

## Investigation of Critical Thinking Disposition and Reflective Thinking Skills Towards Problem-Solving of Sports Sciences Students

*Spor Bilimleri Öğrencilerinin Eleştirel Düşünme Eğilimleri ve Problem Çözmeye Yönelik Yansıtıcı Düşünme Becerilerinin İncelenmesi*

\*Çiğdem Nilüfer Umar<sup>1</sup>

<sup>1</sup>Çanakkale Onsekiz Mart Üniversitesi, Eğitim Fakültesi, Çanakkale, TÜRKİYE / nildemu@gmail.com / 0000-0002-8804-6024

\* Corresponding author

**Abstract:** This study aims to determine the level of critical thinking disposition and reflective thinking skills towards problem-solving of sports science students, to examine the difference between reflective thinking and critical thinking disposition total score averages according to some demographic variables, and to examine critical thinking disposition as a predictor of reflective thinking. Among the survey models, single and relational scanning were used together. The study was conducted with 259 volunteer students from a sports sciences faculty at a state university in Turkey. A self-report measure with three parts was administered: Demographic Data Form; Reflective Thinking Skill Scale towards Problem Solving, and California Critical Thinking Disposition Inventory. According to the assumption of normal distribution of the data set, frequency analysis, one-way analysis of variance (ANOVA), Pearson correlation analysis, and regression analysis were used for the analysis. As a result of the analysis, the students studying in the sports management department had the highest mean critical thinking score. While the reflective thinking score of the participants who studied for 4-5 hours is significantly higher, the critical thinking scores of the participants who studied for more than 6 hours were significantly the highest. In addition, the reflective thinking scores of the participants who spent less than 1 hour for the activity were found to be significantly lower. The participants who saw the contribution of the education given at school to reflective thinking as good had the highest reflective thinking score. As a result of the correlation analysis, it was observed that there were statistically significant, low-level, and positive relationships between critical thinking and reflective thinking. There are positive correlations between critical thinking skills and all three sub-dimensions of reflective thinking. There are positive correlations between reflective thinking and four sub-dimensions of critical thinking. Regression analysis has shown that critical thinking predicts reflective thinking. Whether reflective thinking predicts critical thinking or vice versa, it has been concluded that the development of one will also affect the other.

**Anahtar Kelimeler:** Critical thinking disposition, reflective thinking, sports science students

**Özet:** Bu çalışmanın amacı, spor bilimleri öğrencilerinin eleştirel düşünme eğilimi ve problem çözmeye yönelik yansıtıcı düşünme becerilerinin düzeyini belirlemek, yansıtıcı düşünme ve eleştirel düşünme eğilimi toplam puan ortalamaları arasındaki farkı bazı demografik değişkenlere göre incelemek ve eleştirel düşünme eğiliminin yansıtıcı düşünmenin bir yordayıcısı olarak incelenmesidir. Tarama modellerinden tek ve ilişkisel tarama birlikte kullanılmıştır. Çalışma Türkiye'de bir devlet üniversitesinin spor bilimleri fakültesinde öğrenim görmekte olan 1041 öğrenciden 259 gönüllü öğrencisi ile yürütülmüştür. Üç bölümden oluşan bir ölçme aracı uygulanmıştır: Demografik Veri Formu; Problem Çözmeye Yönelik Yansıtıcı Düşünme Beceri Ölçeği ve California Eleştirel Düşünme Eğilimi Envanteri. Veri setinin normal dağıldığı varsayımına göre verilerin çözümlenmesinde betimsel analiz, tek yönlü varyans analizi (ANOVA), Pearson korelasyon analizi ve regresyon analizi kullanılmıştır. Analiz sonucunda spor yöneticiliği bölümünde okuyan öğrencilerin en yüksek eleştirel düşünme puan ortalamasına sahip olduğu görülmüştür. 4-5 saat ders çalışan katılımcıların yansıtıcı düşünme puanları diğer ders çalışma saatlerine sahip katılımcılarınkine göre anlamlı olarak daha yüksek olurken, 6 saatten fazla ders çalışan katılımcıların eleştirel düşünme puanları anlamlı olarak daha yüksekti. Ayrıca etkinlik için 1 saatten az zaman harcayan katılımcıların yansıtıcı düşünme puanları anlamlı olarak daha düşük bulunmuştur. Okulda verilen eğitimin yansıtıcı düşünmeye katkısı iyi gören katılımcılar en yüksek yansıtıcı düşünme puanına sahip olmuştur. Korelasyon analizi sonucunda eleştirel düşünme ile yansıtıcı düşünme arasında istatistiksel olarak anlamlı, düşük düzeyde ve pozitif yönde ilişkiler olduğu görülmüştür. Hem eleştirel düşünme becerileri ile yansıtıcı düşünmenin her üç alt boyutu arasında hem de yansıtıcı düşünme ile eleştirel düşünmenin dört alt boyutu arasında pozitif yönde ilişkiler görülmüştür. Regresyon analizi, eleştirel düşünmenin yansıtıcı düşünmeyi yordadığını göstermiştir. Yansıtıcı düşünme eleştirel düşünmeyi yordadın ya da tersi olsun, birinin gelişiminin diğerini de etkileyeceği sonucuna varılmıştır.

**Keywords:** Eleştirel düşünme eğilimi, yansıtıcı düşünme, spor bilimleri öğrencileri.

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## INTRODUCTION

In Turkey, Sports Sciences Faculties offer education in coaching, physical education teaching, sports management, and recreation fields. Prospective students who will study in these departments are expected to have special talents in sports as well as national or international achievements. McBride & Cleland (1998) argue that high-level thinking skills, which are used to make rational decisions about actions to be taken, are important in physical education and sports. While high-level thinking skills are included in many formal educational programs, such as physical education and sports programs (Chen & Cone, 2003), professionals working in sports education should create cognitive thinking opportunities for their students, motivate them, and provide support (Gelici, 2011; Gillespie & Culpan, 2000). In this context, the connection between the cognitive, affective, and psychomotor learning domains inherent in sports education makes critical thinking an indispensable element in this

education (Gillespie & Culpan, 2000). Additionally, graduates from sports science faculties should be aware of how the content and practices of the courses they take during their university education contribute to their critical thinking skills and reflective thinking skills for problem-solving before starting their careers.

