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Ortaokul Öğrencilerinin Eleştirel Düşünme Eğilimlerinin İncelenmesi

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***Öz*:** Toplumların inşasında önemli bir yeri olan öğrencilerin eleştirel düşünme eğilimlerinin belirlenmesinin ve eğilimleri üzerinde etkili olan ya da farklılık oluşturan faktörlerin ortaya konulması gerek günümüz gerekse gelecek adına önemlidir. Bu bağlamda bu araştırmanın amacını ortaokul öğrencilerinin eleştirel düşünme eğilimlerini belirlemek ve bu eğilimlerini cinsiyet, yaş, akademik başarı, anne ve baba eğitimi, sahip olunan ve okunan kitap sayısı değişkenlerine göre incelemek oluşturmaktadır. Araştırma nicel araştırma yöntemlerinden biri olan tarama desenine göre tasarlanmış olup araştırmanın örneklemini 2024-2025 eğitim öğretim yılı güz döneminde ortaokul kademesinde öğrenim gören 529 çocuk oluşturmaktadır. Araştırmanın verileri toplanırken "Kişisel Bilgi Formu" ve "UF/EMI Eleştirel Düşünme Eğilim Ölçeği" kullanılmıştır. Araştırma verileri "SPSS 21.00 istatistik programı" ile analiz edilmiştir. Veriler normal dağılım gösterdiği için istatistiksel analizlerde parametrik testler kullanılmıştır. Araştırma sonucunda ortaokul öğrencilerinin eleştirel düşünme eğilimlerinin orta düzeyde olduğu belirlenmiştir. Ayrıca öğrencilerin eleştirel düşünme eğilimlerinin cinsiyet, yaş, akademik başarı, baba eğitimi, sahip olunan ve okunan kitap sayısı değişkenlerine göre istatistiksel olarak anlamlı bir farklılık gösterdiği ancak anne eğitiminin anlamlı bir farklılığa yol açmadığı belirlenmiştir.
Anahtar Kelimeler: Eleştirel düşünme, Eğilim, Ortaokul öğrencileri.

An Investigation of Secondary School Learners' Critical Thinking Inclination

***Abstract*:** It is important to determine the critical thinking inclination of learners, who have an important place in the construction of societies, and to reveal the factors that are effective on their inclinations or that make a difference on behalf of both the present and the future. In this context, the aim of this study is to determine the critical thinking inclinations of secondary school learners and to examine these inclinations according to the variables of gender, age, academic achievement, mother and father education, number of books owned and read. The research was designed according to the survey design, which is one of the quantitative research methods, and the sample of the research consists of 529 children studying at the middle school level in the fall semester of the 2024-2025 academic year. "Personal Information Form" and "UF/EMI Critical Thinking Disposition Scale" were used to collect the data. The research data were analysed with "SPSS 21.00 statistical program". Since the data were normally distributed, parametric tests were used in statistical analysis. As a result of the research, it was determined that the critical thinking inclinations of middle school learners were at a medium level. In addition, it was determined that the critical thinking inclinations of the learners showed a statistically significant difference according to the variables of gender, age, academic achievement, father's education, number of books owned and read, but mother's education did not cause a significant difference.
Keywords: Critical thinking, Inclination, Secondary school learners.

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Introduction

One of the abilities that individuals should have today is critical thinking. Indeed, "critical thinking plays a critical role in the development, progress and change of societies" (Uyar, 2023, p. 63). Critical thinking is a mental process that is very effective in making sense of events by being aware of one's own cognitive processes and intentionally applying what is learned by taking into account the thought processes of other individuals (Cüceloğlu, 1995). Ennis (2011) defines critical thinking as a method of thinking that allows the individual to decide what to believe or what to choose wisely in the most accurate way, while Lipman (2003) defines it as a way of thinking that is aware of evidence and conclusions. In general terms, "critical thinking requires first being aware of a situation among various stimuli and messages. It involves a process that aims to make decisions in a rational, logical, courageous and prudent manner by clearly articulating the issue or problem and thinking systematically in the context of various alternatives. Critical thinking is a questioning guide" (Bakır & Eğmir, 2022, p. 25). In brief, critical thinking is "a type of thinking that includes mental processes and activities such as identification, comprehension, analysis, evaluation, synthesis and decision-making" (Mete, 2021, p. 493).

Critical thinking is also expressed as reflective and logical thinking that enables individuals to decide how to act in various situations (Ennis, 1987). Critical thinking "has an important place in the change, development and progress of free societies because it is through critical thinking that individuals who make up the society understand and interpret life, solve the problems they face and make decisions" (Mete, 2021, p. 492). Critical thinking is a way of thinking that enables one to form predictions about the causes and consequences of an event or phenomenon by questioning and basing it on evidence rather than accepting the existing as it is. Although this way of thinking is more frequently mentioned with the new century, its history goes back a long way (Çolak, Türkkaş-Anasız, Yorulmaz & Duman, 2019). The intellectual origin of critical thinking can be traced back to Socrates' questioning teaching method. Actually, Socrates emphasized that before accepting any idea, the individual should first ask in-depth questions about that question. This is the basis of critical thinking (Paul, Elder & Bartell, 1997).

