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Evaluation of the Relationship between Athlete Self-Efficacy and Mental Toughness in Rugby Players

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ABSTRACT

This research aimed to examine the relationship between athlete self-efficacy and mental toughness of rugby athletes. The research sample consisted of 167 (79 female, 88 male) athletes over the age of 18 competing in the Turkish Rugby first league in 2022. To collect data in the research, "Personal Information Form", "Mental Toughness Inventory in Sports" and "Athlete Self-Efficacy Scale" were used. Frequency and percentage values, as well as parametric tests such as Pearson Correlation Test and independent samples t test, were used in statistical analyses. Statistical significance level was taken as $p<0.05$ in the analyses. According to the results obtained in the research, it can be said that there is a moderate positive relationship between the mental endurance of rugby athletes and their athlete self-efficacy. In addition, male rugby players' athletic self-efficacy and mental endurance are higher than female rugby athletes. While the mental endurance levels of rugby athletes do not vary according to age, the athlete self-efficacy levels of rugby players aged 23 and over are higher than those under the age of 23. Mental toughness and athlete self-efficacy levels do not differ according to educational status. As rugby players' athletic experience increases, their athlete self-efficacy and mental endurance also increase.

Keywords: Athlete, rugby, self-efficacy, mental toughness.

INTRODUCTION

It has been revealed by research that physical and technical performance alone are not sufficient to achieve high-level performance and success in sports (Yalcin & Turan, 2021), and that psychological skills, just like physical and technical skills, should be systematically studied and developed (Weinberg & Gould, 2015).

Rugby, one of the highly competitive sports, is a team sport that includes physical parameters such as endurance, strength, speed, agility, intense contact, and requires strategic thinking (Gabbett et al., 2007). Although rugby is a team sport, individual talents and skills are also very important. The psychological skills of rugby athletes are an important factor in achieving and maintaining high performance (Batista et al., 2019). This situation emphasizes that rugby athletes need to be physically and psychologically prepared for competitions.

Athlete self-efficacy is considered one of the important psychological factors affecting performance in sports. Athlete self-efficacy is the belief of athletes in their abilities to be successful in

the sport they are interested in (Koçak, 2020) and is a more complex structure than beliefs related to performing different situational tasks and motor skills such as hitting the ball hard and curved or hitting the opponent's field (Feltz et al., 2008). Athlete self-efficacy is an important variable that affects athletes' behaviors and thoughts in different situations (Yılmaz et al., 2020) and affects athletes' level of initiative and success in target behavior (Koçak & Çolak, 2024). With this feature, athlete self-efficacy guides athletes in determining goals and roadmaps (Taiwo, 2015). According to Koçak (2020), athletes with high athlete self-efficacy beliefs have higher levels of realistic goal setting, effort, resistance to difficulties, motivation and effective stress management.

Mental endurance is one of the important psychological skills thought to affect success in sports (Güven & Yazıcı, 2020). Mental endurance is known as the ability of an athlete to recover quickly in difficult situations, to minimize the negative effects of the stress they are exposed to, to maximize concentration, to adapt to the environment and psychological resilience (Altıntaş, 2015). Mental endurance is considered an important factor affecting performance in addition to the skills, technical and tactical characteristics of successful athletes (Gucciardi & Gordon, 2011). The concept of mental endurance, which was initially seen as an element of personality, has begun to be evaluated as an indicator of psychological performance for athletes in later periods (Güvendi et al., 2018).

When the relevant literature is examined, studies investigating the relationship between athlete self-efficacy and performance in sports (Singh et al., 2009; Valiante & Morris, 2013; Beattie et al., 2016) draw attention. Studies examining the relationship between mental toughness and performance (Newland et al., 2013; Cowden, 2017; Guszkowska & Wójcik, 2021) are also seen. However, it has been observed that studies examining athlete self-efficacy and mental toughness together (Brace et al., 2020; Aizava et al., 2023) are available in the international literature but are limited among national publications (Yıldız, 2017; Koçyiğit, 2022). On the other hand, studies examining the relationship between athlete self-efficacy and mental toughness in a sports branch such as rugby, where competition is at a high level and psychological factors can affect performance, could not be found. Based on this, it is thought that determining the relationship between athlete self-efficacy and mental toughness level in rugby athletes is important in terms of contributing to the literature.

