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Mental Toughness in Athlete Students: The Predictive Role of Psychological Skills and The Investigation of the Relationship Between Them According to Some Variables

Sporcu Öğrencilerde Zihinsel Dayanıklılık: Psikolojik Becerilerin Yordayıcı Rolü ve Aralarındaki İlişkinin Bazı Değişkenlere Göre İncelenmesi

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MENTAL TOUGHNESS IN ATHLETE STUDENTS: THE PREDICTIVE ROLE OF PSYCHOLOGICAL SKILLS AND THE INVESTIGATION OF THE RELATIONSHIP BETWEEN THEM ACCORDING TO SOME VARIABLES

ABSTRACT:

Scientific realities show that mental toughness and psychological skills are very important for athletes to be psychologically well not only before the competition but also during and after the competition. Being able to continue the sports life at the same time while carrying out educational activities requires more mental toughness and psychological skills than usual. From this point of view, the research aims to determine the role of psychological skills in sports in the mental resilience of athletes who actively do sports and to analyse their relations with each other and with some variables. The study group of the research consists of 420 student-athletes (Avgage=21.96±3.20), 130 of them are females (31.0%) and 290 of them are males (69.0%), studying in the faculties of sports sciences. In the current study, "the Athletes' Psychological Skills Assessment Scale" and "The Mental Toughness Scale" was used. Descriptive statistics, T-Test, ANOVA and Multiple Linear Regression analysis were used for data analysis. In the research findings, it was detected that male athletes have a better ability to perform well under pressure and income status has an effect on getting rid of worries, goal setting and mental preparation. The mental toughness and psychological skills of those who slept 8 hours or less a day were higher than those who slept 8 hours or more. Similarly, it was concluded that athletes who have reading habits have higher mental toughness and psychological skills. Additionally, one of the important results of the research is also that improving concentration, being open to learning, the ability to cope with difficulties, confidence and success motivation, targeting and mental preparation skills, which are among the psychological skills of athletes, explain 44% of the total variance in mental toughness. It can be said that psychological skills have an important role in determining mental toughness.

Keywords: *Mental Toughness, Psychological Skills, Student, Athlete.*

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SPORCU ÖĞRENCILERDE ZİHİNSEL DAYANIKLILIK: PSİKOLOJİK BECERİLERİN YORDAYICI ROLÜ VE ARALARINDAKİ İLİŞKİNİN BAZI DEĞİŞKENLERE GÖRE İNCELENMESİ

ÖZ:

Bilimsel gerçeklikler sporcular için zihinsel dayanıklılığın ve psikolojik becerilerin sportif müsabakalar öncesinde olduğu gibi müsabaka anında ve sonrasında da sporcunun psikolojik açıdan iyi olabilmesi için oldukça önemli olduğunu göstermektedir. Eğitim-öğretim faaliyetlerini yürütürken aynı zamanda sporculuk yaşantısını da devam ettirebilmek normalden daha fazla zihinsel dayanıklılığı ve psikolojik becerileri gerekli kılmaktadır. Buradan hareketle araştırmanın amacı aktif olarak spor yapan sporcu öğrencilerin zihinsel dayanıklılığında sporda psikolojik becerilerin rolü belirlenip, birbirleriyle ve bazı değişkenlerle olan ilişkilerinin çözümlenmesidir. Araştırmanın çalışma grubunu spor bilimleri fakültelerinde öğrenim gören 130'u (%31,0) kadın, 290'ı (%69,0) erkek olmak üzere toplam 420 öğrenci sporcu (Ortyaş=21,96±3,20) oluşturmaktadır. Araştırmada "Sporcuların Psikolojik Becerilerini Değerlendirme Ölçeği" ve "Zihinsel Dayanıklılık Ölçeği" kullanılmıştır. Verilerin analizi için betimsel istatistik, T-Testi, ANOVA ve Çoklu doğrusal regresyon analizi kullanılmıştır. Araştırma bulgularında erkek sporcuların baskı altında iyi performans gösterebilme becerilerinin daha iyi olduğu, gelir durumunun endişelerden kurtulma, hedef belirleme ve mental hazırlıkta etkili olduğu saptanmıştır. Günde 8 saat ve daha az uyuyanların zihinsel dayanıklılıkları ve psikolojik becerileri 8 saat ve üzeri uyuyanlara göre daha yüksek bulunmuştur. Kitap okuma alışkanlığı olan sporcuların da benzer şekilde zihinsel dayanıklılık ve psikolojik becerilerinin daha yüksek olduğu sonucuna varılmıştır. Ayrıca, araştırmanın önemli sonuçlarından birisi de sporcuların psikolojik becerilerinden olan zorluklarla başa çıkabilme, konsantrasyonu sağlayabilme, öğrenmeye açıklık, güven, başarı motivasyonu, hedef belirleme ve zihinsel hazırlık becerileri, zihinsel dayanıklılıktaki toplam varyasın %44'ünü açıkladığıdır. Psikolojik becerilerin zihinsel dayanıklılığı belirlemede önemli rolünün olduğu söylenebilir.