It can be stated that critical thinking ability involves awareness of one's own knowledge repertoire and reasoning processes. A critical thinking individual should show the ability to keep his/her cognitive processes under control during the questioning process and to control these processes with a continuous reflective perspective (Yurdakul & Demirel, 2011). Critical thinking is used to analyze a problem, determine a better solution and the limits of existing solutions (Bakır & Eğmir, 2022). In critical thinking, any thought or information is examined in line with the evidence and the predicted results are revealed. In this respect, the basic assumption of critical thinking is that it focuses on finding meaningful and rational answers based on evidence (Watson & Glaser, 1964). Undoubtedly, critical thinking plays an important role in the formation of free societies, in other words, in the change, progress, and development of these societies. Indeed, critical thinking comes into play in individuals' understanding and interpretation of life, solving the problems they encounter, and in their decision-making processes, which form the foundation of societies. It can be claimed that individuals who research, question, think creatively and critically, make decisions and solve the problems they face have 21st century skills. Actually, critical thinking, which has an important place in reaching the right information and using it, is among the 21st century skills (Mete, 2021). The tendency to think critically is a tendency that provides a mental discipline, improves the quality of life and at the same time prepares the ground for a democratic society (Ocak, Eymir & Ocak, 2016, p. 67). In this context, it can be claimed that critical thinking encompasses a large number of mental or intellectual abilities such as proving the truth, reality and reliability of an information, idea or hypothesis, determining different criteria in matters to be decided, trying to

find evidence of the events around him/her, waiting for people's claims and thoughts to be proven on certain grounds before accepting them, being honest, being open, being consistent and truthful (Özdemir, 2005).

Individuals with critical thinking skills are individuals who can use effective communication language, measure the reliability of sources, ask logical questions, distinguish inconsistent judgments, consider fcognitive errors and prejudices, and have metacognitive awareness (Kökdemir, 2003). Individuals with critical thinking skills value the ideas they believe in rather than popular ideas. They use discussions to clarify problems and evaluate the ideas that emerge based on them. They distinguish between thoughts, prejudices and assumptions that may cloud their minds in order to reach enlightened thoughts and reach genuine conclusions through a planned reasoning system using reliable information. They review thinking strategies and problem-solving tools and apply the most appropriate method to the current situation (Bakır & Eğmir, 2022). The earlier an individual learns and develops this skill, the more prepared he/she will be for life. There are many factors that affect the learning and development of critical thinking abilities. These can be related to the individual himself/herself, as well as his/her family, environment and educational life (Basmaz, 2017).

When the literature is examined, it was observed that many studies on critical thinking have been conducted especially in recent years. In this context, critical thinking has been studied at primary/secondary school level (Altan, 2020; Amanvermez-İncirkuş, 2021; Bakır & Eğmir, 2022; Bayındır, 2015; Bozpolat & Güçcük-Kurga, 2021; Demir, 2006; Elçi et al, 2020; Görücü, 2014; Kandemir & Eğmir, 2020; Karabacak, 2011; Kıran, 2019; Köksal & Söğmen, 2018; Küçükbatman & Kılıç, 2018; Mete, 2021; Oflas, 2009; Saysal-Araz, 2013; Yavuz, 2019; Yıldız, 2011); high school/secondary education level (Akbıyık & Seferoğlu, 2006; Ay & Akgöl, 2008; Ay, 2005; Başbay, 2013; Boldaz, 2022; Demir & Aybek, 2014) and university level (Beşoluk & Önder, 2010; Çetinkaya, 2011; Çolak, Türkkaş-Anasız, Yorulmaz & Duman, 2019; Emir, 2012; Hastaoğlu, Mollaoğlu, Başer & Mollaoğlu, 2018; Kanbay, Işık & Aslan, 2011; Kandemir, 2017; Kartal, 2012; Ocak, Eymir & Ocak, 2016; Oğuz & Sarıçam, 2016; Özgün, 2019; Pekdoğan & Bayar, 2016; Tümkaya, 2011; Yıldırım & Şensoy, 2017; Yüksel & Alcı, 2012; Yüksel, Uzun & Dost, 2013; Zayif, 2008) learners were taken as a sample and their critical thinking inclinations/ skills were examined.

Critical thinking, which has an important function in individuals' future life successes and social participation, is also a skill that develops people's problem-solving abilities. The middle school period, during which children continue their education, coincides with a time of intense and complex emotional, cognitive, and mental development. Therefore, revealing the inclinations es of middle school learners who continue their education in critical thinking, and understanding and developing their emotional, cognitive, and mental skills, is a critical task (Uyar, 2023). Actually, it is very important to determine the critical thinking inclinations of learners attending secondary school and to reveal the factors that may be effective on these inclinations. As Uyar (2023) also stated, it is essential to conduct relevant research to understand how learners use their critical thinking abilities and evaluate information. In addition, important data can be obtained through research that samples secondary school children to understand how learners' critical thinking abilities can be integrated into curricula and educational policies. Moreover, such studies can also serve to develop and strengthen the critical thinking abilities of middle school learners, providing support for their future success through the introduction of various strategies.

As mentioned above, there are various studies in the literature in which middle school learners are taken as a sample and examined. For example, Demir (2006) examined the critical thinking levels of primary school fourth and fifth grade learners in the social studies course in the context of various variables. Oflas (2009) examined the critical thinking ability levels of