This study aims to examine the relationship between rugby athletes' athlete self-efficacy and mental toughness. The research questions determined for this purpose are given below.

Is there a statistically significant relationship between rugby athletes' athlete self-efficacy and mental toughness?

Is there a statistically significant difference between rugby athletes' athlete self-efficacy and mental toughness according to gender?

Is there a statistically significant difference between rugby athletes' athlete self-efficacy and mental toughness according to age categories?

Is there a statistically significant difference between rugby athletes' athlete self-efficacy and mental toughness according to their education level?

Is there a statistically significant difference between rugby athletes' athlete self-efficacy and mental toughness according to their duration of sportsmanship?

Is there a statistically significant difference between rugby athletes' athlete self-efficacy and mental toughness according to whether they are national athletes or not?

METHOD

Research Model

This research was designed in the relational screening design, which is one of the quantitative research methods. Relational screening models are studies that examine the degree of change or existence of many variables together (Fraenkel & Wallen, 2009). The research was initiated with the permission of the Aksaray University Human Research Ethics Committee dated 25.04.2022 (Protocol No: 2022/02-52; Ethics Committee Decision Number: E-34183927-000-00000712396).

Study Group

The universe of the study consists of male and female athletes competing in the Turkish Rugby League. The sample of this study consists of 167 athletes who are over the age of 18 (20.10±4.82 years old) competing in the Turkish Rugby 1st League in 2022. The research sample was reached by random sampling method. Some demographic information of the sample group is summarized in Table 1.

Table 1. Personal characteristics of the athletes participating in the study

Variable	Category	n	Percentage %
Gender	Women	79	47,3
	Men	88	52,7
Age	18-22 age	111	66,4
	23 +	56	33,6
Educational Status	High School	104	62,3
	Undergraduate	63	37,7
Athlete Duration	1-3 years	134	80,2
	4 years +	33	19,8
Total		167	100,0

Table 1 shows that 47.3% of the athletes participating in the study were female, 52.7% were male; 111 participants were between the ages of 18-22, and 56 participants were over 23 years old.

Data Collection Tools

The research data were obtained using the survey technique. Personal Information Form, Athlete Self-Efficacy Scale and Mental Toughness Inventory in Sports were used to collect the data.

Personal Information Form: It was created by the researchers to determine the demographic characteristics of the athletes in the study sample. Questions were included regarding gender, age, education status, duration of sportsmanship and national sportsmanship status, which are thought to be effective on the dependent variables determined within the scope of the study.

Athlete Self-Efficacy Scale: The Athlete Self-Efficacy Scale developed by Koçak (2020) was used to evaluate the self-efficacy of rugby athletes. The scale is a 5-point Likert type and consists of 16 items in total. This scale is a 5-point Likert type and consists of the sub-dimensions of sports branch competence, psychological competence, professional thought competence and personality competence.

Mental Toughness Inventory in Sports: It was developed by Sheard et al. (2009) to determine the mental toughness levels of athletes and was adapted to Turkish by Altıntaş (Altıntaş & Koruç-Bayar, 2016). The inventory consists of 14 items and 3 sub-dimensions. In addition to general mental toughness, it was designed with three sub-dimensions, namely Confidence, Control and Continuity, and a 4-point Likert structure.

Analysis of Data

The data collected within the scope of the study were first examined in terms of descriptive statistics. Whether the data were suitable for normal distribution was evaluated with skewness-kurtosis and stem-leaf scatter. In the data set determined to have normal distribution, the Pearson correlation test was used to determine the relationship between athlete self-efficacy and mental toughness, and whether the participants' gender, age, education status, sports age, and national status variables differed according to their categories was analyzed with the independent groups t-test. SPSS-22 package program was used in the analysis of the data. In the study, $p<0.05$ was accepted as a statistically significant value.