The importance of high-level thinking skills such as reflective thinking and critical thinking, particularly for problem-solving, is increasing day by day to survive in the world of the future. The ability to think is the most distinguishing characteristic of humans from other living beings. Moreover, the 21st century we are in could be an era of wisdom for individuals who can rapidly transform acquired knowledge in a systematic manner, go beyond information, rely on intuition and experiences, and think outside their habitual patterns. Considering that the level of an individual's thinking skills

affects their quality of life, it can be anticipated that education plays a crucial role in ensuring their competence in this regard. According to Doherty (2009), having high-level thinking skills is important to overcome the challenges that can be encountered in today's rapidly changing world and to ensure the sustainability of existence. Gabbard and McBride (1990) also emphasize that teaching basic skills alone in educational institutions is not sufficient to address the problems in the rapidly changing world from economic, political, and social perspectives, and that possessing high-level thinking skills is necessary to make effective decisions. It is important that those who will educate individuals with these skills possess these qualities themselves and develop themselves accordingly (Kasimoğlu, 2013). In this context, higher education institutions have been assigned significant functions in imparting high-level thinking skills to individuals (Kökdemir, 2003). The UNESCO International Education Unit also includes high-level thinking skills in the development of 21st-century education programs (Tutkun & Aksoyalp, 2010). Shinn (2012) highlights that reflective thinking and critical thinking skills are two of the most important skills that graduates should possess after university education. For example, since critical thinking is a mental skill influenced by a person's educational experiences (Carrillo & Benitez, 2004), the prior knowledge learned by students during their education period can have an impact on their critical thinking and reflective thinking skills for problem-solving (Doğanay & Ünal, 2006).

The history of critical thinking dates back to Socrates (Yang et al., 2005). In critical thinking, individuals understand, interpret, analyze, evaluate, and make logical inferences from their thoughts (Cansoy & Türkoğlu, 2017; Rababa & Masha'al, 2020). Psychologists consider critical thinking as a higher-level thinking skill and emphasize the importance of appropriate learning processes, while those with a philosophical perspective view it as the rational aspect of human thought and the intellectual attribute necessary for understanding the world in a reasonable and fair manner (Ten Dam & Volman, 2004). The American Psychological Association (APA) defined critical thinking in an interdisciplinary approach during its 1990 meeting as "making interpretive, evaluative conscious judgments for deciding what to believe or do and expressing those judgments" (Evancho, 2000).

The Delphi study identified the characteristics of an ideal critical thinker as follows: "Always curious, well-informed, trusting in logic, open-minded, flexible, fair in evaluation, honest in confronting personal biases, insightful and measured in judgment, willing to reconsider, open to problems, organized in complex situations, patient in accessing relevant information, logical in selecting criteria, focused on questioning, and persistent in achieving flawless outcomes" (APA, 1990; cited in Facione et al., 2000). The purpose of sports science faculties is to educate graduates who have received the necessary training in the field of sports, adhere to ethical principles, and are capable of teaching and practicing sports using scientific methods at the national level. The aim is to train modern coaches, physical education and sports teachers, sports managers, and recreation leaders who are well-equipped in their respective fields. In this context, it should be expected that individuals graduating from university institutions that provide sports education

align their characteristics with the findings of the Delphi study and possess high-level thinking skills.

Although reflection is rooted in John Dewey's (1933) approach to experiential learning (Kızılkaya & Aşkar, 2009), Fichtner (2010) suggests that approximately two centuries ago, Wilhelm von Humboldt emphasized the importance of uncovering how individuals learn and was the first to use the concept of "reflective learning." Köksal and Demirel (2008) state that Dewey (1933) described reflective thinking as careful and systematic. Dewey (1933) proposed that the process of reflection consists of five stages: suggestions, problems, hypotheses, reasoning, and testing, without necessarily following a strict order. Additionally, Dewey listed open-mindedness, wholeheartedness, and responsibility as essential qualities for reflection (cited in Kızılkaya & Aşkar, 2009).

In practice, Schön (1987), who is one of the most significant contributors to reflective thinking, identifies two forms of reflection: reflection-on-action and reflection-in-action. Reflection-in-action, as described by Schön (1987), involves making adjustments and modifications to actions in real time when faced with problems specific to a particular domain. It conceptualizes multiple perspectives and explores alternative pathways in solving a problem, allowing individuals to hear their own voices, analyze their performance in their professional role, and justify their actions. On the other hand, reflection-on-action (Schön, 1987; Hatton & Smith, 1995) entails seeking the best possible solution by examining completed actions, evaluating the decision-making process, and examining the skills and abilities employed in small-scale, controllable practices. Furthermore, the technical form of reflection (Schön, 1987) involves making decisions about immediate behavior and skills (Hatton & Smith, 1995). Schön's work is based on the examination of professional practices in the daily lives of professionals such as architects, engineers, teachers, and administrators.

In the literature, it is found out that there are many studies about reflective thinking skills toward problem-solving and critical thinking skills. Previously, there are more studies on schools (Aydın, 2015; Babaoğlu, 2018; Bal, 2020; Baş, 2013; Baş & Kırılcım, 2013; Bilgiç, 2017; Eğmir & Ocak, 2018; Gündoğdu, 2017; Güneş, 2015; Kaplan et al., 2017; Sarıcan, 2017; Saygılı & Atahan, 2014; Song et al., 2006; Tat, 2015; Woods & Book, 1995), on candid teachers, teachers and with university students (Açıslı Çelik, 2015; Akar, 2007; Alkın Şahin et al., 2014; Aslan, 2009; Aslan & Aybek, 2017; Aydın & Çelik, 2013; Beşoluk & Önder, 2010; Bağcı & Şahbaz, 2012; Baki et al., 2012; Baysal & Demirtaş, 2012; Can & Kaymakçı, 2015; Cavanagh & Garvey, 2012; Chapman, 2005; Duban & Yanpar Yelken, 2010; Ekinçi & Aybek, 2010; Elmalı & Balkan-Kıyıcı, 2018; Emir, 2013; Evin Gencil & Güzel Candan, 2014; Fırat Durdukoca & Demir, 2012; Gedik et al., 2014; Göğüş et al., 2020; Gök & Erdoğan, 2011; Guberman & Leikin, 2013; Güven & Kürüm, 2004; Kaf Hasırcı & Sadık, 2011; Kandemir, 2015; Korkmaz, 2009; McGuire et al., 2009; Özdemir et al., 2018; Sağır & Bertiz, 2016; Şahin, 2009; Şahin et al., 2014; Şen, 2009; Şenlik et al., 2011; Şensoy & Yıldırım, 2017; Tekin et al., 2016; Wade et al., 2008).