primary school learners, Bayındır (2015) examined the critical thinking inclinations of learners at the second level of primary education, while Köksal and Söğmen (2018) examined the communication skills and critical thinking of secondary school learners. In similar research, Elçi et al. (2020) examined the critical thinking inclinations of middle school learners. Yıldız (2011) examined the critical thinking levels of sixth grade primary school learners in science and technology course in the context of various variables; Saysal-Araz (2013) examined the relationship between technology and science literacy levels and critical thinking of fourth and fifth grade primary school learners. Küçükbatman and Kılıç (2018) examined the relationship between fifth-grade learners' critical thinking inclinations and values and the extent to which critical thinking inclinations predict the values of learners in the context of various variables. Altan (2020) examined the critical thinking abilities of middle school children in the context of some demographic characteristics. Kandemir and Eğmir (2020) examined the relationship between academic self-efficacy and critical thinking abilities of secondary school learners in the context of various variables. Mete (2021) determined the critical thinking levels of eighth grade middle school learners and examined these abilities in the context of gender, family structure, number of siblings, mother and father education level, reading habits, sports / art education and academic achievement in Turkish course. In a similar study, Amanvermez-İncirkuş (2021) evaluated the critical thinking inclinations of middle school learners in terms of sub-dimensions and total scores and whether they varied according to Turkish course academic achievement, gender and class variables. Bozpolat and Güçcük-Kurga (2021) examined the critical thinking inclinations of eighth grade learners in terms of some variables. Bakır and Eğmir (2022) examined the relationship between metacognitive awareness and critical thinking inclinations of middle school learners. Uyar (2023) also examined the critical thinking inclinations of middle school learners. In this study, the critical thinking abilities of middle school children were examined in terms of more variables compared to other studies in the literature. Therefore, it is thought that the results of this research are important in terms of providing the opportunity to compare the results of the studies in the literature in similar and different aspects and providing up-to-date data. Based on these, the problem statement of this research was formed as; "What is the level of critical thinking inclinations of secondary school learners and does gender, age, academic achievement, mother and father education level, number of books owned and read make a statistically significant difference on these inclinations?"

Method

The survey design was used in this research to determine the critical thinking inclinations of secondary school learners and to reveal significant differences according to some variables. Karasar (2011) explains the survey design as "all kinds of screening arrangements made on the whole universe or a group, sample or sample from it in order to reach a general judgment about this universe in a universe consisting of more than one number of elements" (p.79). Büyüköztürk et al. (2016) explained this design, which is one of the quantitative research designs, as research studies in which the opinions, interests, abilities, attitudes, attitudes, concerns, etc. of individuals towards an event or subject are determined and which are carried out on relatively larger samples compared to other studies.

Universe / Sample

While the universe of study consists of all secondary school students in Kilis province, the sample group consists of 529 secondary school students studying in a state secondary school in the central district of Kilis province in the 2024-2025 academic year. The sample of the study was determined using the simple random sampling method. In this method, each sampling unit is given an equal probability of being selected, which means that each sample from the sample space is selected with equal probability (Burak, 2022; Çıngı, 1994). Of the middle school

learners aged between 11-14 years, 287 (54.3%) were girls and 242 (45.7%) were boys. Additional information about the research group can be found in Table 1.

Table 1
Descriptive Information of the Research Group

Gender	n	%
Female	287	54.3
Male	242	45.7
Age	n	%
11 years and under	109	20.6
12 years	192	36.3
13 years and over	228	43.1
Mother's education	n	%
Primary school graduate	133	25.1
Secondary school graduate	158	29.9
High school graduate	150	28.4
Bachelor's/Postgraduate degree	88	16.6
Father's education	n	%
Primary school graduate	105	19.8
Secondary school graduate	115	21.7
High school graduate	136	25.7
Bachelor's/Postgraduate degree	173	32.7

Data Collection

The data collection tools of the research consisted of the "Personal Information Form" created by the researchers and the "UF/EMI Critical Thinking Disposition Scale" adapted into Turkish by Ertaş-Kılıç and Şen (2014).

Personal information form

The research group's "gender, age, academic achievement, parental and maternal education, number of books read and owned per month" were collected through the "Personal Information Form" created by the researcher.

Critical Thinking Disposition Scale

The "UF/EMI Critical Thinking Disposition Scale" used in this research was developed by researchers at the University of Florida and adapted into Turkish by Ertaş-Kılıç and Şen (2014). As a result of the "confirmatory factor analysis" (CFA) conducted to examine the three-factor structure of the 26-item five-point Likert-type "Critical Thinking Disposition Scale" consisting of participation, cognitive maturity and innovativeness, one statement was removed from the scale and 25 statements remained. In this context, the lowest score that can be obtained from the entire measurement tool is 25, while the highest score is 125. In order to determine the reliability of the "Critical Thinking Disposition Scale", internal consistency coefficients for both the whole scale and its sub-dimensions were also checked. So, the Cronbach's alpha internal consistency coefficient for the whole scale was found to be 0.91, 0.70 for the cognitive maturity sub-dimension, 0.88 for the participation sub-dimension and 0.73 for the innovativeness sub-dimension (Ertaş-Kılıç & Şen, 2014).

Analysis of Research Data

In this study, "Personal Information Form" and "UF/EMI Critical Thinking Disposition Scale" were administered to the children together. The data obtained from the scale forms,

which were completed in an average of 15 minutes, were first transferred to the "SPSS 21.00" statistical program and the necessary analysis was performed. Before the analysis, the normality tests of the data were checked and it was examined whether the variances were homogeneous. In this context, it was determined that the data showed normal distribution (Kolmogorov-Smirnov and Shapiro-Wilk significance value= p >.05). Therefore, parametric tests were used in statistical analyses. In the analysis phase, as Seçer (2015) stated, "t-test for independent samples was used to compare the values of two groups on a continuous variable" and "one-factor analysis of variance (One-Way Anova) was used to measure the effects of an independent variable with three or more than three levels on a continuous dependent variable". During the one-factor analysis of variance, if the difference between the mean scores was significant, that is, if the variances were homogeneous, the "Post Hoc Tukey" test was performed, and if the variances were not homogeneous, the "Post Hoc Tamhane" test was performed. In addition to these, mean, standard deviation, percentage and frequency values, which are basic statistical procedures, were calculated. The significance of p<.05 was taken as a basis in the analysis results.

Findings

In this study, firstly, a descriptive analysis of the data on the critical thinking trends of secondary school learners was conducted. Then, statistical analyses on whether the critical thinking inclinations of learners show a significant difference according to the variables of "gender, age, academic achievement, mother and father education, number of books owned and read" were included.