Anahtar Sözcükler: *Zihinsel Dayanıklılık, Psikolojik Beceri, Öğrenci, Sporcu.*

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INTRODUCTION

While the concept of mental resilience, which is a long and complex process affected by personal characteristics, environmental conditions and critical situations, was initially considered as a part of personality, later it was handled as a psychological performance indicator of athletes (Crust & Swann, 2011; Carver &

Harmon-Jones, 2009). Mental toughness, which is considered to increase the performance level of athletes, is one of the important subjects of sports psychology (Csikszentmihalyi, 1990; Nergiz et al., 2015). Sports scientists, sports managers, trainers, and even athletes themselves have now focused on the subject of mental toughness. In addition to this, they have begun to accept mental toughness as one of the most important psychological factors in terms of the continuity of sportive success (Jones et al., 2007; Sheard, 2012) and achieving the maximum performance level (Bull et al., 2005; Cox, 2012; Gould et al., 1987; Jones, 2002). The fitness levels or skills of the athletes can significantly affect the outcome of the competition. Indeed, if the physical capacities of the athletes are similar to their competitors, the winner is usually the one with better mental skills (Weinberg & Gould, 2015). In this context, mental and emotional elements in sports can take a more effective role than biomechanics, physiological, technical-tactical and physical elements. Technical-tactical, physiological and psychological skills can be effective in the formation of a good or bad sportive performance and the resulting success and failure (Konter, 1998).

Studies and practices on sports psychology have focused on the question of "Can psychological skills increase sports performance?", and they have revealed that physical sports skills can be developed through psychological methods to increase success and athletic level (Murphy, 2009). Additionally, it is seen that the number of coaches, athletes and sports psychologists who believe that mental toughness has a significant effect on the positive or negative results of competitions is increasing (Pehlivan, 2014).

In the results of studies conducted in recent years, scientists have not agreed on the conceptual framework of mental toughness (Clough et al., 2002; Gould et al., 2002; Gucciardi et al., 2009; Thelwell et al., 2005). The necessity of embodying the conceptual framework more effectively and accurately emerges (Gucciardi et al., 2015). Mental toughness, in the most general way, is explained as the better level of coping skills of athletes in training, competition and some different events compared to their competitors in different mental situations. On the other hand, specifically, it is described as a natural or developed psychological power which enables them to be more task-oriented, self-confident and controlled under pressure than their competitors, as well as to make these characteristics sustainable (Jones et al., 2002). In other words, athletes with more mental toughness show the feature of being individuals who are more competitive, self-confident, and self-motivated, can maintain their attention in stressful situations and can overcome these situations efficiently, can withstand even more complex situations and can sustain a high level of self-belief after failure (Crust & Clough, 2011). Luthans (2002), on the other hand, explains mental toughness as the power to recover from setbacks, failures, conflicts and responsibilities and many similar negative situations, and the positive psychological capacity that can be developed to reach a positive situation.