In this study, the focus is on the levels of critical thinking disposition and reflective thinking skills related to problem-

solving among students in the sports faculty. In line with this rationale, the study sought to answer the following questions. Sports faculty students;

1. Do sports faculty students show significant differences in their total scores of critical thinking disposition based on variables such as their field of study, weekly study time (theoretical and practical), and weekly activity time (reading books, engaging in social activities, participating in a team or club)?
2. Do sports faculty students show significant differences in their total scores of reflective thinking skills for problem-solving based on variables such as their field of study, weekly study time (theoretical and practical), and activity time (reading books, engaging in social activities, actively participating in sports in a team or club)?
3. Is there a significant relationship between the total scores of critical thinking disposition and reflective thinking skills for problem-solving?
4. To what extent do the scores of critical thinking disposition predict the scores of reflective thinking skills for problem-solving?

## METHOD

**Research Design:** This quantitative research study aims to investigate the relationship between reflective thinking and critical thinking and the level of reflective thinking predicted by critical thinking components. In line with the objectives of the study, both singular and relational survey models were used. In singular scanning models, the current status of variables is presented individually in terms of type or quantity, and characteristics such as behavior, attitude, expectation, need, and level of knowledge related to the research topic are attempted to be determined through a single measurement process. Relational survey models, on the other hand, aim to determine the presence and degree of co-variation among two or more variables (Karasar, 2023; Lodico et al., 2010).

**Research Aim:** In this study, the focus is on the levels of critical thinking disposition and reflective thinking skills related to problem-solving among students in the sports faculty. These aspects, considered worthy of investigation in every faculty and department, are examined specifically within the context of sports education. The main rationale of this study is to contribute to the existing literature by determining the levels of critical thinking disposition and reflective thinking skills among students in the sports faculty, examining the differences in reflective thinking and critical thinking disposition total score averages based on certain demographic variables, exploring critical thinking disposition as a predictor of reflective thinking, and generating recommendations related to the subject.

**Sample:** This survey study was conducted at the sports science faculty of a university in Turkey. There are 1041 students enrolled in the faculty for the Fall Semester of the 2022-2023 academic year, distributed across four departments: coaching, physical education teaching, sports management, and recreation. A total of 259 students, 89 girls (26.4%) and 170 boys (56.6%), participated in the study. For the age variable, 78 students (30.1%) between the ages of 17-

18, 122 students (47.1%) between the ages of 19-20, 44 students (17.0%) between the ages of 21-22, and 15 students over the age of 23. (5.8%) are found. There are 115 students (44.4%) studying in the coaching department, 70 students (27.0%) studying in the physical education department, 42 students (16.2%) studying in the sports management department, and 32 students (12.4%) studying in the recreation department. Frequency distributions for gender, age, and department are given in Table 1.

**Table 1:** Number and percentage distribution of participants for demographic information

Variable	Category	n	%
Gender	Male	89	34,4
	Female	170	65,6
Age	17-18 age	78	30,1
	19-20 age	122	47,1
	21-22 age	44	17,0
	23 age above	15	5,8
Department	Coaching	115	44,4
	Physical Education Teaching	70	27,0
	Sports Management	42	16,2
	Recreation	32	12,4
Total		259	100,0

**Data Collection:** The survey instrument, the aim of the research and the consent form were mentioned to undergraduate students via e-mail. The survey was conducted online via e-mail and hard copy surveys. A self-report measure with three parts was administered: Demographic Data Form; Reflective Thinking Skill Scale towards Problem Solving (Kızılkaya & Aşkar, 2009), and California Critical Thinking Disposition Inventory (Facione et al., 1998).

**Demographic Data Form:** A questionnaire was developed by the author to gather demographic information from the participants. The questionnaire included items related to gender, age, type of department, perception of the contribution of education to critical and reflective thinking skills, and time spent on studying for courses and engaging in social activities.

**Reflective Thinking Skill Scale towards Problem Solving:** The scale developed by Kızılkaya and Aşkar (2009) consists of 14 questions with a 5-point Likert scale that measure three dimensions of reflective thinking as questioning (5 items), reasoning (4 items), and evaluation (5 items). In the original study, the Cronbach Alpha value was found 0.87. In this study, the Cronbach Alpha value was found 0.83 for the general scale.

**California Critical Thinking Disposition Inventory:** The scale developed by Facione et al. (1998) consists of 75 questions with a 5-point Likert scale that measure 7 scales of critical thinking as truth-seeking, open-mindedness, analyticity, systematicity, self-confidence, inquisitiveness, and cognitive maturity. An adaptation study of the scale to Turkish was done by Kökdemir (2003) consisting of 51 items with 6 subscales as truth-seeking, open-mindedness, analyticity, systematicity, self-confidence, inquisitiveness. Since the cognitive maturity dimension could not be obtained in the Turkish version of the scale, this study investigates the effects of only six constructs of critical thinking on reflective thinking skills toward problem-solving. The Cronbach Alpha coefficient was found to be 0.88 in the Turkish adaptation

study. In this study, the Cronbach Alpha coefficient was 0.86 for the whole scale.

**Analyzing of Data:** Skewness and kurtosis values were examined to assess the normality of the data. The data set met the assumption of normal distribution, as indicated by skewness and kurtosis values within the range of  $+/-1.69$ . Based on this result, it was decided to use parametric tests. Frequency analysis was employed to examine the distribution of variables in terms of person and percentage. One-way Analysis of Variance (ANOVA) was used to investigate mean differences among three or more categories. Pearson correlation analysis was utilized to explore relationships between dependent variables. Multiple linear regression analysis was employed to examine predictive relationships. The stepwise method was preferred for parameter estimation in regression analysis. SPSS version 26 software package was used for data analysis, with a significance level of  $p=0.05$ .

