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Research on Critical Thinking and Empathy Building Levels of Physical Education and Sports School and Science Faculty Students

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Abstract

The aim of this study was to examine the levels of critical thinking and empathy of students studying in the physical education sports school and science faculty and to reveal the difference between these two variables. In the research, a method for descriptive scanning and relational scanning, which aimed to reveal the current situation, was used. The universe of the research consists of students studying at Bartın University in the 2017-2018 academic year. The study comprised a total of 673 ($n_{(male)}$= 362, $n_{(female)}$ = 311) selected by random cluster sampling method from School of Physical Education and Sports and Science Faculty students in 2017-2018 academic year. In the research, "Personal Information Form" prepared by the researcher, "Critical Thinking Tendency Scale" developed by Semerci (2003) and Empathic Tendency Scale (EES) developed by Dökmen (1988) were used as data collection tools. In the research, t test was used for binary comparisons and One Way Variance Analysis (ANOVA) was used for three or more cluster comparisons. Tukey HSD multiple comparison test was used to determine the source of the differences found to be significant as a result of ANOVA, because the variances are homogeneous. Pearson Moments Product Correlation (r) Coefficient technique was used to reveal the relationship between the participants' critical thinking disposition and their empathy. Significance level was taken as $p < 0.05$. According to the results of the research, it was concluded that when variables such as gender, actively doing sports (Faculty of Science), reading habit, income level were taken into account, there was a significant difference in terms of empathic tendency total scores. There was a statistically significant difference between the critical thinking disposition metacognition, flexibility, systematicity subscales according to the reading variable, and the critical thinking disposition resilience sub-dimension point average in terms of faculty variable.

Keywords: Critical Thinking, Empathic Tendency, Physical Education and Sport, Faculty of Science, Student*

Introduction

The free and self state of the human mind is called thought.In other words, it is the situation that makes comparing, separating and connecting, establishing connection and shaping (Semerci, 2000).Thinking directs human effort to a particular purpose or outcome.Instead of making erroneous decisions without storing enough information, it provides direction with the help of systematically collected information.The mental process that connects and concludes between concept and event, solves problems, investigates and criticizes the event is called thinking (Yüceliş, 2003; Aybek, 2006).Critical thinking constitutes an important part of the thinking that provides easier solution of information and the ease of accessing information (Semerci, 2000).The mental and effective process that a person does to understand the situation is called thinking (Cüceloğlu, 2009).The reflection achieved by the reaction of the person as a result of the reaction of the stimulus is called thinking (Morgan et al., 1986).Critical thinking is called the regular, functional and effective process to understand and present one's own and others' thoughts, ideas, and to make these abilities even better (Chaffe, 1994; act. Kökdemir, 2003).According to Facione, critical thinking; In addition to interpretations, analyzes, evaluations and inferences, it is defined as making a decision and making judgments for a purpose as a result of the explanation of criteria, concepts, evidence, contexts and methods (Özdemir, 2005).On the other hand, critical thinking is defined as one's ability to think independently, logically and openly, and this concept has no meaning for controversy and constant negative criticism (Külahçı, 1995).It is possible to base the origins of critical thinking historically on ancient, medieval and modern philosophy.Names such as Jean Piaget, John Dewey, Edward Thorndike, Henry Hazlitt, Ernest Dimnet, Joseph Wertheimer, Joseph Jastrow, Karl Duncker, Victor Noll, GrahamWallas and Joseph Rossman are important scientists who have made great contributions to the field of critical thinking (Ruggiero, 1988).Based on the definitions, the elements of critical thinking are stated as follows (Güzel, 2005):

Table 1. Elements of critical thinking

Modesty	Problem solving	Discipline
Impartiality	Discussion	Honesty
Experience	To decide	Autonomy
Analyzing	Courage	Reasoning
Organizing	Consistency	Creativity
Rationality	Validity	Making Observations
Alternative search	Versatile inquiry	Making inferences
Empathy	Cognitive awareness	Evaluation
Perseverance	Reflectivity	Wonder
Confidence	Knowledge	

The realistic and logical thinking that will enable the individual to decide what to do and what to believe is called critical thinking (Ennis, 1987). Skills such as gaining certainty of ideas, testing the accuracy of information, evaluating the result and solving the problem are components of critical thinking. On the other hand, it is necessary to respect the opinions of the other person, to approach with a different perspective, to find the right information, to be open-minded and to think critically as a whole (Beyer and Pasnak, 1993).