The environments where sports events take place can express many negative situations such as stress, loss of concentration and failure for the athletes. They need to keep their mental toughness levels at the highest levels in order to be able to get rid of these situations, remove the pressure, recover as soon as possible and be successful (Crust, 2008; Sheard, 2012). In addition, athletes with low mental toughness levels or even not having this feature have evaluated themselves as mentally uncontrolled and weak in terms of performance in sports events (Goldberg, 1992). As seen in the literature, it can be said that being physically strong alone is not enough for continuous performance and sportive success, and psychological factors are at least as important as physical resilience. In addition, it is thought that psychological skills are needed to achieve mental toughness, and use and maintain it efficiently in sports life.

Psychological skills in athletes consist of mental training processes such as the ability to struggle against difficulties, concentration, willingness to learn, self-success motivation and confidence, focusing on the goal and mental preparation, high performance in times of stress and getting rid of anxiety. There is a lot of evidence that psychological skills (Urfa & Aşçı, 2018; Erhan et al., 2015; Erhan et al., 2016), one of the determining factors of sportive performance, play an active role in reducing sports injuries (Vetter & Symonds, 2010; Birrer & Morgan, 2010). Although it is one of the most important methods that provide sportive efficiency in the world, it is obvious that the concept of psychological skills is not fully used in our country (Erhan et al., 2015). However, to achieve high performance in sports, psychological skills that are a systematic and programmed process and pave the way for the acquisition and development of psychological abilities such as motivation, concentration, goal setting, determination, positive affect and self-control, are very important (Neff, 2006).

The scientific facts given show that mental toughness and psychological skills are very important for athletes in terms of being psychologically good during and after the competition, as well as before the sports competitions. On the other hand, the current research participants continue their student life as well as their athletics. Being able to continue the sports life while carrying out educational activities requires more mental toughness and psychological skills than normal. It can be said that the responsibilities of these individuals, who can be called the ones with dual identities carrying both student and athlete identities, have doubled both in their social and sports lives. As these responsibilities increase, so does the potential for exposure to adversity. Despite everything, it can be said that being ready means acquiring and effectively using psychological resilience and psychological skills for an athlete student. Therefore, the necessity and importance of these features are emphasized once again. In line with this importance, the research aims to analyse the relationships between the mental toughness and psychological skills in sports of athletes who actively do sports, with each other and with some variables.

METHOD

Research Design

In this study, the relational survey model, which is one of the quantitative research techniques, was used. Survey models consist of two parts a general survey and a relational survey. General survey models are surveys made either on the whole universe or on a group, sample or sampling to be taken from the universe to reach a general view of the universe in a universe consisting of numerous factors. The relational screening model is a research model that aims to determine the state and level of change between two or more variables. (Fraenkel et al., 2011).

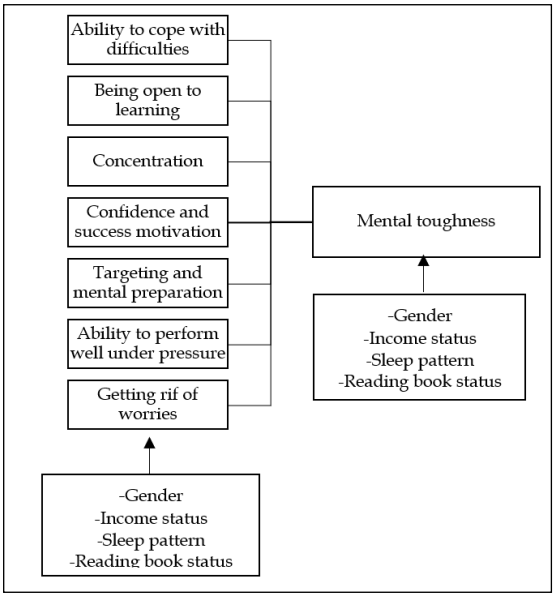

Figure 1. Conceptual diagram of the research model.

Are the ability to cope with difficulties, being open to learning, concentration, confidence and success motivation, targeting and mental preparation, ability to perform well under pressure, and getting rid of worries significant predictors of mental toughness?