## RESULTS

The data were analyzed to find answers to the research questions. As a result, the following findings were obtained regarding the differences in problem-solving reflective thinking and critical thinking disposition total score averages based on demographic variables (academic department, weekly study duration [theoretical and practical], and weekly activity duration [reading books, engaging in social activities, participating in a team or club], and the perceived contribution of courses taken at the faculty to their reflective thinking and critical thinking disposition): the relationship between critical thinking disposition and problem-solving reflective thinking total scores; and the predictive power of critical thinking disposition scores on problem-solving reflective thinking level. The results are presented below.

### Examining the Difference Between Reflective Thinking (RT) and Critical Thinking (CT) Total Scores According to Demographic Variables:

The first two research questions of the study aimed to examine whether there were significant differences in the total scores of critical thinking disposition and problem-solving reflective thinking among sports faculty students based on the following variables: academic department, weekly study duration (theoretical, reading books, and practical), weekly activity duration (social activities, participation in a team or club), and the perceived contribution of courses taken at the faculty to their critical thinking disposition and problem-solving reflective thinking skills. As a result of the analysis, the students studying in the sports management department ( $\bar{x} = 173,21$ ) had the highest mean score of critical thinking ( $F(3,255) = 2.689; p < .05$ ). While the reflective thinking score ( $\bar{x} = 54,44$ ) of the participants who studied for 4-5 hours is significantly highest ( $F(3,255) = 3,356; p < .05$ ), the critical thinking scores of the participants who study for more than 6 hours ( $\bar{x} = 172,58$ ) was significantly the highest ( $F(3,255) = 6,332; p < .001$ ). In addition, the reflective thinking scores of the participants who spent less than 1 hour for the activity were found to be significantly lower ( $F(3,255) = 6,695; p < .001$ ). The participants who saw the contribution of the education given at school to reflective thinking (CRT) as good ( $\bar{x} = 53,89$ ) had the highest reflective thinking score ( $F(2,256) = 5,444; p < .01$ ). Similarly, both reflective ( $\bar{x} = 54,15$ ) and critical thinking ( $\bar{x} = 172,11$ ) scores were significantly higher in participants who saw the contribution of the education given to critical thinking (CCT) as good ( $F(2,256) = 6,999; p < .01$ ;  $F(2,256) = 3,592; p < .05$ ). Examining the difference between reflective thinking (RT) and critical thinking (CT) total scores according to demographic variables are given in Table 2.

**Table 2:** Examining the difference between reflective thinking (RT) and critical thinking (CT) total scores according to demographic variables.

	<i>n</i>	Reflective Thinking			Critical Thinking			
		$\bar{x} \pm ss$	<i>F</i>	<i>p</i>	$\bar{x} \pm ss$	<i>F</i>	<i>p</i>	
Department	Coaching	115	51,69±12,13	1,221	0,303	171,34±22,74	2,689	0,047
	Physical Edu. Teach.	70	51,74±9,29			163,97±19,94		
	Sports Management	42	54,90±7,55			173,21±13,87		
	Recreation	32	53,41±7,37			170,28±12,13		
Study Time	Less than 1 hour	48	48,73±13,60	3,356	0,019	158,60±24,91	6,322	0,000
	1-3 hours	90	52,11±9,43			171,74±18,28		
	4-5 hours	48	54,44±9,26			171,63±16,91		
	Over 6 hours	73	53,96±8,72			172,58±17,70		
Activity Time	Less than 1 hour	26	45,73±13,04	6,695	0,000	162,15±25,36	2,288	0,079
	1-3 hours	36	53,33±9,32			175,28±17,19		
	5 hours	27	48,17±7,83			167,88±16,44		
	Over 6 hours	173	53,85±9,78			169,66±19,69		
CRT	Good	133	53,89±10,37	5,444	0,005	172,04±18,07	2,516	0,083
	Moderate	88	52,24±8,78			167,76±18,15		
	Poor	38	47,79±11,78			164,79±27,63		
CCT	Good	148	54,15±8,97	6,999	0,001	172,11±16,62	3,592	0,029
	Moderate	69	51,62±10,04			167,68±19,26		
	Poor	42	47,74±13,12			163,43±28,53		

**Relationships Between Reflective Thinking and Critical Thinking:** Correlation analysis was applied to examine the relationships between reflective thinking and critical thinking. As a result of the correlation analysis, it was observed that there were statistically significant, low-level and positive relationships between critical thinking and reflective thinking in the range of  $r = .185$  to  $r = .470$ . There are positive correlations between critical thinking skills and all three sub-dimensions of reflective thinking: questioning, evaluation, and reasoning. There are positive correlations between reflective thinking and four sub-dimensions of critical thinking: search for truth, analyticity, self-confidence, and intellectual curiosity. The correlation coefficients obtained provided an idea for examining the predictive relationships. There are positive correlations between questioning and four sub-dimensions of critical thinking: search for truth analyticity, self-confidence, and intellectual curiosity. There are positive correlations between evaluation and four sub-dimensions of critical thinking: search for truth analyticity, self-confidence, and intellectual curiosity. There are

positive correlations between reasoning and four sub-dimensions of critical thinking: search for truth analyticity, self-confidence, and intellectual curiosity. Examining the relationships between reflective and critical thinking are given in Table 3.

**Table 3:** Examining the relationships between reflective thinking and critical thinking

	Questioning	Evaluation	Reasoning	Reflective Thinking
Search for Truth	0,234***	0,211**	0,185**	0,230***
Open-mindedness	- 0,115	- 0,044	- 0,004	- 0,076
Analytical	0,435***	0,367***	0,387***	0,431***
Systematicity	- 0,110	- 0,078	- 0,057	- 0,090
Self Confidence	0,371***	0,337***	0,418***	0,405***
Intellectual Curiosity	0,452***	0,409***	0,436***	0,470***
Critical Thinking	0,310***	0,321***	0,384***	0,366***

\*\*\* $p < 0,01$ ; \*\* $p < 0,001$

**Critical Thinking as a Predictor of Reflective Thinking:** Critical thinking sub-dimensions, which are thought to be predictors of reflective thinking, were included in the model and the model was estimated with the "stepwise" method. The model established as a result of the regression analysis was found to be statistically significant ( $F(4,254) = 27,798$ ;  $p < .001$ ). Among the variables included in the model, intellectual curiosity, self-confidence, truth-seeking, and analyticity dimensions explain 30% of reflective thinking. When other parameters are kept constant for the regression coefficients obtained, a 1-unit increase in the intellectual curiosity score increases the reflective thinking score by .396 units, a 1-unit increase in the self-confidence score by .327 units, a 1-unit increase in the truth-seeking score by .283, and a 1-unit increase in the analytical score by .257 units. Analysis of critical thinking as a predictor of reflective thinking is given in Table 4.