Descriptive Data on Learners' Critical Thinking Inclinations

The "Critical Thinking Disposition Scale" developed for children consists of three five-point Likert-type dimensions and 25 statements. For this reason, the lowest score that can be obtained from this measurement tool is 25 points, while the highest score that can be obtained is 125 points. In this context, when the critical thinking trends levels of learners attending secondary school were evaluated in three groups as low (25-58), moderate (58-92) and good (92-125), it was concluded that the mean of the learners' critical thinking inclination was $\bar{X}$=89.38 according to the results obtained from the measurements in this study. This finding shows that the critical thinking trends of learners attending secondary school are at a moderate level.

Differences in Learners' Critical Thinking Inclinations According to Gender

In order that determine whether there is a significant difference in the critical thinking trends of secondary school learners according to gender, "t-test for independent samples" analysis was performed and the results are given in Table 2. However, before presenting the results of this analysis, it was first examined whether the homogeneity of variances condition, which is an important precondition of the t-test for independent samples, was met. In this context, it was determined that the variances of "cognitive maturity" (p=.430; p>.05) and "innovative thinking" (p=.413; p>.05), which are sub-dimensions of critical thinking inclination, were homogeneous, while the variances of "participation" (p=.004; p<.05) and general "critical thinking" inclination (p=.017; p<.05) were not homogeneous.

Table 2
Critical Thinking Inclinations of Learners by Gender

Dimension	Gender	n	$\bar{X}$	sd	*t*	*p*
Participation	*A	287	37.63	5.96	1.695	.091
	*B	242	36.66	7.19		
Cognitive maturity	*A	287	26.35	4.89	1.956	.051
	*B	242	25.51	4.93		
Innovative thinking	*A	287	26.60	4.64	1.981	.048
	*B	242	25.76	5.07		
Critical thinking	*A	287	90.59	13.32	2.127	.036
	*B	242	87.94	15.28		

**A: Female, B: Male, n=529; p<.05*

As seen in Table 2, "t-test for independent samples" was conducted to determine whether the "participation", "cognitive maturity" and "innovative thinking" trends, which are sub-dimensions of critical thinking tendency, and general critical thinking inclinations of secondary school learners differed significantly according to gender. As a result of the analysis, it was determined that the difference between the averages was significant in terms of "innovative thinking" (t_{527}= 1.981; p<.05) and general "critical thinking" (t_{482}= 2.127; p<.05) inclinations. When the averages are taken into consideration, it can be claimed that there is a significant result in favor of girls and that the critical thinking tendency of female secondary school learners is higher than that of boys. However, there was no significant difference between the averages in the "participation" (t_{468}= 1.695; p>.05) and "cognitive maturity" (t_{527}= 1.956; p>.05) sub-dimensions of critical thinking trends. Therefore, it can be claimed that the inclinations of male and female learners are equivalent for both dimensions.

Differences in Learners's Critical Thinking Inclinations by Age

One-factor analysis of variance (One-Way Anova) was conducted to determine whether the critical thinking trends of secondary school learners showed a significant difference according to age and the results are given in Table 3. However, before giving the results of this analysis, it was first examined whether the homogeneity of variances, which is an important precondition of One-Way Anova, was met. In this context, it was determined that the variance of "participation" (p= .197; p>.05), one of the sub-dimensions of critical thinking trends, was homogeneous. However, the variances of "cognitive maturity" (p=.006; p<.05), "innovative thinking" (p= .000; p<.05) and general "critical thinking" tendency (p= .001; p<.05) were not homogeneous.

Table 3
Critical Thinking Inclinations of Learners According to Age

Dimension	Age level	n	$\bar{X}$	sd	df	F	*p*	Significant difference
Participation	*A	109	35.90	7.06	2/526	5.851	.003	*A-B/C
	*B	192	37.88	5.94				
	*C	228	37.98	6.59				
Cognitive maturity	*A	109	24.96	5.36	2/526	6.882	.001	*A-B/C
	*B	192	26.35	4.26				
	*C	228	26.92	5.14				
Innovative thinking	*A	109	25.21	5.67	2/526	6.871	.001	*A-B/C
	*B	192	26.65	3.94				
	*C	228	27.08	4.76				
Critical thinking	*A	109	86.09	16.06	2/526	8.407	.000	*A-B/C
	*B	192	90.90	11.54				
	*C	228	91.99	15.25				

**A: 11 years and under, B: 12 years, C: 13 years and over, n=529; p<.05*

As seen in Table 3, "one-factor analysis of variance (One-Way Anova)" was performed to determine whether "participation", "cognitive maturity" and "innovative thinking" trends, which are sub-dimensions of critical thinking inclination, and general critical thinking inclinations differed significantly according to age. As a result of the analyses, it was found that the difference between the averages was statistically significant in "participation" (F_{526}= 5.851; p<.05), "cognitive maturity" (F_{526}= 6.882; p<.05), "innovative thinking" (F_{526}= 6.871; p<.05) and "critical thinking" (F_{526}= 8.407; p<.05) inclination and all of its sub-dimensions. In the analyzes, it was determined that the critical thinking tendency of the learners who attended secondary school "11 years old and younger" was lower than the "12 years old" and "13 years old and older" learners. In general, when the critical thinking trends of learners attending secondary school according to age are evaluated, it can be claimed that the critical thinking inclinations of learners attending secondary school increase as their ages increase.

The Difference of Learners's Critical Thinking Inclinations According to Academic Achievement

One-factor analysis of variance (One-Way Anova) was conducted to determine whether the critical thinking trends of secondary school learners showed a significant difference according to academic achievement and the results are given in Table 4. However, before giving the results of this analysis, it was first examined whether the homogeneity of variances, which is an important precondition of One-Way Anova, was met. In this context, it was determined that the variances of "participation" (p=.121; p>.05) and "cognitive maturity" (p=.080; p>.05), which are sub-dimensions of critical thinking trends, were homogeneous. However, the variances of the "innovative thinking" dimension (p=.009; p<.05) and the general "critical thinking" tendency (p=.006; p<.05) were not homogeneous.