Halpern, who emphasized metacognitive mechanisms in his definitions on critical thinking, proposed four models for teaching critical thinking skill:

- Demonstrate clearly critical thinking skills,
- Willingly develop thinking and learning process,
- Being in learning activities that can transform and present continuity,
- Controlling the behavior and displaying behavior based on the control of metacognition mechanisms (Halpern, 2003).

Ennis expressed his critical thinking skills under 12 items:

- To focus on the question,
- Analyzing arguments, evidence, evidence etc.,
- Formulating and analyzing questions,
- To evaluate the validity and reliability of the resources,
- To evaluate the observation reports,
- To reveal and evaluate the results,
- Inducing and evaluating inductions,
- Formulating and evaluating judgments about value,
- Defining and evaluating terms,
- To evaluate the hypothesis put forward,
- To comply with the stages of the decision process in the resulting action,
- Being able to communicate with different individuals (Ennis, 1987).

The main purpose of our country is to provide the physical, cognitive, social and psychological development of the person, to participate in physical activities gradually and by doing, to participate in physical activities throughout life, critical thinking, problem solving, creative thinking and decision making, there are high-level cognitive skills like. Although there is a difference in physical education lesson hours in high school and primary education programs, critical thinking skills are part of the curriculum and uniting in common point is the aim of physical education lesson (MEB, 2007).The intense relationship between affective, cognitive and psychomotor domains leads critical thinking to an indispensable position while creating a program in physical education (Gillespie and Culpan, 2000). Critical thinking skills are the main elements in the curriculum of Physical Education and Creative Dance lessons (Chen and Cone, 2003).The process by which the individual thinks that he / she is in front of him is looking at the events as such, understanding the thoughts and feelings of the other person and transmitting this is called empathy (Dökmen, 2002). The necessary factor for behaviors such as helping and sharing is empathy (Gander and Gardiner, 1993). In the philosophical dictionary, it is defined as empathy that the person puts himself in another consciousness, understands the wishes, thoughts, feelings of that consciousness, and reflects his inner feelings into a situation (Cevizci, 1996). It is known that empathy is a process of comprehension that sometimes involves taking perspective, while others are known to play a role in comprehension (Cress and Holm, 1998).Except for a few reflexive movements that we have brought from birth, all the behaviors that we do are learned. Although the effects of our genetic equipment on learning ability are the same, the movements vary greatly. The reason for this change is that everyone's learning process passes differently (Arı, 2002). In the trainings given in order to gain empathy skill, it should be given as a skill one by one rather than by disintegrating empathy as a whole (Özbay and Şahin, 2010).It is known that people with high levels of empathy have higher levels of association in the team than others. There is

a parallel structure between the empathic tendency levels of the teams and the empathic tendency levels of the athletes. If the level of empathic tendency in the team is high, the probability of being successful also increases (Dorak and Vurgun, 2004; Özgün et al., 2017). The high empathic tendencies of athletes at the time of sporting competitions become a positive approach for the athletes to be successful. The fact that the athlete has empathic behavior towards his teammates, coach, supporters and follow-up team players at the time of the competition provides an opportunity to increase the skill level in the team and provides the opportunity to perform better in the team (Erkuş and Yakupoğlu, 2001). As a result of another study on empathic sensitivity, it was observed that coaches engaged in individual sports tend to have more empathic tendencies compared to coaches engaged in team sports (Lorimer and Jowett, 2009). Although physical education lessons are outside the competitive sports environment, emphasis should be given to empathy education in this course (Shields and Bredemeier, 1994). It should be known that the feeling and understanding of the thoughts and feelings of the individual against the substitution of the individual is a very important situation in terms of physical education and sports, and these courses should be given due attention. The main goal is to provide opportunities for people to better understand others and to develop new ways. Within the scope of physical education lesson, different issues that may be the source of empathy exercises occur continuously (Luther and Hotz, 2004).

