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# The comparison of critical thinking and problem solving disposition of athletes according to gender and sport type<sup>1</sup>

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## Abstract

The terms “critical thinking and problem solving” are crucial for cognitive processes of athletes. It could also be said that these two concepts are likely to affect athletic performance of individuals. Therefore, the aim of this research was to investigate critical thinking and problem solving disposition of athletes. For this purpose 432 athletes ( $X_{age}$ :  $20.53 \pm 3.85$ ;  $X_{sportexperience}$ :  $9.47 \pm 4.22$ ) who comprise of 261 males (60.4%) and 171 females (39.6%) participated to the research. Problem Solving Inventory and California Scale of Disposition to Think Critically. The data was analysed by SPSS 17.0 by using descriptive statistics and t-test Level of significance was determined to be 0.05. Results showed that mean score for critical thinking was  $3,82 \pm ,41$  and the mean was  $3,83 \pm ,46$  for problem solving skill of the athletes. It was also found that there was not a significant difference between males and females according to critical thinking ( $p > 0,05$ ). However, males' and females' scores for problem solving significantly differed ( $p < 0,05$ ). Any significant difference was not obtained according to sport type. Overall, it could be said that gender can act as a determiner role among athletes in terms of problem solving disposition.

**Keywords:** Critical thinking, problem solving, athletes

## Introduction

Constructivism refers to perspectives on human learning that reject the notion of the existence of an objective reality to see learning as an interpretative process shaped by previous experience through which we construct our own particular versions of reality (Light and Wallian, 2008). One cannot think of constructivist teaching, however, as a monolithic, agreed-upon concept. The extent

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of the agreement among the various constructivist approaches is that constructivism is a learning or meaning-making theory (Richardson, 1997). As constructivism began to take hold among cognitive scientists as a viable model to explain epistemology and behavior, it began to have an effect on models of education. Although educators now commonly talk about a “constructivist-based” practice as if there is such a thing, in reality constructivism is not a theory of teaching; it is a theory about learning (Fosnot, 2005). When considered from view of sport, it is possible to say there are numerous problems in sport fields. Therefore, it may be considered that athletes are able to show a better sportive performance by perceiving those problems and seeking solutions for them. In this context, an athlete may be defined as a student who is acting in sport fields.

Information society requires individuals to have many diverse qualifications such as knowing and applying various ways of thinking, researching, problem solving, and having creative and critical thinking skills (Demirhan et al., 2011). Critical thinking is, self-directed, self-disciplined, self-monitored, and self-corrective thinking. It presupposes assent to rigorous standards of excellence and mindful command of their use. It entails effective communication and problem-solving abilities. Critical thinking helps us to see with new eyes (Paul and Elder, 2013). Constructivist teaching fosters critical thinking and creates motivated and independent learners (Gray, 1997). According to Facione (2010), a few critical thinking skills such as: interpretation, analysis, inference, evaluation, explanation, and self-regulation which can be applied by the athletes to improve their sport performance in the competitions. The first step of core critical thinking skill refers to interpretation which mentions how to comprehend and express the significant and meaning a wide variety of experiences, situations, events, judgments, conventions, benefits, roles, criteria, and procedures. Therefore, athletes should be able to apply their interpretations as a core critical thinking skills to cope with the different kinds of sport competitions (Sulaiman et al., 2013). Defined as a cognitive-affective behavioral process through which an individual or group identifies or discovers effective means of coping with problem encountered in everyday living (Yığiter, 2013), problem solving in psychology, which is the focus of attention is an important issue for many years. Made a lot of investigation relating to the process of problem solving was placed in a multi-concept. Problem solving is cognitive processing directed at achieving a goal when no solution method is obvious to the problem solver (Kolayış et al., 2012).

In addition, constructivism is the way to explained how human construct their knowledge. Therefore, like students athletes should also need to think divergently, such that: thinking creative, looks the problems from every side to find many possible solutions based on the information. Therefore, to enrich students' experience and construct their ability from the material that have

been studied by the student with their ability, better use constructivism (Sanni et al., 2011).

Since the terms “critical thinking and problem solving” have an undeniable importance on cognitive processes of athletes as well as that of individuals, it has been the matter of the study to investigate critical thinking and problem solving disposition of athletes.

In this study it was aimed to find answers to the questions listed below:

- 1- If there is a difference between critical thinking and problem solving in terms of gender
- 2- If there is a difference for critical thinking and problem solving in terms of sport type.

## **Method**

### ***Participants***

432 athletes who comprise of 261 males (60.4%) and 171 females (39.6%) participated to the research. 215 (49.8) athletes were from team sports and 217 (50.2%) of them were from individual sports. Mean age of the participants was  $20.53 \pm 3.85$  and mean sport experience was  $9.47 \pm 4.22$ .

### ***Instruments***

Problem Solving Inventory was used in order to measure athletes' problem solving skills. The scale was developed by Heppner and Peterson (1982) to assess one's perceived ability in problem-solving behaviors and attitudes. Its Turkish adaptation study was performed by Şahin, Şahin and Heppner (1993). The scale is a Likert-type scale consisting of 35 items. Thirty two items are evaluated since the nature of scale. Minimum score is 32 and maximum is 192. Higher scores indicate that the individual perceives himself to be inadequate about problem solving skills.