**Table 4:** Analysis of critical thinking as a predictor of reflective thinking

Predictor	B(b)	SH	Beta	t	p	R <sup>2</sup>	F <sub>(4,254)</sub>	p
Fixed (a)	7,779	4,587		1,696	0,091	0,304	27,798	0,000
Intellectual Curiosity	0,396	0,106	0,262	3,732	0,000			
Self Esteem	0,327	0,105	0,191	3,116	0,002			
Search for truth	0,283	0,096	0,156	2,943	0,004			
Analyticity	0,257	0,113	0,157	2,274	0,024			

## DISCUSSION AND CONCLUSION

This study aims to determine the levels of critical thinking disposition and reflective thinking skills for students in the Sports Faculty, examine the differences in reflective thinking and critical thinking disposition total scores according to some demographic variables, and provide a detailed analysis of critical thinking disposition as a predictor of reflective thinking. It is noteworthy that there are limited studies that investigate the combined examination of critical thinking disposition and reflective thinking skills among students in the Sports Faculty. Previous studies have explored the definitions, structures, measurement methods, ways of development, and relationships between critical thinking and predictive thinking (McMillan, 1987; Phan, 2009). However, the role of critical thinking disposition as a predictor of reflective thinking skills related to problem-solving has not been studied specifically for students in the Sports Faculty, considering the differences between departments (Sports Management, Physical Education and Sports Teaching, Coaching, and Recreation). Additionally, the study has not examined the levels of critical thinking disposition and reflective thinking skills in relation to weekly study time (theoretical, reading, and practical) and weekly activity time (social activities, involvement in a team or club) as well as the perceived contributions of the courses they take in the Sports Faculty to critical thinking disposition and reflective thinking skills (Aryani, Rais, & Wirawan, 2017; Kember, 2010; Leung & Kember, 2003).

After McBride (1992) emphasized the importance of students in the field of sports acquiring high levels of critical thinking skills and the need for competency in teaching these skills, the expectation of students gaining critical thinking skills

during their university education process has been reiterated in Association of American Colleges and Universities [AAC&U] reports (2004). According to the results of this study, which aimed to determine the levels of critical thinking disposition and problem-solving reflective thinking skills among sports faculty students, examine the differences in the mean scores of reflective thinking and critical thinking based on certain demographic variables, and explore the predictive role of critical thinking disposition on reflective thinking, the following conclusions were drawn; Department of education, the duration of weekly coursework (theoretical and practical) vary according to their perceptions of the contribution of the courses they take at the faculty to critical thinking disposition. Reflective thinking skills for problem solving also differ according to their perceptions of the contribution of the courses they take at the faculty to their reflective thinking skills towards problem solving, weekly study (theory and practice) and weekly activity (reading a book, social activity, activity in a team or club).

While the critical thinking disposition of sports faculty students varies according to the departments they study in, it was found that students in the sports management department had significantly higher average scores in critical thinking disposition compared to students in other departments. When looking at the literature, it is observed that there is no significant difference in the critical thinking disposition of students studying in different programs at universities (McDonough, 1997). However, it has been found that students in the physical education teaching program have significantly higher average scores in critical thinking disposition compared to students in other departments of

sports sciences (McBride et al., 2002; Saçlı & Demirhan, 2008). These differences may be attributed to the nature of critical thinking, where questioning can be specific to each field. Shin et al. (2006) stated that the duration and content of educational programs are important in developing students' critical thinking skills. Based on Hager and Kaye's study (1991), which suggests that critical thinking should be taught to students before they enter a professional program rather than being discipline-specific, it can be argued that sports science faculties should pay attention to reflective teaching-learning conditions in program development processes and course content.

In recent years, the sports management department has gained popularity among young people within sports science programs. While the courses of various programs in sports science faculties in different countries, including Turkey, converge on General Culture and Basic Sports Knowledge, the sports management program specifically includes courses such as sports sociology, sports economics, sports marketing, management and organization, organizational behavior in sports, strategic management, sports policy, management in sports enterprises, and sports law to acquire qualifications related to vocational knowledge in the field of sports industry (Martin, 2013; Sunay, 2021). Alongside the mentioned courses related to vocational knowledge, tasks such as internships, practical experiences, and gaining expertise further support the development of critical thinking skills in sports management students, enabling them to deeply reflect on the complexities of the sociocultural, sociopolitical, and socio-economic aspects of the sports industry (Frisby, 2005; Skinner & Edwards, 2005). In this study, the higher average scores of sports management program students in critical thinking disposition compared to others can be attributed to the content of the courses they take related to vocational knowledge.

In this study, it was determined that participants who study for more than 6 hours per week have significantly higher average scores in critical thinking disposition. Participants who study for 4-5 hours per week have significantly higher average scores in reflective thinking for problem-solving. Terenzini et al. (1995) state in their study that students' weekly study time and practice are significantly and positively related to critical thinking. Some studies in the literature support the finding of a positive relationship between time allocated to reading and critical thinking disposition in this study (Demirer et al., 2011; Facione & Facione, 1997; Hawkins, 2012; Murphy et al., 2014; Özensoy, 2011; Susar Kırmızı, et al., 2014), while Şen (2009) states in a study with teacher candidates that there is no significant relationship between critical thinking and reading books. The allocation of time to classes or reading books supporting students' higher-level skills (Hong & Lin, 2011) and reflective thinking skills (Hatton & Smith, 1995) aligns with the findings of this study.

In this study, it was found that participants who perceived the contribution of the courses they take at the faculty to their critical thinking disposition as positive had significantly higher average scores in both reflective thinking for problem-solving and critical thinking disposition. Participants who reported that the courses they take at the faculty contribute

positively to their reflective thinking for problem-solving also had higher average scores in reflective thinking. According to Miragaia & Soares (2017) in their study "Higher Education in Sport Management: A Systematic Review of Research Topics and Trends," pedagogical approaches that incorporate internships, new technologies, and e-learning, encompassing higher-order thinking skills, are opportunities to enhance the reliability of programs and guide students towards a global approach in sport education, allowing them to become competent professionals.