RESULTS

Descriptive statistics such as arithmetic mean, standard deviation, median, skewness-kurtosis and Cronbach's Alpha of the dependent variables used in the study are summarized in Table2.

Table 2. Descriptive statistics on mental toughness and athlete self-efficacy

Scale	Dimensions	$\bar{X}$±S.S.	Median	Skewness	Kurtosis	Cr α
Mental Toughness	Scale total	2,90 ± 0,34	2,86	,348	,267	,734
	Confidence	3,03 ± 0,44	3,00	,259	-,127	,711
	Continuity	3,30 ± 0,42	3,25	-,246	-,165	,794
	Control	2,29 ± 0,59	2,25	,115	-,033	,687
	Scale total	3,75 ± 0,68	3,81	-,544	-,273	,892

Athlete Self-efficacy	Sport Discipline Efficacy	3,49 ± 0,87	3,50	-,487	-,075	,785
	Psychological Efficacy	3,95 ± 0,83	4,00	-,764	,267	,736
	Professional Thought	3,63 ± 0,79	3,75	-,251	-,464	,765
	Personality Efficacy	3,93 ± 0,77	4,00	-,533	-,381	,718

When the skewness and kurtosis coefficients of the dependent variables used in the study are examined, it is seen that the skewness and kurtosis coefficients for all variables are in the range of (-1, +1). In the literature, it is stated that the skewness and kurtosis coefficients between +1.5 and -1.5 (Tabachnick & Fidell, 2013) are sufficient to accept the existence of a normal distribution. Accordingly, it can be said that the data of this study conform to a normal distribution. In addition, the Cronbach's Alpha values obtained as a result of the reliability analysis conducted for the measurement tools showed that the scales can be used reliably in this sample.

According to the arithmetic mean values in Table 2, it can be said that rugby athletes generally received the highest score in the continuity sub-dimension of their mental toughness and the lowest score in the control sub-dimension. In terms of athlete self-efficacy, it is seen that the highest average is in the psychological competence sub-dimension and the lowest average is in the sports branch competence sub-dimension.

Pearson correlation analysis was conducted to determine the relationships between the mental toughness of athletes and athlete self-efficacy, and the findings are presented in Table 3.

Table 3. Evaluation of the relationship between mental toughness and athlete self-efficacy

Scales	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1. Confidence	1							
2.Control	,16*	1						
3. Continuity	,41**	,18*	1					
4.MT-Total	,78**	,65**	,67**	1				
5.SDE	,50**	,06	,46**	,47**	1			
6.PSE	,39**	,16*	,49**	,47**	,53**	1		
7.PTE	,29**	,09	,36**	,34**	,52**	,60**	1	
8.PE	,48**	,09	,39**	,45**	,60**	,71**	,61**	1
9. ASES-Total	,50**	,12	,51**	,52**	,80**	,85**	,81**	,87**

*p<0,05; **p<0,01; MT=Mental Toughness, ASES: Athlete Self-Efficacy Scale, SDE: Sports Discipline Efficacy, PSE: Psychological Efficacy, PTE: Professional Thought Efficacy, PE: Personality Efficacy

When the correlation matrix in Table 3 is examined, it is seen that there is a moderate, positive and statistically significant relationship (r=,52; p<0,01) between the total mental toughness (MT) and total athlete self-efficacy (ASES). Similarly, there are positive and statistically significant correlations between the MT and athlete self-efficacy sub-dimensions ranging from 0,34 to 0,47. There are positive correlations between the ASES and mental toughness sub-dimensions ranging from 0,12 to 0,51.

Whether there is a statistically significant difference between the athletic self-efficacy and mental toughness levels of rugby players according to gender was analyzed using an independent groups t-test. The results are summarized in Table 4.