California Scale of Disposition to Think Critically was used to measure critical thinking disposition of the athletes. The original version of the scale was developed by Facione and Facione (1992). The scale consists of 75 items and was originally created in English. Language adaptation of the scale into Turkish was carried out by Kökdemir (2003). For each item in the scale, it was opted to give 6 points to the option of “I absolutely agree”, 5 points to the option of “I agree”, 4 points to the option of “I partially agree”, 3 points to the option of “I partially don't agree”, 2 points to the option of “I don't agree” and 1 point to the option of “I don't agree at all”. For the whole scale of California Disposition to think critically it was stated that the disposition to think critically was low for the participants with less than 240 points (40 x 6), intermediate for those with 240 to 300 points, and high for those with 300 points or above (50 x 6) (Kökdemir, 2003 as cited in Yenice, 2012).

### **Data Collection**

Athletes were contacted by the researchers in face to face interactions. The researchers explained the aim of the research and requested the athletes to take part in the research. The participants were informed that participation was voluntary and all information gathered would be used only for scientific purposes.

### **Data Analysis**

The data obtained from this research were analyzed by using SPSS 17.0. Descriptive statistics were used to examine the variables for mean, standard deviation, minimum and maximum values. T-test was used to determine the differences in terms of gender and sport type. Level of significance was determined as 0.05.

### **Results**

Descriptive statistics for the variables have been presented on table 1.

**Table 1. Descriptive statistics for the variables**

	N	Minimum	Maximum	Mean	Std. Deviation
Critical Thinking	432	2,75	5,75	3,82	,41
Problem Solving Skill	432	2,63	5,41	3,83	,46

Results showed that mean score for critical thinking was  $3,82 \pm ,41$  and the mean was  $3,83 \pm ,46$  for problem solving skill of the participants.

**Table 2. The difference according to gender**

	Gender	N	Mean	Std. Deviation	t	p
Critical Thinking	Male	261	3,80	0,39	-1,50	0,13
	Female	171	3,86	0,43		
Problem Solving Skill	Male	261	3,79	0,45	-2,42	*0,02
	Female	171	3,90	0,47		

\* $p < 0,05$

Results revealed that there was not a significant difference between males and females according to critical thinking ( $p > 0,05$ ). In contrary, significant difference was obtained between males and females for the scores of problem solving skill ( $p < 0,05$ ).

**Table 3. The difference according to sport type**

	Sport type	N	Mean	Std. Deviation	t	p
Critical Thinking	Team Sports	215	3,80	0,38	-1,203	0,23
	Individual Sports	217	3,85			
Problem Solving Skill	Team Sports	215	3,81	0,46	-1,094	0,27
	Individual Sports	217	3,86			

Independent sample t test indicated that there was not a significant difference between the athletes of team sports and individual sports for critical thinking ( $p > 0,05$ ). The results also showed that there was no significant difference between the athletes of team sports and the athletes from individual sports in terms of problem solving skills ( $p > 0,05$ ).

## Discussion

The purpose of the study was to examine critical thinking and problem solving disposition of athletes in terms of gender and types of sports.

When the literature is examined, there are some results supporting that gender is a significant indicator in problem solving disposition (Altunçekiç, Yaman & Koray, 2005; Yıldırım, Hacıhasanoğlu, Karakurt & Türkleş, 2011). Cross-sectional studies described the relationship between problem-solving disposition and gender among younger adults, middle-aged and older aged using large sample sizes (Brems and Johnson, 1988; D'Zurila et al., 1998). However, in the study of Canan and Ataoğlu (2010), gender was not found to be a determinant of problem solving disposition.

Although both males and females can have their performance fall apart, for males, the conditions leading to the deterioration of performance seem to many coaches to be more obvious. In addition, many coaches will tell you that as problems do occur, males seem to be more capable of problem solving in the situation, than females (Nideffer and Bond, 2000). The findings of this study showed that there was a significant difference between genders on problem-solving disposition. The type of gender was positively significant in the favour of males. This result has been supported also by the studies of Brems & Johnson, 1988; D'Zurila et al., 1998; Heppner & Peterson, 1982; Uslu & Girgin, 2010., Kolayış, et al., 2012. According to Uslu and Girgin (2010) Turkish culture; as in Turkish culture, boys are more independent than girls in their relationships outside, they are not limited and under control as much as girls. When they are leaving their families in order to have an

education for most of the girls it is their first separation. So they have more difficulties in problem solving skills compared to boys. Since boys meet outside world earlier than girls, it can be considered that they are more capable of solving problems.

When the second research topic of the present study is examined, no significant difference for critical thinking according to gender and types of sports was found. The results of this study shows similarities with the studies done by Walsh & Hardy (1999), Gelen (2002), Kökdemir (2003), Yaman and Yalçın (2005), Ekinci (2009), Tümkeya et al., (2009), Turan (2012) in terms of critical thinking disposition not varying in gender. Similarly, it was also found that gender was not a significant variable related to critical thinking disposition. In Azar's (2010) study there was not found significant difference between the two groups who have higher and lower critical dispositions regarding gender.

In the light of the explanations, aiming to examine critical thinking and problem solving disposition of athletes in terms of gender and types of sports, problem-solving disposition for athletes was related with gender, and it was in favour of males. However, no significant difference for critical thinking in terms of gender and types of sports was found. Starting from these results, it is possible to say that while gender may act as a determiner role among athletes in terms of problem solving disposition. No differences were found with regard to gender for critical thinking disposition of athletes.

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