In this study, the California Critical Thinking Disposition Inventory (CCTDI) developed by Facione et al. (1998) was used to measure participants' critical thinking dispositions. In addition to that, participants' perceptions of the contribution of the courses they take at the faculty to their own critical thinking disposition and reflective thinking for problem-solving were also investigated. While some authors discuss the advantages and accuracy of using direct measures of critical thinking, Gonyea (2005) suggests that self-report measures are valid and more efficient within certain limitations. Self-report has become a commonly used method to gather information about university students, particularly regarding their perceptions, attitudes, and behaviors (Astin, 1993). Pike (1996) and Astin (1993) emphasize that when self-report measures and direct assessment measure the same constructs, self-report measures can be acceptable for academic development, but they cannot entirely replace direct assessment measures. In the literature, it is noted that there is a moderate correlation between students' self-reports and direct measures of critical thinking (Pascarella & Terenzini, 1991; Tsui, 2002), while according to Bowman and Seifert (2010), there is a small or approximately zero correlation between students' self-reports and direct assessments of critical thinking skills. On the other hand, student self-reports can also reflect student satisfaction and engagement (Bowman & Seifert, 2010). Faculty pedagogical methods used to enhance higher-order thinking skills contribute to satisfaction with teaching practices, learning environment, and respect for instructors.

In this study, it was found that participants who perceived a positive contribution of the courses they took at the faculty to their critical thinking disposition also had significantly higher average scores in reflective thinking for problem-solving. As reported by Astin (1993), students are more satisfied with their educational experiences when they believe in what they have learned. On the other hand, students who are dissatisfied with their university experiences are less likely to report positive effects on their personal development (Bowman & Seifert, 2010). As seen in this study, the high-performing participants in terms of critical thinking disposition and reflective thinking for problem-solving also had a high perception of the contribution of their courses, which could be attributed to their satisfaction with their faculty experiences. These findings are consistent with the results of other studies.

According to the study results, participants who allocated more than 6 hours per week for engaging in social activities or being active in a club had higher reflective thinking skills for problem-solving compared to those who spent less time. On the other hand, participants who spent less than 1 hour on

activities had significantly lower scores in reflective thinking for problem-solving. Reflective thinking inherently requires deep thinking and socialization (Choy & Oo, 2012). Terenzini et al. (1995) stated in their study that the time students spend with their peers has a negative relationship with critical thinking, indicating that activities may hinder critical thinking. In this study, however, there was no significant difference in critical thinking disposition based on the weekly activity variable. This finding is consistent with the study by Terenzini et al. (1995), where they suggested that supportive peer environments, focused on tolerance, compromise, consensus-building, and emphasizing shared similarities rather than differences, can temporarily suspend critical thinking. Aldahmash, Alshmrani, and Almufti (2017) emphasize the importance of group work where students can discuss with group members, focus on individual and others' thinking processes, and evaluate each other, while Taggart and Wilson (2005) highlight the significance of verbal thinking in assessment. Otherwise, they would become individuals who have learned to think only as coaches, recreation instructors, physical education and sports teachers, and sports managers, rather than individuals who are in line with the goals of 21st-century skills. Educators can deeply analyze the curriculum, assign autobiographical, metaphorical, and cultural writings, and use appropriate control mechanisms to foster higher-order thinking skills in their students (Copeland et al., 1993).

According to correlation analysis results, it is seen that there is a moderate relation between critical thinking and reflective thinking and their sub-dimensions. According to results, there are positive correlations between critical thinking skills and all three sub-dimensions of reflective thinking: questioning, evaluation, reasoning. There are positive correlations between reflective thinking and four sub-dimensions of critical thinking: search for truth, analyticity, self-confidence, intellectual curiosity. Also, there are positive correlations between questioning and four sub-dimensions of critical thinking: search for truth analyticity, self-confidence, intellectual curiosity. There are positive correlations between evaluation and four sub-dimensions of critical thinking: search for truth analyticity, self-confidence, intellectual curiosity. There are positive correlations between reasoning and four sub-dimensions of critical thinking: search for truth analyticity, self-confidence, intellectual curiosity.

Researchers who define critical thinking often refer to reflective thinking as well (Ennis, 2015; Phan, 2011). According to Phan (2009), critical thinking is a higher level of reflective thinking that encompasses how we perceive something, what we feel during perception, and how we respond to it. Nosich (2011) identifies reflective thinking, coverage of criteria, authenticity, and logical reasoning as the most important characteristics of critical thinking. Critical thinking is related to reflective thinking (Ghanizadeh, 2017) and supports it (Plan, 2011). Wilson and Jan (1993) stated that critical thinking intersects with predictive thinking in dimensions such as evaluation, analysis, questioning, problem-finding, organization, and assumption development. There are also studies in the literature that focus on reflective thinking practices that enhance critical thinking. Aryani, Rais, and Wirawan (2017) state in their study that the practices

aimed at developing reflective thinking skills in students support their critical thinking skills. Additionally, some researchers suggest that reflective thinking through one's experiences supports the development of critical thinking skills (Gibbons & Gray, 2004; Jones, 2003; Yeh, 2004). Evin-Gencil and Güzel-Candan (2014) state that individuals who engage in reflective thinking also possess critical thinking skills. The results of the correlation analysis in this study are consistent with the theoretical definitions and discussions of critical thinking and reflective thinking, as well as with findings from studies that indicate the relationship between these two variables (Colley, Andrea & Carol, 2012; Duban & Yanpar Yelken, 2010; Farrah, 2012; Leung & Kember, 2003; Phan, 2011). In addition to researchers who, like the findings of this study, state that critical thinking nurtures reflective thinking (Leung & Kember, 2003; Mezirow, 1991; Semerci, 2007), Ghanizadeh (2017) argued that reflective thinking supports systematic analysis and evaluation of learning processes in students and contrary to the results of this study, reflective thinking has a predictive quality for critical thinking.