Material and Method

The universe of the research consisted of the School of Physical Education and Sports and the Faculty of Science (n = 1033) in Bartın University, Bartin University in 2017-2018 academic year. The research group consists of 673 ($n_{(male)}$ = 311, $n_{(female)}$ = 362) Physical Education and Sports School and Faculty of Science students who are selected by the 2017-2018 education-random random cluster sampling method in Bartın University.

Research Model

In order to reveal the current situation, a method for descriptive scanning and relational scanning was used in the research. The research consists of two stages:
In the first stage of the research, the critical thinking disposition and empathy level of the students studying in physical education and sports school and science faculty were determined. Whether students' critical thinking tendencies and empathy levels differ according to gender, age, active sports, income level variables are evaluated with various statistical processes. In the second stage of the research, the relationship between students' critical thinking disposition and empathy levels were evaluated in accordance with the relational screening model in physical education and sports school and science faculty.

Collecting Data

Personal Information Form

Collecting information about the personal characteristics of the School of Physical Education and Sports and Faculty of Science students and examining the research; A personal information form consisting of 5 questions was prepared by the researcher in order to

determine the gender, age, the unit they study, the level of active sports, the level of income and the habit of reading books.

Critical Thinking Tendency Scale

Critical Thinking Disposition Scale was developed by Semerci (2016) and its validity and reliability were tested for prospective teachers and teachers. According to the factor analysis results, the KMO value of the EDE scale is 0.972 and the Bartlett test value is 25990.380 (Sd = 1176, p = 0.000). The scale meets 49.161% of the variance. In the results of the analysis made for the EDE scale, it is seen that the factor loads vary between 0.33-0.71. The scale is multi-dimensional and its sub-themes are metacognition, flexibility, systematicity, perseverance-patience and open-mindedness. The scale consists of 49 items. The scale is rated as "I totally agree (5), I mostly agree (4), I partially agree (3), I mostly disagree (2), I disagree at all (1)".

Empathic Tendency Scale

It was developed by Dökmen (1988) in order to measure the potential of individuals to develop empathy in daily life. It is a Likert type scale and consists of 20 questions and each question is given 1 to 5 points. While collecting points, questions 3, 6, 7, 8, 11, 12, 13, 15 are collected in reverse. The minimum score to be taken from the scale is 20, and the maximum is 100. The total score represents the empathic tendency scores of the subjects. The high score indicates that the empathic tendency is high; low indicates that the empathic tendency is low.

Analysis of the data

By calculating the arithmetic means and standard deviations of the answers given to the scales, the distribution of students' critical thinking disposition and empathy levels were determined. With independent variables related to sub-problems; levels of critical thinking and empathy were tested by parametric tests, t test was used for binary comparisons, and One Way Variance Analysis (ANOVA) for three or more cluster comparisons.

Tukey HSD multiple comparison test was used to determine the source of the differences found to be significant as a result of ANOVA, because the variances are homogeneous. Pearson Moments Product Correlation (r) Coefficient technique was used to reveal the relationship between the participants' critical thinking disposition and their empathy. In the analysis, the level of significance was taken as $p < 0.05$.

Findings

Table 2. T-test results for comparing the data obtained from the research group by gender variable

	Gender	N	M	Ss	t	sd	p
Empathetic Tendency	Female	311	63,99	8,13	2,460	671	,014
	Male	362	62,42	8,30			
Metacognition	Female	311	3,82	,62	,865	671	,387
	Male	362	3,78	,63			
Flexibility	Female	311	3,80	,68	1,132	671	,258

Critical Thinking Tendency		Male	362	3,74	,65			
	Systematicty	Female	311	3,77	,61	-,336	671	,737
		Male	362	3,79	,63			
	Perseverance and Patience	Female	311	3,83	,76	,932	671	,352
		Male	362	3,78	,66			
	Catholicity	Female	311	3,90	,82	1,127	671	,260
		Male	362	3,83	,79			

A statistically significant difference was found between the average scores of the empathic tendency scale according to the gender variable of the data obtained from the study group ($p < 0.05$). Looking at the mean scores of this difference, it was observed that it was in favor of women. No statistically significant difference was found between the mean scores of critical thinking disposition sub-dimensions according to gender variable ($p > 0.05$).