Do gender, income status, sleeping pattern and reading book status affect the ability to cope with difficulties, being open to learning, concentration, confidence and success motivation, targeting and mental preparation, ability to perform well under pressure, getting rid of worries, and mental toughness?

Research Group

The research group consists of a total of 420 (Avgage=21.96±3.20) athlete students, 130 of them are women (31.0%) and 290 of them are men (69.0%), who are actively continuing their sports life. While determining the research group, the method of "Convenience Sampling" was used (Erkuş, 2009). Dillman and Salant (1994) reported that 350-500 samples are usually sufficient for a fairly large group of 5000 and above in survey studies. Accordingly, the research group (n=420) is sufficient in number.

Data Collection Tools

In addition to the short demographic information form created by the researchers within the scope of the research, the Athletes' Psychological Skills Assessment Scale and Mental Toughness Scale were used as data collection tools.

The Athletes' Psychological Skills Assessment Scale: The Athletes' Psychological Skills Assessment Scale which was developed by Smith et al. (1995) and adapted into Turkish by Erhan et al. (2015) consists of 28 questions and 7 sub-dimensions. The sub-dimensions of the scale are the ability to cope with difficulties, being open to learning, concentration, confidence and success motivation, targeting and mental preparation, ability to perform well under pressure and getting rid of worries. The answers given to the questions in the scale are (1) rarely, (2) sometimes, (3) often, and (4) almost always. The items 3, 7, 10, 12, 19, and 23 on the scale are reverse coded.

Mental Toughness Scale: The Mental Toughness Scale, developed by Madrigal et al. (2013) and adapted into Turkish by Erdoğan (2016), consists of 11 items in total. The scale is also made up of one dimension. The Cronbach Alpha internal consistency coefficient is 0.86. The scale is a 5-point Likert type. The answers given to the scale are (1) strongly disagree, (2) disagree, (3) undecided, (4) agree, and (5) strongly agree (Erdoğan, 2016).

Data Collection Process

In the research, the method of "Convenience Sampling" was used. The questionnaire method was used as a data collection technique in the study. Before each scale was filled by athletes, it adhered to a voluntary basis, and the rules to be followed were specified in detail. Data collection tools were both delivered to the participants via Google Form by transferring to the online environment and applied by the researcher in the classroom by making an appointment with the instructor within face-to-face lesson hours.

Data Analysis

The data collected from the research were transferred to the SPSS 26.0 package program for analysis. It was decided whether the data met the assumptions of normality tests by examining the skewness and kurtosis values. After the analysis, it was seen that the values were between +1 and -1 and these data were considered to be normally distributed (Tabachnick ve Fidel, 2013). Descriptive statistics, t-test, ANOVA and multiple linear regression test were used in the analysis of the data.

Ethics Committee Approval

Ethics committee approval was received for this study from Tokat Gaziosmanpaşa University, Social and Humanities Research

The Title of The Ethics Committee

Social and Humanities Research

Approval Date: 25.08.2022

Ethics Document's Number: 11-01/26

FINDINGS

In this section, the findings obtained as a result of the analyses are presented in tables.

Table 1. Descriptive Statistics of Variables.

Scale	Dimensions	N	Mean	SD	Kurtosis	Skewness	Cronbach's
MTS	Mental Toughness	420	42.22	7.65	0.61	-0.53	0.74
APSAS	Ability to Cope With Difficulties	420	11.68	2.00	-0.48	-0.08	0.76
	Being Open to Learning	420	12.96	1.81	0.39	-0.43	0.77
	Concentration	420	11.01	2.30	-0.47	-0.50	0.75
	Confidence and Success Motivation	420	11.93	2.25	-0.05	-0.23	0.75
	Targeting and Mental Preparation	420	11.04	2.22	-0.38	0.33	0.76
	Ability to Perform Well Under Pressuare	420	10.69	2.43	-0.49	0.40	0.75
	Getting Rid of Worries	420	13.73	1.90	0.56	-0.85	0.81