Table 4. Comparison of mental toughness and athlete self-efficacy according to gender

Scale	**Dimension**	**Gender**	**n**	**$\bar{X}$±S.S.**	**t**	**p**
Mental Toughness	Scale total	Women	79	2,84 ± ,33	2,044	,043*
		Men	88	2,95 ± ,34		
	Confidence	Women	79	2,93 ± ,43	2,786	,006*
		Men	88	3,12 ± ,42		
	Continuity	Women	79	3,31 ± ,41	0,088	,930
		Men	88	3,30 ± ,44		
	Control	Women	79	2,24 ± ,58	1,087	,279
		Men	88	2,34 ± ,60		
	Scale total	Women	79	3,63 ± ,75	2,092	,038*

		Men	88	3,86 ± ,59		
Athlete Self-efficacy	Sport Discipline Efficacy	Women	79	3,26 ± ,98	3,180	,002*
		Men	88	3,69 ± ,71		
	Psychological Efficacy	Women	79	3,93 ± ,93	0,247	,805
		Men	88	3,97 ± ,73		
	Professional Thought Efficacy	Women	79	3,51 ± ,84	1,930	,055
		Men	88	3,74 ± ,73		
	Personality Efficacy	Women	79	3,83 ± ,88	1,576	,117
		Men	88	4,02 ± ,64		

*p<0,05

When the analysis results presented in Table 4 are examined, it is seen that there is a statistically significant difference in favor of male athletes according to the MT total scores (t=2,044; p=,043) and MT confidence dimension scores (t=2.786; p<0.05). There is no statistically significant difference in the continuity and control sub-dimensions of the mental toughness scale (p>0,05).

It is seen that there is a statistically significant difference in favor of male athletes according to the participants' ASES total scores (t=2,092; p<0,05) and the sport discipline efficacy dimension scores (t=3,180; p<0,05). There is no significant difference in the psychological efficacy, professional thought efficacy and personality efficacy dimensions of athlete self-efficacy according to gender (p>0,05).

The mental toughness and athlete self-efficacy levels of rugby athletes according to the age variable were compared with the independent groups t test and the findings are given in Table5.

Table 5. Comparison of mental toughness and athlete self-efficacy according to age

Scale	**Dimension**	**Age**	**n**	**$\bar{X}$±S.S.**	**t**	**p**
Mental Toughness	Scale total	18-22	111	2,89 ± ,34	0,039	,969
		23 +	56	2,90 ± ,32		
	Confidence	18-22	111	3,01 ± ,44	0,620	,536
		23 +	56	3,06 ± ,44		
	Continuity	18-22	111	3,34 ± ,41	1,752	,082
		23 +	56	3,22 ± ,46		
	Control	18-22	111	2,27 ± ,61	0,636	,525
		23 +	56	2,33 ± ,56		
Athlete Self-efficacy	Scale total	18-22	111	3,67 ± ,67	2,021	**,045***
		23 +	56	3,90 ± ,68		
	Sport Discipline Efficacy	18-22	111	3,35 ± ,88	2,847	**,005***
		23 +	56	3,75 ± ,80		
	Psychological Efficacy	18-22	111	3,91 ± ,81	0,840	,402
		23 +	56	4,03 ± ,88		
	Professional Thought Efficacy	18-22	111	3,57 ± ,75	1,358	,176
		23 +	56	3,75 ± ,86		
	Personality Efficacy	18-22	111	3,86 ± ,77	1,608	,110
		23 +	56	4,07 ± ,74		

*p<0,05

According to the analysis results in Table 5, it was determined that the mental toughness of rugby players did not show any statistically significant difference according to the age variable (p>0,05).

On the other hand, the athlete self-efficacy of rugby players aged 23 and over was significantly higher than those under 23 (t=2,021; p<0,05). A similar difference was found in the sub-dimension of sports discipline efficacy. The sports discipline efficacy of

athletes aged 23 and over was significantly higher than those under 23 (t=2,847; p<0,05). There was no significant difference in the psychological efficacy, professional thought efficacy and personality efficacy dimensions of athlete self-efficacy according to age (p>0,05).

The mental toughness and athlete self-efficacy of rugby players according to their educational status were compared with the independent groups t test (Table 6).