Table 3. T-test results for comparing the data obtained from the research group according to the faculty / college variable

		Department	**N**	**M**	**Ss**	**t**	**sd**	**p**
Empathetic Tendency		High school of Physical Education and Sports	368	63,43	8,04	,995	671	,320
		Faculty of Science	305	62,80	8,50			
Critical Thinking Tendency	**Metacognition**	High school of Physical Education and Sports	368	3,76	,64	-1,822	671	,069
		Faculty of Science	305	3,85	,60			
	Flexibility	High school of Physical Education and Sports	368	3,72	,67	-2,273	671	,023
		Faculty of Science	305	3,84	,64			
	Systematicty	High school of Physical Education and Sports	368	3,78	,61	-,133	671	,894
		Faculty of Science	305	3,78	,62			
	Perseverance and Patience	High school of Physical Education and Sports	368	3,82	,66	,726	671	,468
		Faculty of Science	305	3,78	,76			
	Catholicity	High school of Physical Education and Sports	368	3,83	,78	-1,116	671	,265
		Faculty of Science	305	3,90	,83			

There was no statistically significant difference between the average scores of the empathic tendency scale according to the faculty variable of the data obtained from the research group ($p > 0.05$). A statistically significant difference was found between the mean scores of flexibility sub-dimension of critical thinking disposition scale according to the faculty variable ($p < 0.05$). It has been observed that this difference arises from the students of the Faculty of Science.

Table 4. T-test results for comparing the data obtained from the research group according to the variable of doing sports

		SPORTS STATUS	**N**	**M.**	**Ss**	**t**	**sd**	**p**
Empathetic Tendency		Not doing sports	212	62,47	8,74	-1,449	671	,148
		Doing sports	461	63,46	8,01			
	Metacognition	Not doing sports	212	3,78	,61	-,612	671	,541
		Doing sports	461	3,81	,63			

Critical Thinking Tendency	**Flexibility**	Not doing sports	212	3,79	,64	,577	671	,564
		Doing sports	461	3,76	,67			
	Systematicty	Not doing sports	212	3,71	,63	-1,835	671	,067
		Doing sports	461	3,81	,61			
	Perseverance and Patience	Not doing sports	212	3,72	,81	-1,964	671	,051
		Doing sports	461	3,84	,65			
	Catholicity	Not doing sports	212	3,86	,85	-,077	671	,938
		Doing sports	461	3,86	,78			

There was no statistically significant difference between the average scores of empathic tendency scale and critical thinking tendency sub-dimensions according to the sporting variable of the data obtained from the research group (p> 0.05).

Table 5. T-test results for comparing the data obtained from the students of the Faculty of Science according to the variable of doing sports

		SPORTS STATUS	**N**	**M**	**Ss**	**t**	**sd**	**p**
Empathetic Tendency		Not doing sports	212	62,47	8,74	-2,228	303	,035
		Doing sports	93	65,25	7,91			
Critical Thinking Tendency	**Metacognition**	Not doing sports	212	3,78	,61	-3,094	303	,002
		Doing sports	93	4,01	,56			
	Flexibility	Not doing sports	212	3,79	,64	-1,721	303	,086
		Doing sports	93	3,93	,63			
	Systematicty	Not doing sports	212	3,71	,63	-2,904	303	,004
		Doing sports	93	3,94	,59			
	Perseverance and Patience	Not doing sports	212	3,72	,81	-1,997	303	,047
		Doing sports	93	3,91	,62			
	Catholicity	Not doing sports	212	3,86	,85	-1,319	303	,188
		Doing sports	93	4,00	,78			

A statistically significant difference was found between the mean scores of empathic tendency scale, metacognition, systematicity, perseverance and patience sub-dimensions, which are sub-dimensions of critical thinking tendency scale, according to the variables of doing sports, obtained from the students of the Faculty of Science (p <0.05). It was observed that this emerging difference was caused by students doing sports.