APSAS: The Athletes' Psychological Skills Assessment Scale
MTS: Mental Toughness Scale

Concerning the distribution of the scale score, it was seen that the mean score of the total scores obtained from the MTS was (M =42.22) and the standard deviation was (SD=7.65). Examining the Skewness (-0.53) and Kurtosis (0.61) values calculated for the MTS, it can be said that the data meet the normality assumption. The internal consistency coefficient of the whole scale (11 items) is α=0.74. Similarly, participants achieved the highest total score in the Getting rid of worries dimension of APSAS (M= 13.73, SD=1.90). Athlete students included in the study got the lowest total score in the Ability to perform well under pressure dimension of APSAS (M= 10.69, SD=2.43). When the Skewness and Kurtosis values calculated for the APSAS sub-dimensions were examined, it was determined that the data were normally distributed. In addition, the internal consistency coefficients for the APSAS sub-dimensions were also high.

Table 2. The Results of Independent Samples T-Test Concerning Gender.

Scale	Dimensions	Gender	N	Mean	SD	t	p
MTS	Mental Toughness	Male	290	42.09	7.85	-0.34	0.730
		Female	130	42.37	7.26		
APSAS	Ability to Cope With Difficulties	Male	290	11.69	1.96	0.20	0.840
		Female	130	11.65	2.10		
	Being Open to Learning	Male	290	12.98	1.68	0.36	0.734
		Female	130	12.91	2.08		
	Concentration	Male	290	11.06	2.39	0.82	0.411
		Female	130	10.86	211		
	Confidence and Success Motivation	Male	290	12.02	2.33	1.44	0.149
		Female	130	11.68	2.04		
	Targeting and Mental Preparation	Male	290	10.93	2.32	-1.29	0.196
		Female	130	11.23	1.99		
	Ability to Perform Well Under Pressure	Male	290	10.94	2.45	3.20	0.001*
		Female	130	10.13	2.24		
	Getting Rid of Worries	Male	290	13.75	1.91	0.36	0.713
		Female	130	13.68	1.88		

APSAS: The Athletes' Psychological Skills Assessment Scale
MTS: The Mental Toughness Scale

Independent sample T-test analysis results showed that participants' MTS scores did not differ significantly in terms of gender variable (t=-0.34, p>0.05); however, the ability to perform well under pressure score of APSAS showed a statistically significant difference (t=3.20, p<0.001). The mean scores of the male participants were higher than the females in the dimension where the difference was determined (Table 2).

Table 3. The Results of the One-Way ANOVA Test Concerning Income Status.

Scale	Dimensions	Income Status	N	Mean	SD	f	p	Difference
MTS	Mental Toughness	my income is less than my expenses (1)	216	42.06	7.94	0.05	0.948	
		my income is equal to my expenses (2)	155	42.30	7.49			
		my income is more than my expenses (3)	49	42.32	7.09			
APSAS	Ability to Cope With Difficulties	my income is less than my expenses (1)	216	11.68	2.03	1.42	0.242	
		my income is equal to my expenses (2)	155	11.54	2.06			
		my income is more than my expenses (3)	49	12.10	1.64			
	Being Open to Learning	my income is less than my expenses (1)	216	12.94	1.87	0.30	0.737	
		my income is equal to my expenses (2)	155	13.03	1.82			
		my income is more than my expenses (3)	49	12.81	1.50			
	Concentration	my income is less than my expenses (1)	216	11.01	2.02	0.29	0.744	
		my income is equal to my expenses (2)	155	10.91	2.19			
		my income is more than my expenses (3)	49	11.20	2.59			
	Confidence and Success Motivation	my income is less than my expenses (1)	216	11.89	2.20	0.08	0.923	
		my income is equal to my expenses (2)	155	11.91	2.23			
		my income is more than my expenses (3)	49	12.04	2.54			
	Targeting and Mental Preparation	my income is less than my expenses (1)	216	10.75	2.04	3.86	0.022*	1-2
		my income is equal to my expenses (2)	155	11.40	2.29			
		my income is more than my expenses (3)	49	11.02	2.62			
	Ability to Perform Well Under Pressure	my income is less than my expenses (1)	216	10.79	2.43	1.41	0.243	
		my income is equal to my expenses (2)	155	10.45	2.26			
		my income is more than my expenses (3)	49	11.04	2.78			
	Getting Rid of Worries	my income is less than my expenses (1)	216	13.56	1.87	4.29	0.014*	1-2
		my income is equal to my expenses (2)	155	14.08	1.71			
		my income is more than my expenses (3)	49	13.40	2.43			