Table 4
Critical Thinking Inclinations of Learners According to Academic Achievement

Dimension	Academic achievement level	n	$\bar{X}$	sd	df	F	p	Significant difference
Participation	*A	69	31.84	5.88	4/524	23.099	.000	*A-B/C/D/E
	*B	85	36.34	6.46				*B-E
	*C	120	36.87	6.78				*C-E
	*D	120	37.62	6.01				*D-E
	*E	135	40.34	5.24				
Cognitive maturity	*A	69	23.50	5.12	4/524	9.170	.000	*A-C/D/E
	*B	85	25.00	4.76				*B-E
	*C	120	26.04	4.85				*C-E
	*D	120	26.25	5.26				*D-E
	*E	135	27.53	4.03				
Innovative thinking	*A	69	24.36	5.32	4/524	10.554	.000	*A-D/E
	*B	85	25.85	5.39				*B-E
	*C	120	25.10	4.75				*C-E
	*D	120	26.45	4.73				*D-E
	*E	135	28.19	3.66				
Critical thinking	*A	69	79.71	14.08	4/524	18.270	.000	*A-B/C/D/E
	*B	85	87.20	14.86				*B-E
	*C	120	88.02	14.40				*C-E
	*D	120	90.32	13.98				*D-E
	*E	529	89.38	14.30				

**A: Very Low, B: Low, C: Medium, D: Good, E: Very good, n=529; p<.05*

As seen in Table 4, “one-factor analysis of variance (One-Way Anova)” was conducted to determine whether “participation”, “cognitive maturity” and “innovative thinking” inclinations, which are sub-dimensions of critical thinking trends, and general critical thinking inclinations differ significantly according to academic achievement. As a result of the analysis, it was found that the difference between the averages was statistically significant in “participation” (F_{524}= 23.099; p<.05), “cognitive maturity” (F_{524}= 9.170; p<.05), “innovative thinking” (F_{524}= 10.554; p<.05) and “critical thinking” (F_{524}= 18.270; p<.05) tendency and all of its sub-dimensions. In the analysis, it was determined that secondary school learners with “very low” academic achievement had a lower level of critical thinking trends than learners with “low”, “medium”, “good” and “very good” academic achievement. In addition, there was a significant difference between the critical thinking trends of children with “very good” academic achievement and those with “low”, “medium” and “good” academic achievement in favor of children with “very good” academic achievement. In general, it can be claimed that as the average academic achievement of secondary school learners increases, their critical thinking trends also increase.

The Difference of Learners’ Critical Thinking Inclinations According to Mother's Education

One-factor analysis of variance (One-Way Anova) was conducted to determine whether the critical thinking trends of secondary school learners showed a significant difference according to their mother’s education and the results are given in Table 5. However, before giving the results of this analysis, it was first examined whether the homogeneity of variances, which is an important precondition of One-Way Anova, was met. In this context, it was determined that the variances of “participation” (p=.205; p>.05), “innovative thinking” (p=.076; p>.05) and general “critical thinking” tendency (p=.455; p>.05), which are sub-dimensions of critical thinking tendency, were homogeneous. However, it was determined that the variances of the “cognitive maturity” dimension (p=.047; p<.05) were not homogeneous.

Table 5
Critical Thinking Inclinations of Learners According to Mother’s Education

Dimension	Mother’s education	n	$\bar{X}$	sd	df	F	p	Significant difference
Participation	*A	133	36.20	6.06	3/525	2.098	.100	---
	*B	158	37.46	6.05				
	*C	150	37.06	7.30				
	*D	88	38.38	6.72				
Cognitive maturity	*A	133	25.83	4.05	3/525	1.692	.168	---
	*B	158	25.63	5.46				
	*C	150	25.82	4.93				
	*D	88	27.03	5.02				
Innovative thinking	*A	133	26.47	4.27	3/525	3.400	.018	*C-D
	*B	158	26.06	5.12				
	*C	150	25.44	5.25				
	*D	88	27.45	4.25				
Critical thinking	*A	133	88.51	12.36	3/525	2.213	.086	---
	*B	158	89.17	14.49				
	*C	150	88.32	15.33				
	*D	88	92.87	14.55				

** A: Primary school graduate, B: Secondary school graduate, C: High school graduate, D: Bachelor’s/Postgraduate degree, n=529; p<.05*

As seen in Table 5, “one-factor analysis of variance (One-Way Anova)” was performed to determine whether “participation”, “cognitive maturity” and “innovative thinking”

inclinations, which are sub-dimensions of critical thinking tendency, and general critical thinking inclinations differ significantly according to mother's education. In consequence of the analysis, it was determined that the difference between the averages was significant only in terms of the sub-dimension of "innovative thinking" (F_{525}= 3.400; p<.05). It was concluded that the difference between primary school graduates and undergraduate/graduate graduates was in favor of the learners whose mothers were undergraduate/graduate graduates. No significant result was reached in terms of "participation" and "cognitive maturity", which are sub-dimensions of critical thinking trends, and the overall "critical thinking" trends. Therefore, in this study, it can be claimed that the critical thinking tendency of learners attending secondary school according to their mother's education is equivalent to each other.

The Difference of Learners' Critical Thinking Inclinations According to Father's Education

One-factor analysis of variance (One-Way Anova) was conducted to determine whether there was a significant difference in the critical thinking inclinations of secondary school learners according to their father's education and the results are given in Table 6. However, before giving the results of this analysis, it was first examined whether the homogeneity of variances, which is an important precondition of One-Way Anova, was met. In this context, it was determined that the variances of "participation" (p=.272; p>.05), "cognitive maturity" (p=.823; p>.05), "innovative thinking" (p=.080; p>.05) and general "critical thinking" tendency (p=.777; p>.05), which are sub-dimensions of critical thinking tendency, were all homogeneous.