Table 6. Comparison of mental toughness and athlete self-efficacy according to educational status

Scale	Dimension	Education	n	$\bar{X}$±S.S.	t	p
Mental Toughness	Scale total	High School	104	2,92 ± ,33	0,937	,350
		Undergraduate	63	2,86 ± ,35		
	Confidence	High School	104	3,04 ± ,43	0,323	,747
		Undergraduate	63	3,01 ± ,44		
	Continuity	High School	104	3,36 ± ,42	2,437	,016*
		Undergraduate	63	3,20 ± ,42		
	Control	High School	104	2,29 ± ,60	0,204	,838
		Undergraduate	63	2,31 ± ,60		
Athlete Self-efficacy	Scale total	High School	104	3,72 ± ,67	0,760	,449
		Undergraduate	63	3,80 ± ,70		
	Sport Discipline Efficacy	High School	104	3,40 ± ,88	1,601	,111
		Undergraduate	63	3,63 ± ,85		
	Psychological Efficacy	High School	104	3,96 ± ,79	0,170	,865
		Undergraduate	63	3,93 ± ,90		
	Professional Thought Efficacy	High School	104	3,59 ± ,77	0,828	,409
		Undergraduate	63	3,70 ± ,83		
	Personality Efficacy	High School	104	3,92 ± ,77	0,760	,449
		Undergraduate	63	3,95 ± ,77		

*p<0,05; **p<0,01

According to Table 6, a significant difference was found between the mental toughness of the athletes according to the educational status variable in the continuity dimension of MT (t=2,437; p<0,05). Accordingly, the mental toughness of the athletes with a high school education level is higher than the athletes with a higher education level.

On the other hand, no significant difference was found in the MT scale total, confidence and control dimensions, and ASES and its sub-dimensions according to educational status (p>0.05).

The mental toughness of the rugby athletes and the athlete self-efficacy were compared with the independent groups t-test according to the sportsmanship duration categories, and the results are summarized in Table 7.

Table 7. Comparison of mental toughness and athlete self-efficacy according to duration of athletics

Scale	Dimension	Athletic duration	n	$\bar{X}$±S.S.	t	P
Mental Toughness	Scale total	1-3 years	134	2,89 ± ,33	2,944	,004*
		4 years +	33	3,05 ± ,34		
	Confidence	1-3 years	134	2,97 ± ,43	3,697	,000*
		4 years +	33	3,27 ± ,36		
	Continuity	1-3 years	134	3,29 ± ,44	0,557	,578
		4 years +	33	3,34 ± ,38		
	Control	1-3 years	134	2,26 ± ,59	1,412	,160
		4 years +	33	2,42 ± ,63		
Athlete Self-efficacy	Scale total	1-3 years	134	3,68 ± ,68	2,737	,007*
		4 years +	33	4,04 ± ,60		
		1-3 years	134	3,34 ± ,88	5,819	,000*

	Sport Discipline Efficacy	4 years +	33	4,07 ± ,56		
	Psychological Efficacy	1-3 years	134	3,92 ± ,85	0,965	,336
		4 years +	33	4,08 ± ,74		
	Professional Thought Efficacy	1-3 years	134	3,59 ± ,72	1,255	,211
		4 years +	33	3,79 ± ,93		
	Personality Efficacy	1-3 years	134	3,86 ± ,79	2,358	,020*
		4 years +	33	4,21 ± ,63		

*p<0,05

According to the analysis results presented in Table 7, rugby players with a sports age of 4 years and above have significantly higher mental toughness than rugby players with a sports age of 1-3 years (t=2,944; p<0,05). Again, in the MT confidence sub-dimension, rugby players with a sports age of 4 years and above have higher confidence levels than rugby players with a sports age of 1-3 years (t=3,697; p<0,05). There is no significant difference in the continuity and control dimensions (p>0,05).

According to Table 7, rugby players with a sports age of 4 years and above have higher athlete self-efficacy levels than those with a sports age of 1-3 years (t=2,737; p<0,05). A similar difference is also found in the dimensions of ASES sports discipline efficacy (t=5,819; p<0,05) and personality efficacy (t=2,358; p<0,05). There is no significant difference in the dimensions of psychological efficacy and professional thought efficacy (p>0,05).