APSAS: The Athletes' Psychological Skills Assessment Scale
MTS: The Mental Toughness Scale

One-Way ANOVA was used to examine whether the mental toughness and psychological skill levels of the participants differed statistically significantly depending on their income or not. The analysis revealed that participants' MTS scores did not differ significantly in terms of the income status variable ($F=0.05$, $p>0.05$). However, significant differences were detected in the targeting and mental preparation ($F=3.86$, $p<0.05$) and getting rid of worries ($F=4.29$, $p<0.05$) sub-dimensions of APSAS. According to Post-hoc comparisons, the mean score of the participants whose income was equal to their expenses in both dimensions was found to be higher than those of the participants whose income was more than their expenses (Table 3).

Table 4. The Results of Independent Samples T-Test Concerning Sleep Pattern.

Scale	Dimensions	Sleeping Pattern	N	Mean	SD	t	p
MTS	Mental Toughness	8 hours or more daily	170	40.48	7.91	-3.91	0,000*
		Less than 8 hours daily	250	43.40	7.25		
APSAS	Ability to cope With Difficulties	8 hours or more daily	170	11.40	1.97	-2.42	0,016*
		Less than 8 hours daily	250	11.88	2.00		
	Being Open to Learning	8 hours or more daily	170	12.56	1.81	-3.74	0,000*
		Less than 8 hours daily	250	13.23	1.77		
	Concentration	8 hours or more daily	170	10.51	2.25	-3.65	0,000*
		Less than 8 hours daily	250	11.34	2.28		
	Confidence and Success Motivation	8 hours or more daily	170	11.27	2.33	-5.08	0,000*
		Less than 8 hours daily	250	12.37	2.08		
	Targeting and Mental Preparation	8 hours or more daily	170	10.72	2.20	-2.41	0,016*
		Less than 8 hours daily	250	11.25	2.22		
	Ability to Perform Well Under Pressure	8 hours or more daily	170	10.38	2.37	-2.13	0,034*
		Less than 8 hours daily	250	10.89	2.45		
	Getting Rid of Worries	8 hours or more daily	170	13.87	2.03	1.21	0,223
		Less than 8 hours daily	250	13.64	1.80		

MTS: The Mental Toughness Scale

APSAS: The Athletes' Psychological Skills Assessment Scale

The T-test results regarding sleep patterns are given in Table 4. The analysis revealed that MTS scores differed significantly ($t=-3.91$, $p<0.01$). In addition, significant differences were found in other sub-dimensions ($p<0.05$), except for the getting rid of worries dimension of APSAS ($t=1.21$, $p>0.05$). Mental toughness, ability to cope with difficulties, being open to learning, concentration, confidence and success motivation, targeting and mental preparation, and ability to perform well under pressure mean scores of the participants sleeping less than 8 hours a day were found to be higher in comparison of those sleeping 8 hours or more daily.

Table 5. The Results of Independent Samples T-Test Concerning Reading Book Status.