Table 6. ANOVA results for comparing the data obtained from the research group according to the reading variable

		n	M	Ss	Total of Squares	sd	Frame Average	F	p	Difference
Empathetic Tendency	Often	201	65,10	9,02	1196,063	2	598,032	8,978	,000	1-2 1-3
	Rarely	376	62,54	7,47	44630,776	670	66,613			
	Never	96	61,41	8,81	45826,839	672				
Metacognition	Often	201	3,93	,66	6,769	2	3,385	8,715	,000	1-2 1-3
	Rarely	376	3,77	,61	260,215	670	,388			
	Never	96	3,63	,58	266,984	672				
Flexibility	Often	201	3,90	,68	5,249	2	2,624	5,994	,003	1-2 1-3
	Rarely	376	3,74	,66	293,355	670	,438			
	Never	96	3,64	,59	298,604	672				
Systematicty	Often	201	3,88	,63	3,217	2	1,608	4,189	,016	1-2
	Rarely	376	3,74	,61	257,283	670	,384			
	Never	96	3,71	,61	260,499	672				
Perseverance and Patience	Often	201	3,86	,70	1,841	2	,921	1,817	,163	
	Rarely	376	3,80	,71	339,522	670	,507			
	Never	96	3,69	,71	341,363	672				
Catholicity	Often	201	3,90	,78	,406	2	,203	,310	,733	
	Rarely	376	3,84	,82	437,759	670	,653			
	Never	96	3,86	,76	438,164	672				

According to the book reading variable of the data obtained from the study group, it was concluded that the difference between the mean scores of empathic tendency scale, critical thinking tendency scale metacognition, flexibility and systematicity sub-dimensions were statistically significant ($p < 0.05$). According to the Post-Hoc test conducted to determine which group these differences originated from, the empathic tendencies and critical thinking tendencies were observed to be higher than those who “frequently read”, “rarely” and “never” read.

Table 7. Correlation analysis results to determine the relationship between the data obtained from the research group according to age and income variable

		Empathetic Tendency	Metacognition	Flexibility	Systematicty	Perseverance and Patience	Catholicity
Age	r	,059	,010	-,018	,005	,020	,009
	p	,124	,800	,637	,900	,608	,809
Revenue	r	,364**	,060	,008	,061	,028	,058
	p	,000	,118	,839	,114	,463	,132
Empathetic Tendency	r	1	,327**	,325**	,307**	,265**	,194**
	p		,000	,000	,000	,000	,000

No statistically significant relation was found between the average scores of empathic tendency scale and critical thinking tendency sub-dimensions of the data obtained from the research group according to age variables. However, as a result of the correlation test conducted to determine the level of relationship between the average scores of empathic tendency to the income variable obtained from the research group, a statistically low and significant correlation was found. Additionally, in line with the data obtained from the

research group, a positive and low statistically significant relationship was observed between the mean scores of empathic tendency scale and sub-dimensions of critical thinking tendency scale.

Table 8. The distribution of the data obtained from the research group regarding the normal distribution indicators

		N	Min.	Maks.	M.	Ss	Skewness		Kurtosis	
							Statistics	Std. Error	Statistics	Std. Error
Empathetic Tendency		673	36.05	89.25	63.15	8.25	.174	.094	.532	.188
Critical Thinking Tendency	**Metacognition**	673	1.29	5.00	3.80	.63	-.599	.094	.583	.188
	Flexibility	673	1.36	5.00	3.77	.66	-.460	.094	.139	.188
	Systematicty	673	1.46	5.00	3.78	.62	-.352	.094	-.002	.188
	Perseverance and Patience	673	1.13	5.00	3.80	.71	-.524	.094	.362	.188
	Catholicity	673	1.00	5.00	3.86	.80	-.558	.094	.003	.188

Regarding the analysis of the data obtained from the research group, it was observed that the data showed a normal distribution when the basic parametric test assumptions were checked. Table 8. When examined, it can be said that the data have a normal distribution in cases where the coefficient of flatness and skewness do not exceed ± 3 (Kline, 2011)

Discussion and Conclusion

Regarding the discussion of the results obtained from the research group regarding the purpose, it was concluded that the difference between the average scores of the empathic tendency scale was statistically significant while there was no significant difference in the sub-dimensions of the critical thinking disposition scale by gender variable.

