beliefs and their academic achievements.

The international literature also covers some studies depicting that the students' epistemological beliefs having develop over time had a positive and direct effect on academic achievement (Conley et al., 2004). For instance, Schommer and Dunnell (1997) also conducted a study with gifted students and examined the relationship between their epistemological beliefs and academic achievement. As a result of their parallel studies with high school students, Schommer et al. (1997) found that students' learning improved as their grade level progressed, their academic achievement increased and their epistemological beliefs also improved. In his two-dimensional study with the 5th grade students, Elder (1999 as cited in Özbay, 2016) found that students had more developed epistemological views as their academic achievement increased. Schreiber and Shinn (2003) argued that students' epistemological beliefs affect their academic achievement and learning processes. Conley et al. (2004) identified a high correlation between academic achievement and epistemological beliefs. Ricco et al. (2010), in their studies conducted with the sixth, seventh and eighth graders, revealed significant relationships between the accuracy of knowledge, the necessity of verifying the knowledge and academic performance goals.

This might indicate that academic achievement is a variable that makes a significant difference on the critical reading level. Students with high academic achievement can examine events from different perspectives, analyze, identify relationships, infer, question knowledge, and organize information. In fact, in the study conducted by Akbıyık and Seferoğlu (2006), a significant difference between critical thinking dispositions in favor of those with high academic achievement is parallel to this interpretation. Karabıyık (2013) noted that the higher the critical reading level is, the higher the academic achievement gets. Özensoy (2011) also reported in his experimental study that the students' academic success increased in social studies course based upon critical reading. Çam (2006) also revealed a relationship between the 5th grade students' critical reading skills and their academic achievement. Emiroğlu (2014), Karabey (2013) and Özdemir (2005) also stated that the academic success of the students increased after the critical reading practices with the experimental groups. Likewise, similar results emerged in the studies conducted by Aydoğdu (2020), Demir and Kan (2017) and Ip et al. (2000). These results support that of this study.

The study results unveiled that there was no significant difference between the eighth grade students' epistemological beliefs their critical reading levels in terms of socio-economic level. However, the student's contact with

knowledge will decrease as the education or economic level of the family decreases in our society. It has become easier to reach information in the new world order. Additionally, an individual takes someone from either his/her family or immediate surroundings as a role model. With the advancements in technology, it has become possible to access books, resources and therefore information in every environment. For this reason, it is much less likely that the socio-economic situation will have an adverse effect on knowledge and learning in current studies. Correspondingly, Akar et al. (2016, p. 12) concluded that the socio-economic situation did not affect the students' critical reading skills. Akyol (2011) and Güven and Çam Aktaş (2013) affirmed that the critical reading skills of the students who had positive conditions in terms of socio-economic status were more sufficient. Some studies depicted that the income level of the upper age groups had an insignificant effect on students' critical reading skills, and as the age gets younger, the socio-economic status of the family was announced to have a noteworthy effect on critical reading (Topçu, 2007). Unlike these results, Demir and Kan (2017, p. 674), Güven and Çam Aktaş (2013) put forward that the students in the schools located within the socio-economically better region had a higher level of critical reading skills than those in the schools within the socioeconomically weaker region. This suggests that students who learn at schools located in a region with higher socio-economic status may have higher reading awareness and reading frequency. Özdemir (2017) caught the main points in his study and, evaluated the relationship between the socio-economic situation and critical reading, and thus indicating that the only support that parents can provide for children is not to buy books for them. In the same study, the researcher also pinpointed that students can develop a positive attitude towards reading through discussing and making evaluations about the book and in this manner children can gain critical reading skills. For those whose curiosity is promoted at a young age and who can find some answers to their questions, it may be easier to construct knowledge, and to develop their critical thinking skills. This skill will also contribute to the development of critical reading skills later on. No discussion could be made on this issue, since there were no research results related to whether the students' epistemological beliefs differed across their socio-economic level.