Table 6
Critical Thinking Inclinations of Learners According to Father's Education

Dimension	Father's education	n	$\bar{X}$	sd	df	F	p	Significant difference
Participation	*A	105	36.61	6.93	3/525	2.128	.096	----
	*B	115	36.14	6.65				
	*C	136	37.55	6.08				
	*D	173	37.93	6.57				
Cognitive maturity	*A	105	26.18	4.74	3/525	2.692	.046	*A-D
	*B	115	25.39	5.06				
	*C	136	25.34	5.08				
	*D	173	26.72	4.73				
Innovative thinking	*A	105	26.59	4.72	3/525	4.013	.008	*A-D
	*B	115	25.00	5.58				
	*C	136	26.05	4.76				
	*D	173	26.94	4.33				
Critical thinking	*A	105	89.39	14.26	3/525	2.976	.031	*A-D
	*B	115	86.53	14.82				
	*C	136	88.95	13.93				
	*D	173	91.60	14.00				

**A: Primary school graduate, B: Secondary school graduate, C: High school graduate, D: Bachelor's/Postgraduate degree, n=529; p<.05*

As seen in Table 6, "one-factor analysis of variance (One-Way Anova)" was performed to determine whether "participation", "cognitive maturity", "innovative thinking" and general critical thinking inclinations, which are sub-dimensions of critical thinking trends, differed significantly according to father's education. "Post Hoc Tukey" test was performed to determine which groups the difference was between. In consequence of the analysis, no statistically significant result was found for the "participation" dimension (F_{525}= 2.128; p>.05). However, a statistically significant result was reached for "cognitive maturity" (F_{525}= 2.692; p<.05) and "critical thinking" (F_{525}= 2.976; p<.05) tendency and "innovative thinking" (F_{525}= 4.013; p<.05).

In the analyses, it was determined that the significant difference was in favor of the children whose father's education was "primary school graduate" and those whose father's education level was "undergraduate /graduate" in favor of the children whose father's education level was "undergraduate/graduate".

The Difference of Learners' Critical Thinking Inclinations According to the Number of Owned Books

One-factor analysis of variance (One-Way Anova) was conducted to determine whether there was a significant difference in the critical thinking trends of secondary school learners according to owned book and the results are given in Table 7. However, before presenting the results of this analysis, it was first examined whether the homogeneity of variances, which is an important precondition of One-Way Anova, was met. In this context, it was determined that the variances of "participation" (p=.735; p>.05), "innovative thinking" (p=.241; p>.05) and general "critical thinking" tendency (p=.384; p>.05), which are sub-dimensions of critical thinking tendency, were homogeneous. However, it was determined that the variances of the "cognitive maturity" dimension (p=.006; p<.05) were not homogeneous.

Table 7
Critical Thinking Inclinations of Learners According to Owned Book

Dimension	Number of owned book	n	$\bar{X}$	sd	df	F	p	Significant difference
Participation	*A	151	35.10	6.77	4/524	9.860	.000	*A-C/D/E
	*B	129	36.62	6.56				*B-E
	*C	87	37.49	6.16				*C-E
	*D	72	37.79	5.69				
	*E	90	40.30	6.19				
Cognitive maturity	*A	151	25.05	4.90	4/524	5.679	.000	*A-D/E
	*B	129	25.58	5.44				*B-E
	*C	87	25.37	5.18				*C-E
	*D	72	27.34	3.80				
	*E	90	27.53	4.15				
Innovative thinking	*A	151	25.57	4.90	4/524	2.293	.058	----
	*B	129	26.65	4.80				
	*C	87	25.78	5.37				
	*D	72	25.98	4.94				
	*E	90	27.31	4.05				
Critical thinking	*A	151	85.73	14.41	4/524	6.968	.000	*A-E
	*B	129	89.73	14.35				*B-E
	*C	87	87.78	15.03				*C-E
	*D	72	91.12	12.50				*A-D
	*E	90	95.14	12.75				

**A: 25 and less, B: Between 26-50, C: Between 51-75, D: Between 76-100, E: 101 and above, n=529; p<.05*

As seen in Table 7, "one-factor analysis of variance (One-Way Anova)" was performed to determine whether "participation", "cognitive maturity" and "innovative thinking" inclinations, which are sub-dimensions of critical thinking inclinations, and general critical thinking trends differed significantly according to owned book. "Post Hoc Tukey" test was performed to determine which groups the difference was between. In consequence of the analysis, no statistically significant result was found for the difference between the averages for the dimension of "innovative thinking" (F_{524}= 2.293; p>.05). However, a statistically significant result was reached for "critical thinking" (F_{524}= 6.968; p<.05) tendency and these two sub-dimensions, namely "participation" (F_{524}= 9.860; p<.05) and "cognitive maturity" (F_{524}= 5.679; p<.05). According to the results of the analysis, it was concluded that the critical thinking

inclinations of secondary school learners who have 101 or more books at home are significantly higher than those who have 100 or less owned books. In addition, it was determined that there was a significant difference between those who had 76-100 books and those who had 25 books or less in favor of those who had 76-100 books. Actually, in general, it can be claimed that as the number of books of secondary school learners increases, their critical thinking inclinations also increase.

The Difference of Learners' Critical Thinking Inclinations According to the Number of Books Read Per Month

One-factor analysis of variance (One-Way Anova) was conducted to determine whether there was a significant difference in the critical thinking trends of secondary school learners according to the number of books they read per month and the results are given in Table 8. However, before presenting the results of this analysis, it was first examined whether the homogeneity of variances, which is an important precondition of One-Way Anova, was met. In this context, it was determined that the variances of "participation" (p=.819; p>.05), "cognitive maturity" (p=.078; p>.05), "innovative thinking" (p=.058; p>.05) and general "critical thinking" tendency (p=.281; p>.05), which are sub-dimensions of critical thinking tendency, were all homogenous.