Based on the findings of research and discussions, the following conclusions can be drawn: (a) the average scores of critical thinking disposition and reflective thinking for problem-solving were found to be higher among students in the sports management program compared to students in other sports departments; (b) students with higher average scores in these two variables also had longer weekly study and social activity durations; (c) students who perceived that the courses they took at the faculty contributed well to these two variables also had higher average scores in critical thinking disposition and reflective thinking for problem-solving; (d) a low-level positive relationship between critical thinking disposition and reflective thinking for problem-solving.

**Recommendations:** The findings of this study contribute to this classification by providing information about the effects of the sub-dimensions of critical thinking skills on the development of reflective thinking for problem-solving. Based on the research mentioned in the previous paragraphs, it can be stated that regardless of whether reflective thinking predicts critical thinking or vice versa, the development of one will have an impact on the other. Researchers can utilize the results of this study to conduct applied research on different variables in order to equip sports science students with critical thinking and reflective thinking skills for better performance in their professional and social lives. Reflective thinking education as a student-centered approach should provide sports science students with instruction where they can apply new knowledge, receive reinforcement, make inferences from their experiences, and express themselves. Based on this study, higher-order thinking skills courses can be included in higher education undergraduate programs. Apart from sports science students, this study can also be studied with students in different undergraduate programs. Students' critical thinking dispositions and reflective problem-solving skills at the beginning and end of the undergraduate program can be examined.

**Limitations:** One limitation of the study is its small effect size, which may be attributed to the fact that it was conducted

with 259 voluntary students from a sports science faculty in a state university in Turkey.

#### Ethical Considerations

Journal writing rules, publication principles, research and publication ethics rules, journal ethics rules were followed in the present study. Responsibility for any violations that may arise regarding the article belongs to the author. 2023-YÖNP-0045 numbered ethics committee approval was obtained from the ethics committee of Çanakkale Onsekiz Mart University.

**Conflict of Interest:** The author declares no conflict of interest regarding the study.

**Contribution of authors:** The author contributed to 100% of the study.

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## GENİŐLETİLMİŐ ÖZET

**Çalışmanın Amacı:** Spor fakültesi öğrencilerinin eleştirel düşünme eğilimi ve problem çözmeye yönelik yansıtıcı düşünme becerileri düzeylerinin belirlenmesi, bazı demografik değişkenlere göre yansıtıcı düşünme ve eleştirel düşünme eğilimi toplam puan ortalamaları arasındaki farkın incelenmesi, yansıtıcı düşünmenin yordayıcısı olarak eleştirel düşünme eğiliminin incelenmesi ve konuyla ilgili öneriler oluşturulması bağlamında alan yazına katkı sağlama düşüncesi araştırmanın temel gerekçesini oluşturmaktadır.

**Araştırma Soruları:** Spor fakültesi öğrencilerinin;

1. Eleştirel düşünme eğilimi toplam puanları, öğrenim gördükleri bölüm, haftalık ders çalışma (teorik ve uygulama) ve haftalık aktivite (kitap okuma, sosyal aktivite, bir takım veya kulüpte faaliyet) süresi, fakültede aldıkları derslerin eleştirel düşünme eğilimine yönelik katkılarına ilişkin algıları değişkenlerine göre anlamlı farklılıklar göstermekte midir?
2. Problem çözmeye yönelik yansıtıcı düşünme düzeyi toplam puanları, öğrenim gördükleri bölüm, haftalık ders

çalışma (teorik ve uygulama) ve aktivite (kitap okuma, sosyal aktivite, bir takım veya kulüpte aktif spor yapma) süresi, fakültede aldıkları derslerin problem çözmeye yönelik yansıtıcı düşüncelerine yönelik katkılarına ilişkin algıları değişkenlerine göre anlamlı farklılıklar göstermekte midir?

3. Eleştirel düşünme eğilimi ve problem çözmeye yönelik yansıtıcı düşünme düzeyi toplam puanları arasında anlamlı bir ilişki var mıdır?
4. Eleştirel düşünme eğilimi puanlarının problem çözmeye yönelik yansıtıcı düşünme düzeyi puanlarını yordama düzeyi nedir?

**Literatur Araştırması:** Türkiye’de Spor Bilimleri Fakülteleri; antrenörlük, beden eğitimi öğretmenliği, spor yöneticiliği ve rekreasyon dallarında eğitim vermektedir. Bu bölümlerde öğrenim görecek olan öğrenci adaylarından spor alanında özel yeteneğe sahip olmalarının yanı sıra millî veya uluslararası derecelere sahip olmaları da beklenir. McBride ve Cleland (1998) uygulanacak eylemler ile ilgili mantıklı kararları alabilmek için faydalanılan üst düzey düşünme becerilerinin beden eğitimi ve spor alanlarında önemli olduğunu ifade ederler. Üst düzey düşünme becerileri, pek çok örgün öğretim programında olduğu gibi beden eğitim ve spor alanlarındaki programlarda yer alıyor olsa da (Chen ve Cone, 2003) spor eğitimi alanında çalışanlar, öğrencilerine bilişsel düşünme fırsatları oluşturup onları motive edip desteklemelidirler (Gelici, 2011; Gillespie ve Culpan, 2000). Bu bağlamda spor eğitimin özündeki bilişsel, duyuşsal ve psikomotor öğrenme alanlarının arasındaki bağ, eleştirel düşünmeyi bu eğitim açısından vazgeçilemez bir öge haline getirmektedir (Gillespie & Culpan, 2000). Bunun yanı sıra spor bilimleri fakültelerinden mezun olacak öğrencilerin mesleğe başlamadan önce, üniversite eğitimleri esnasında aldıkları derslerin içerik ve uygulamalarının eleştirel düşünme becerilerine ve problem çözmeye yönelik yansıtıcı düşünme beceri düzeylerine ne derece katkısı olduğu konusunda farkındalıklarının olması beklenmelidir.