Akar (2007), Korkmaz (2009), Ekinci and Aybek (2010), Narin (2009) and Şen (2009) with Loken (2005), Sacli and Demirhan (2008) and Korur (2014) studies on physical education and sports students. 2009), it was concluded that there was no significant difference between critical thinking and gender in the study results they conducted for students studying in different departments. As a result, we can say that the results of our study are similar to those conducted. On the other hand, Walsh and Hardy (1999), Kökdemir (2003), Yıldırım (2005), Gülveren (2007), Ay and Akgöl (2008), Zayif (2008), and Beşoluk and Önder (2010) have made critical thinking trends in women. They stated that they are higher than men and these results are not in line with these studies in the literature.

According to the results of the studies conducted by Bozkurt (1997), Ünal (1997), Çimer (1998), Duru (2002), Arslanoğlu (2012) and Filiz (2009), female participants had higher empathic tendencies than male participants. It may be thought that the emergence of these results may be due to the fact that women continue their lives in a more emotional, calm and systematic approach than men. However, studies conducted by Kumanlı (1996), Genç ve Kalafat (2008), Garcia Lopez and Gutierrez (2015) showed no significant difference between

gender and empathic tendency. With these studies in the literature, it is seen that our study results are in an inverse relationship.

Regarding the discussion of the results obtained from the research group regarding the purpose, the difference between the critical thinking disposition scale resilience sub-dimension mean score was statistically significant and this difference was due to the students of the Faculty of Science, whereas there was no significant difference between the mean scores of the empathic trend scale.

In relation to the discussion of the results obtained from the students of the Faculty of Science, a statistically low and significant difference was found between the mean scores of the empathic tendency scale according to the variable of doing sports. A statistically significant difference was found between the scores of critical thinking disposition scale metacognition, systematicity, perseverance and patience sub-dimensions of the students of Science Faculty according to the variable of doing sports. It was observed that this emerging difference was caused by students doing sports. The results of our study are in parallel with the results of Kırımoğlu et al. (2014).

Regarding the discussion of the results obtained from the research group regarding the purpose, a significant difference was found between the critical thinking disposition scale metacognition, flexibility and systematicity sub-dimensions mean scores and empathic tendency scale mean scores. It has been observed that this difference is often in favor of readers.

Regarding the discussion of the results obtained from the study group, no significant difference was found between the mean scores of critical thinking disposition scale sub-dimensions and empathic tendency scale according to the age variable.

Made by Çimer (1998), Açıkalın (2000), Yıldırım (2001), Barut (2004), Zekioğlu and Tatar (2006) and Çiçek (2006) There was no difference between age variable and empathic tendency levels in studies with. Our results are parallel to our results. However, in the studies conducted by Akçalı (1991), Öz (1998), Yılmaz and Akyel (2008), Şahin and Özdemir (2015), emphatic tendency levels increased as the age increased. Our results are not parallel to our study results.

Regarding the discussion of the results obtained from the research group regarding the purpose, it was concluded that the relationship between the age variable and the mean scores of the critical thinking disposition scale sub-dimensions and the empathic tendency scale were statistically significant. It was observed that the average scores of empathic tendencies increased as the income levels increased. The results of the studies conducted by Ceyhan (1994), Filiz (2009) and our income level result are parallel.

Suggestions

As a result of the findings obtained regarding the differentiation of individuals' empathic tendency towards book reading habits and their critical thinking disposition, more practices should be given to gain this habit.It can be thought that by differentiating the demographic variables related to the socio-economic field of the region of residence, it will make

significant contributions to the emergence of values specific to the area. It is recommended to examine the studies with emphasis on theoretical and conceptual features with studies to be carried out in different age groups and to apply existing studies to individuals in the age category.

As a result of the literature review regarding the study, it can be suggested that critical thinking, empathy and social skills studies should be applied with each other. At the same time, research problems related to experimental studies can be prepared by considering the lifelong development of individuals for their conflict tendency and emotional intelligence.

Considering that students' empathic tendencies and critical thinking tendencies are increasing according to the findings obtained in the results of the study, guidance should be made at young ages, based on the importance of directing individuals to sports at an early age.

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