Table 8
Critical Thinking Inclinations of Learners According to the Number of Books Read per Month

Dimension	Number of book read monthly	n	$\bar{X}$	ss	df	F	p	Significant difference
Participation	*A	31	31.80	6.40	4/524	11.966	.000	*A-B/C/D/E *B-C/D/E
	*B	240	36.10	6.24				
	*C	158	38.70	5.92				
	*D	73	38.79	7.39				
	*E	27	39.74	5.68				
Cognitive maturity	*A	31	22.74	3.22	4/524	7.662	.000	*A-B/C/D/E *B-C/D/E
	*B	240	25.30	4.86				
	*C	158	27.15	4.45				
	*D	73	26.79	5.32				
	*E	27	26.44	6.13				
Innovative thinking	*A	31	25.16	3.89	4/524	5.462	.000	*A-B/C/D/E *B-C/D/E
	*B	240	25.34	4.98				
	*C	158	26.96	4.12				
	*D	73	27.17	5.60				
	*E	27	28.37	4.99				
Critical thinking	*A	31	79.70	10.70	4/524	10.461	.000	*A-B/C/D/E *B-C/D/E *A-B/C/D/E
	*B	240	86.75	13.94				
	*C	158	92.82	12.30				
	*D	73	92.76	16.76				
	*E	27	94.55	15.34				

**A: Less than a book, B: Between 1-5, C: Between 6-10, D: Between 11-15, E: 16 books and above, n=529; p<.05*

As seen in Table 8, "one-factor analysis of variance (One-Way Anova)" was conducted to determine whether "participation", "cognitive maturity" and "innovative thinking" inclinations, which are sub-dimensions of critical thinking tendency, and general critical thinking inclinations differ significantly according to books they read per month. "Post Hoc Tukey" test was performed to determine which groups the difference was between. In consequence of the analyses, it was found that the difference between the averages was statistically significant in "participation" (F_{524}= 11.966; p<.05), "cognitive maturity" (F_{524}= 7.662; p<.05), "innovative thinking" (F_{524}= 5.462; p<.05) and "critical thinking" (F_{524}= 10.461;

p<.05) inclination and all of its sub-dimensions. According to the results of the analysis, it was concluded that there was a significant difference between those who read five books or less and those who read six books or more in favor of those who read more. In this context, it can be claimed that as the number of books that middle school learners read per month increases, their critical thinking inclinations also increase.

Conclusion and Discussion

In this study, the critical thinking inclinations of learners attending secondary school were determined and these inclinations were examined according to gender, age, academic achievement, mother and father education level, number of books owned and read. In consequence of the study, it was determined that the critical thinking inclinations of learners attending secondary school were at a medium level. The studies conducted by Saysal-Araz (2013), Görücü (2014), Bayındır (2015), Kutlu-Kalender (2015), Kıran (2019), Yavuz (2019), Mete (2021) reached similar results. In these studies, it was concluded that the critical thinking levels of learners attending secondary school were at a medium level. Karabacak (2011), Köksal and Söğmen (2018), Bakır and Eğmir (2022) and Uyar (2023) determined that the critical thinking inclinations of learners attending secondary school were at a high level. However, in the study conducted by Yahşi-Cevher (2008), it was concluded that the critical thinking inclinations of learners attending secondary school were at a low level. Nevertheless, when the literature studies are examined in general terms, it can be claimed that the critical thinking inclinations of learners attending secondary school are medium and above.

When the critical thinking inclinations of learners attending secondary school according to gender were taken into consideration, it was concluded that there was a significant result in favor of girls and that girls had a higher tendency to think critically than boys. Similarly, it was concluded that the difference between the averages in the dimension of "innovation thinking" tendency, which is one of the sub-dimensions of critical thinking tendency according to gender, was significant in favor of girls. However, no significant difference was found between the averages in the dimensions of "participation" and "cognitive maturity" tendency, which are sub-dimensions of critical thinking trends, according to gender. Therefore, it was concluded that the inclinations of male and female learners were equivalent for both dimensions. Similar conclusions were reached in the studies conducted by Demir (2006), Yıldırım-Ankaralıgil (2009), Yıldız (2011), Karabacak (2011), Akıllı (2012), Saysal-Araz (2013), Küçükbatman and Kılıç (2018), Kıran (2019), Yıldırım (2019), Yüksekbilgili (2019), Altan (2020) and Amanvermez-İncirkuş (2021). In these studies, a significant difference was observed in favor of female learners in the critical thinking inclinations of learners attending secondary school according to gender variable. In the studies conducted by Yahşi-Cevher (2008), Görücü (2014), Bayındır (2015), Yavuz (2019), Elçi et al. (2020), Kandemir and Eğmir (2020), Mete (2021), Bakır and Eğmir (2022) and Uyar (2023), it was concluded that the critical thinking inclinations of learners attending secondary school did not differ according to gender. Therefore, when the literature is examined in general terms, the fact that the critical thinking inclinations of learners attending secondary school have a significant result in favor of girls and that there is no significant result in favor of boys in any study is quite meaningful, although it creates a parallelism in the literature. Because these results can be considered as an indication that some studies should be conducted to improve the critical thinking inclinations of male learners.