This study also dealt with the book reading status of the students as a variable. An analysis was conducted to suggest whether the eighth grade students' epistemological beliefs and their critical reading levels significantly varied across book reading status. While there was no significant difference between the students' epistemological beliefs in terms of book reading variable, a significant difference was identified across their critical reading levels in terms of book reading, which was in favor of those who read books. Based upon this result, it may be wise to mention that reading books did not have an effect on the students' epistemological beliefs, but on their critical reading. Critical reading is grounded on the ability to think critically and to observe. An individual must be a good observer to be able to analyze the environment with a critical eye. Observation is not only

done by looking around, but books are also tools for observation. Under the strength of these findings, students who read books can be said to have a high level of critical reading. The study conducted by Demir and Kan (2017) brought forth that students, who spend more time on reading books on a weekly basis and those who read more books throughout the year, get higher scores. Besides, a significant difference was found in favor of female students in the same study. Reading books is as significant as Turkish lessons during the critical reading skills development process. Thus, thinking skills and, in particular, critical thinking skills will develop. The above-mentioned study of Demir and Kan (2017, p. 674) also suggested that the students had a moderately critical reading level, which may be due to the inadequacy of critical reading learning outcomes in schools and the students' inability to gain the habit of reading books. They even stated that students' critical reading skills increased as the time spent on reading books and the number of books increased on a weekly and yearly basis. Therefore, reading frequency and reading habit are crucial in critical reading skill. Özmutlu et al. (2014, p. 1131) found a significant difference between the critical reading level and the weekly book reading number, namely, the level of critical reading increased as the number of book reading increased.

Orhan (2007) asserted that the students' comprehension and analysis skills increased as the reading habit increased. Ogurlu (2014) concluded that as the number of pages read increased students' critical reading scores were significantly higher. In this sense, he also emphasized how important it is for teachers to encourage students for read books and to organize discussing meeting the books read at the point of being critical readers. Kiran (2019) noted that an increase in the number of storybooks read by 4th grade students positively affected their critical thinking; furthermore, Basmaz (2017) stated that the number of books in a house affects students' critical thinking. Koçak et al. (2015) also stressed in their study that students who enjoyed reading books had higher levels of critical thinking. However, that is not the case in Cevher's (2008) study, referring that there was no relationship between critical reading and book reading.

Taking a step further, this study examined the relationship between the secondary school eighth grade students' epistemological beliefs and their critical reading levels. Hereunder, a moderate level, positive and significant relationship was determined between the 8th grade students' epistemological beliefs and their critical reading levels. This may indicate a relationship between the students' epistemological beliefs and their critical reading levels. Students' critical reading skills will also increase as their epistemological beliefs increase, which is an important result that cannot be overlooked. Because this will shed light onto the regulation of the teaching-learning process especially for teachers. Providing that teachers practice activities for improving students' critical reading skills in the teaching-learning process, they will also contribute to their questioning knowledge and nonacceptance of knowledge as it is (Aybek & Aslan, 2018). Moreover, critical thinking is related to the concept of epistemological belief and hence affecting the individual's

approach toward knowledge units and learning (Ennis, 1991 as cited in Kandemir & Eğmir, 2020, p. 180). Self-control, logic, metacognition and reflective thinking are also active in critical thinking. Therefore, knowledge is tested and evaluated at this stage. In a similar vein, critical reading is a process that includes various mental activities and that is closely related to the individual's attitude towards knowledge (Kandemir & Eğmir, 2020, p. 180).

Based on the aforementioned results, various recommendations have been provided:

1. The students' epistemological beliefs and their critical reading levels were determined to be at a moderate level. Studies on the reasons why students' epistemological beliefs and their critical thinking levels are not at a high level may contribute to the relevant literature.
2. The students' reading status through their critical reading levels was determined to be significantly effective. Based on this result, students' critical reading skills can be improved by encouraging them to read a novel, story, magazine, etc.
3. The study findings suggested a positive and significant relationship between the students' critical reading levels and their epistemological beliefs. Accordingly, teachers are recommended to apply activities to develop students' critical reading skills in their lessons. For this, learner-centered activities can be organized. Students' epistemological beliefs will also develop in this regard.
4. It is recommended to conduct studies that examine the secondary school students' epistemological beliefs and their critical reading levels in terms of different variables such as parents' educational status and their occupation.

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