DISCUSSION

When the findings obtained in this study were evaluated, it was determined that there was a significant relationship between athlete self-efficacy and mental toughness of high-level rugby athletes. This relationship shows that athlete self-efficacy and mental toughness increase and decrease together and in the same direction. Literature information supports the findings obtained in this study. For example, in studies conducted on athletes in different sports branches (Chen & Cheesman, 2013; Newland et al., 2013; Koçyiğit, 2022; Aizava et al., 2023; Koçak & Çolak, 2024), results were obtained indicating that athletes' self-efficacy can be a determinant for their mental toughness. This relationship between athlete self-efficacy and mental toughness was found to be largely valid on the basis of sub-dimensions. It was determined that there was no significant relationship between the sub-dimensions of athlete self-efficacy and the control sub-dimension of mental toughness, whereas the relationships between the sports branch and psychological competence sub-dimensions of the athlete self-efficacy scale and mental toughness were relatively higher.

When the gender variable findings of the study were examined, it was determined that there was a statistically significant difference in favor of male athletes in both athlete self-efficacy and mental toughness. It was determined that there was a significant difference in favor of male athletes in the sports branch of athlete self-efficacy and the confidence sub-dimensions of mental toughness. There are research results in the literature that are parallel to this finding (Demir & Çelebi, 2019; Kalkavan et al., 2020; Koç & Gençay, 2021; Şahinler & Beşler, 2021) and research results that are not similar (Ilhan, 2020; Sarı et al., 2020; Kocaekşi & Yıldırım, 2020; Ramolale et al., 2021).

No significant relationship was found between the mental toughness of rugby players and their age categories. Studies in the literature that did not find a significant correlation between mental toughness and age (Sarı et al., 2020) support this finding. However, there are studies reporting that the mental toughness of athletes varies according to age (Demir & Çelebi, 2019; Kalkavan et al., 2020; Ilhan, 2020; Şahinler & Beşler, 2021; Koç & Gençay, 2021). According to the age variable, it was determined that there was a significant difference between the athlete self-efficacy of rugby players, and that the athlete self-efficacy of athletes aged 23 and over was significantly higher than that of athletes under 23. In the literature, it is possible to come across studies reporting that athlete self-efficacy increases as age increases (Asan, 2023).

A significant difference was found in the continuity sub-dimension of mental toughness according to the educational status variable. It has been observed that athletes with secondary education have higher mental toughness than athletes with higher education. It is possible to come across studies in the literature that support this finding (Şahinler & Beşler,

2021) and contradict it (Sarı et al., 2020). It has been determined that there is no significant difference between the athlete self-efficacy according to the educational status variable of top-level rugby athletes.

According to the findings obtained in the study, rugby players with more than 4 years of athletic experience have higher mental toughness and athlete self-efficacy levels than those with less than 4 years. Guszkowska and Wójcik (2021) and Yarayan et al. (2018), stated that mental toughness increases as athletic experience increases. Similarly, Koçak (2019) and Koçak and Çolak (2024) reported a positive relationship between experience and self-efficacy in athletes.

As a result, there is a positive relationship between athlete self-efficacy and mental toughness in rugby players. Male rugby players have higher athlete self-efficacy and mental toughness. While the mental toughness levels of rugby players do not change according to age, the athlete self-efficacy levels of rugby players aged 23 and over are higher than those under 23. In addition, the mental toughness and athlete self-efficacy levels do not change according to educational status. As the athletic experience of rugby players increases, their athlete self-efficacy and mental toughness also increase.

Considering the research results and literature information obtained, studies can be conducted to increase the athlete self-efficacy and mental toughness levels of female and short-term athletic rugby players. On the other hand, since it is a new sport in Turkey, the number of athletes playing rugby at the elite level is low. One of the biggest limitations of this study is the small sample size despite reaching all high-level athletes. It is thought that research to be conducted especially on the youth athlete sample will be important in subsequent studies. Similar studies can be conducted with different sample sizes and different variables. Qualitative research methods can be used to obtain more in-depth information.

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