In the present study, it was concluded that the difference between the critical thinking tendency averages of learners attending secondary school according to the age factor was significant. In the analyses, it was determined that the critical thinking tendency of the learners attending secondary school "11 years old and below" was lower than the "12 years old" and "13 years old and above" learners. In general, it was concluded that the critical thinking tendency of

middle school learners increased as their age increased. A similar conclusion was reached in the study conducted by Ay and Akgöl (2008) on secondary school learners. In the said study, it was concluded that the critical thinking power of secondary school learners increased as their age increased. Amanvermez-İncirkuş (2021) explains the effect of age factor on critical thinking tendency as follows: "When the relationship between grade level, in other words, age or education level status and critical thinking is considered, it is generally thought that individuals gain more experience as they get older or their education level increases, so their critical thinking abilities increase in parallel with their age or education level" (p. 1275). Oflas (2009), Yıldırım (2019), Altan (2020) reached a similar conclusion. In these studies, it was concluded that the critical inclinations of learners attending secondary school increased as their age increased along with their class or education level. In the studies conducted by Bayındır (2015), Kandemir and Eğmir (2020), it was determined that the difference between the age level, in other words, the class variable and the learners' critical thinking inclination levels was statistically significant. However, it was concluded that this difference was in favor of groups with lower class level. In the studies conducted by Yahşi-Cevher (2008), Saysal-Araz (2013), Görücü (2014), Yıldırım-Döner (2020), Uyar (2023), it was concluded that learners' critical thinking inclinations did not differ according to the class level, in other words, the age factor. Therefore, it is seen that the results of these studies and the findings of the current study do not overlap in this respect.

In the current study, it was determined that the critical thinking tendency of learners attending secondary school showed a significant difference according to academic achievement. A similar conclusion was reached in the studies conducted by Kıran (2019) and Uyar (2023). In this context, in these studies, it was concluded that learners attending secondary school with higher critical thinking inclinations also had higher GPAs. Karabacak (2011) and Mete (2021) found a significant relationship between critical thinking inclinations of learners attending secondary school and their academic achievement in Turkish course; Yıldız (2011) found a significant relationship between critical thinking inclinations and academic achievement in science and technology course; Yavuz (2019) found a significant relationship between critical thinking inclinations and academic achievement in social studies course. Tümkaya (2011) and Kartal (2012) concluded that academic achievement has a significant effect on undergraduate learners' critical thinking inclinations.

In the current study, the effect of parental education level on the critical thinking inclinations of learners attending secondary school was also examined. In this context, it was concluded that the level of mother's education did not have any statistically significant effect on learners' critical thinking inclinations. A similar conclusion was reached in the studies conducted by Sadioğlu and Bilgin (2008), Yahşi-Cevher (2008), Basmaz (2017), Akıllı (2012), Çağlayan-Öztürk (2013), Ocak and Kutlu-Kalender (2017), Bayındır (2015), Yüksekbilgili (2019), Bozpolat and Güçcük-Kurga (2021), Uyar (2023). In these studies, it was concluded that the level of mother's education did not have any predictive effect on the critical inclination levels of learners attending secondary school. However, Oflas (2009), Yıldırım-Ankaralıgil (2009), Saysal-Araz (2013), Görücü (2014), Kutlu-Kalender (2015), Küçükbatman and Kılıç (2018), Kıran (2019), Yıldırım (2019), Altan (2020), Yıldırım-Döner (2020), Kandemir and Eğmir (2020), In the studies conducted by Mete (2021), Bakır and Eğmir (2022), it was concluded that the level of maternal education had a statistically significant effect on the critical thinking inclinations of learners attending secondary school. When it is examined whether there is a significant difference in the critical thinking tendency of secondary school learners according to their father's education level, it is concluded that the level of father's education has a statistically significant effect on the critical thinking inclinations of secondary school learners. A similar result was found in the studies conducted by Yahşi-Cevher (2006), Oflas (2009), Yıldırım-Ankaralıgil (2009), Akıllı (2012), Çağlayan-Öztürk (2013), Saysal-Araz (2013), Kutlu-Kalender (2015), Küçükbatman and Kılıç (2018), Kıran (2019), Yıldırım (2019), Altan

(2020), Yıldırım-Döner (2020), Kandemir and Eğmir (2020). In these studies, it was determined that as the level of father's education increased, the critical thinking inclinations of learners attending secondary school also increased. However, in the studies conducted by Sadioğlu and Bilgin (2008), Yahşi-Cevher (2008), Bakan (2010), Görücü (2014), Bayındır (2015), Yüksekbilgili (2019), Basmaz (2017), Mete (2021), no statistically significant relationship was found between the level of father's education and critical thinking tendency of learners attending secondary school.

In the current study, the effect of books on the critical thinking inclinations of learners attending secondary school was also examined. In this context, it was concluded that both the number of books learners read per month and the owned books have a statistically significant effect on the critical thinking inclinations of learners attending secondary school. Actually, when the literature is examined, it is seen that both the number of books at home (Basmaz, 2017) and the number of books read (Görücü, 2014; Kıran, 2019; Yıldırım, 2019; Yıldırım-Döner, 2020) have a statistically significant effect on the critical thinking inclinations of learners attending secondary school. In the studies conducted by Yahşi-Cevher (2008), Kutlu-Kalender (2015), Basmaz (2017), Eğmir and Ocak (2017), Ocak and Kutlu-Kalender (2017), no statistically significant relationship was found between the number of books read and critical thinking inclination.

When the findings obtained from the research are examined, it stands out as an important and noteworthy finding that all variables except one variable (mother's education level) create a significant difference on the critical thinking tendency of secondary school learners. It is thought that these results should be taken into consideration by all stakeholders of education, including learners, parents, educators and educational administrators, and reflected to the educational process. In addition, considering the results of this study and other studies in the literature, it is suggested that some studies should be conducted to improve the critical thinking inclinations of male learners. In addition, it may be recommended to conduct studies in which learners' metacognitive awareness will be examined in more depth with mixed or experimental methods.

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