Geleceğin dünyasında var olabilmek için özellikle problem çözmeye yönelik yansıtıcı düşünme ve eleştirel düşünme gibi üst düzey düşünme becerilerinin önemi her geçen gün artmaktadır. İnsanı diğer canlılardan ayıran en önemli özelliği düşünebilme yetisidir. Bununla birlikte içinde bulunduğumuz 21. Yüzyıl, hızla ulaştığı bilgiyi sistemli şekilde evirebilen, bilginin ötesine geçebilen, sezgi ve tecrübelerini ortaya koyarak deneyimleyen, alışkansalının dışında düşünebilmeyi başaran bireylerin bilgeliğe erişim çağı olabilir. Bireyin düşünme becerilerinin seviyesi yaşam kalitesini etkilediği göz önünde alındığında bu konuda yetkin olmaları yönünde alacakları eğitimin önemli olduğu ön görülebilir. Doherty’e (2009) göre hızla değişen günümüz dünyasında karşılaşılabilecek sorunların üstesinden gelmek ve varlığın sağlığına yetkin olabileme adına üst düzey düşünme becerilerine sahip olma önemlidir. Gabbard ve McBride (1990) da eğitim kurumlarında sadece temel becerileri öğretmenin, ekonomik, politik ve sosyal açıdan hızla değişen dünyadaki sorunların üstesinden gelmek için yeterli olamayacağını ve etkin kararlar alabilmek için üst düzey düşünme becerilerine sahip olmak gerektiğini vurgular. Bu becerilere sahip bireyleri yetiştirecek olan bireylerin de bu

özelliklere sahip olması ve bu doğrultuda kendilerini geliştirmeleri önem taşımaktadır (Kasımoğlu, 2013). Bu bağlamda üst düzey düşünme becerilerini bireylere kazandırılması noktasında yükseköğretim kurumlarına önemli fonksiyonlar yüklenmiştir (Kökdemir, 2003). UNESCO Uluslararası Eğitim Birimi de 21. yüzyıl eğitim programlarının geliştirilmesinde üst düzey düşünme becerilerine yer vermektedir (Tutkun ve Aksoyalp, 2010). Shinn (2012) de yansıtıcı düşünme ve eleştirel düşünme becerilerinin, üniversite eğitiminin devamında mezunların sahip olmaları gereken en önemli becerilerden ikisi olduğuna dikkat çekmektedir. Örneğin eleştirel düşünme, kişinin eğitim sürecindeki deneyimlerinden etkilenen bir zihinsel beceri (Carrillo ve Benitez, 2004) olduğuna göre öğrencinin eğitim döneminde konu ile ilgili öğrendiği ön bilgiler, eleştirel düşünme ve problem çözmeye yönelik yansıtıcı düşünme becerisi üzerinde etkili olabilir (Doğanay ve Ünal, 2006).

**Yöntem:** Çalışmanın amaçları doğrultusunda, tarama modellerinden tekil ve ilişkisel tarama bir arada kullanılmıştır. Tekil tarama modellerinde, değişkenlerin tek tek tür ya da miktar olarak mevcut durumları ortaya konmakta ve araştırma konusuyla ilgili davranış, tutum, beklenti, gereksinim, bilgi düzeyi gibi özellikler tek bir ölçme işlemi ile belirlenmeye çalışılmaktadır. İlişkisel tarama modelleri ise iki veya daha çok sayıdaki değişken arasında birlikte değişim varlığını ve derecesini belirlemeyi amaçlamaktadır (Büyüköztürk ve diğerleri, 2013; Karasar, 2012; Lodico, Spaulding & Voegtler, 2010). Araştırmaya 2022-2023 Güz Döneminde spor fakültesinin antrenörlük, beden eğitimi öğretmenliği, spor yöneticiliği ve rekreasyon olmak üzere dört bölümünde öğrenim gören 89 kız (%26,4) ve 170 erkek (%56,6) olmak üzere toplam 259 öğrenci katılmıştır. Öğrencilerine e-posta yoluyla anket aracı, araştırmanın amacı ve onam formu gönderilmiştir. Veriler, Demografik Veri Formu; Problem Çözmeye Yönelik Yansıtıcı Düşünme Beceri Ölçeği (Kızılkaya ve Aşkar, 2009), California Eleştirel Düşünme Eğilimi Envanteri (Facione, Facione ve Giancarlo, 1998) ile toplanılmıştır.

**Sonuç ve Değerlendirme:** Bu çalışmada spor yöneticiliği programı öğrencilerinin eleştirel düşünme eğilimleri ve problem çözmeye yönelik yansıtıcı düşünme puan ortalamaları diğer spor bölümlerindeki öğrencilerin puan ortalamalarından daha yüksek çıkmıştır. Yine bu iki değişkenin puan ortalamaları yüksek olanların haftalık ders çalışma ve haftalık sosyal aktivite süreleri de yüksektir. Bunun yanı sıra fakültede aldıkları derslerin bu iki değişkene katkısının iyi olduğunu algılayan öğrencilerin de eleştirel düşünme eğilimleri ve problem çözmeye yönelik yansıtıcı düşünme puan ortalamaları yüksektir. Öğrenci merkezli bir yaklaşım olarak yansıtıcı düşünme eğitiminde, spor bilimleri öğrencilerine yeni bilgileri uygulayabilecekleri, pekiştireç alabilecekleri, deneyimlerinden çıkarım yapabilecekleri ve kendilerini ifade edebilecekleri bir öğretim olmalıdır. Bu çalışmada sosyal aktivitede bulunma süreleri fazla olan katılımcıların problem çözmeye yönelik yansıtıcı düşünme becerilerinin de yüksek olduğu belirlenmiştir. İster yansıtıcı düşünme eleştirel düşünmeyi yordalsın isterse durum tersi olsun her hâlikârda birinin geliştirilmesi diğerini de etkileyeceği söylenebilir. Bu çalışmadaki bulgular, eleştirel

düşünme becerilerinin alt boyutlarının problem çözmeye yönelik yansıtıcı düşünme becerilerinin geliştirilmesindeki etkileri hakkında bilgi vererek bu sınıflandırmaya katkıda bulunmaktadır. Araştırmacılar, spor bilimleri öğrencilerinin gerek meslek yaşamlarında gerekse sosyal yaşamlarında iyi performans göstermeleri amacıyla eleştirel düşünme ve yansıtıcı düşünme becerilerini kazandırmak için bu araştırmanın sonuçlarından yararlanarak farklı değişkenler üzerinde uygulamalı araştırmalar yapabilirler. Araştırmanın Türkiye'de bir devlet üniversitesinin 1041 öğrencili spor bilimleri fakültesindeki gönüllü 259 öğrencisiyle gerçekleştirilmesi neticesinde küçük bir etki büyüklüğüne sahip olması çalışmanın sınırlılığdır.