Scale	Dimensions	Reading Book Status	N	Mean	SD	t	p
MTS	Mental Toughness	Yes	228	43.44	7.09	3.62	0.000*
		No	192	40.77	8.04		

APSAS	Ability to cope with difficulties	Yes	228	12.08	1.85	4.58	0.000*
		No	192	11.20	2.07		
	Being open to learning	Yes	228	13.15	1.83	2.36	0.018*
		No	192	12.73	1.77		
	Concentration	Yes	228	11.20	2.20	1.86	0.062
		No	192	10.78	2.40		
	Confidence and success motivation	Yes	228	12.22	2.02	2.99	0.003*
		No	192	11.57	2.45		
	Targeting and mental preparation	Yes	228	11.19	2.16	1.53	0.127
		No	192	10.85	2.30		
	Ability to perform well under pressure	Yes	228	10.96	2.45	2.55	0.11*
		No	192	10.35	2.38		
	Getting rid of worries	Yes	228	13.97	1.85	2.84	0.005*
		No	192	13.44	1.93		

MTS: The Mental Toughness Scale

APSAS: The Athletes' Psychological Skills Assessment Scale

As seen in Table 5, statistically significant differences were determined in MTS mean scores ($t=3.62$, $p<0.01$). Statistically significant differences were detected in all other dimensions except the targeting and mental preparation ($t=1.53$, $p>0.05$) and concentration ($t=1.86$, $p>0.05$) dimensions of APSAS. The mean scores of the participants who read books were found to be higher than those who did not in the dimensions where the difference occurred.

Table 6. Multiple Regression Analysis Results on the Prediction of Mental Toughness

B	Unstandardized Coefficients		Standardized Coefficients			
	Std. Error	β	t	Sig.	Zero-order	Partial
Constant	1.144	3.667	-	0.312	0.755	-
Ability to Cope With Difficulties	0.919	0.193	0.241	4.763	0.000	0,525
Being Open to Learning	0.507	0.185	0.120	2.743	0.006	0.406
Concentration	0.222	0.173	0.067	1.285	0.200	0.456
Confidence and Success Motivation	0.846	0.175	0.249	4.832	0.000	0.546
Targeting and Mental Preparation	0.668	0.164	0.194	4.062	0.000	0.486
Ability to Perform Well Under Pressure	0.050	0.175	0.016	0.287	0.774	0.435
Getting Rid of Worries	0.243	0.188	0.060	1.292	0.197	-0.126

R=0.660
R2=0.436
$\mathbf{F}_{(7,412)}$=14.465
P=0.000
Dependent Variable= Mental Toughness
Model= Mental Toughness =1.144 + Ability to cope with difficulties*0.919 + Being open to learning *0.507 + Concentration*0.222 + Confidence and success motivation*0.846 + Targeting and mental preparation *0.668 + Ability to perform well under pressure *0.050 + Getting rid of worries *0.243
APSAS: The Athletes' Psychological Skills Assessment Scale
MTS: The Mental Toughness Scale

Multiple linear regression analysis was performed to predict MTS using APSAS dimensions. In the analysis, zero-order and partial correlations were examined, and it was seen that there was a moderate degree of a positive relationship between the ability to cope with difficulties and MTS (r=0.525); however, the correlation between the two variables was (r=0.23) when other variables were controlled. Similarly, it was observed that there was a moderate positive relationship between being open to learning and MTS (r=0.406), but when other variables were checked, the correlation between the two variables was (r=0.13). Again, it was observed that there was a moderate positive relationship between concentration and MTS (r=0.456), but the correlation between the two variables was (r= 0.06) when looking at other variables. It was determined that there was a moderate positive relationship between confidence and success motivation and MTS (r=0.546); however, the correlation between the two variables was (r=0.23) when other variables were

controlled. Similarly, there was a moderate positive correlation between targeting and mental preparation and MTS (r=0.486), but when other variables were examined, the correlation between the two variables was (r=0.20). It was detected that there was a moderate positive relationship between the ability to perform well under pressure and MTS (r=0.435), but when other variables were checked over, the correlation between the two variables was (r=0.02). It was determined that the correlation between getting rid of worries and MTS was a low degree of negative (r=-0.126), but when other variables were controlled, the correlation between the two variables was (r=0.06). As a result, it was put forward that a significant regression model, $F(7, 412) = 14.465$, $p< 0.001$, and 44% of the variance in the dependent variable ($R2_{adjusted} =0.436$) was explained by the independent variables. According to the standardized regression coefficient (β), the relative order of importance of the independent (predictive) variables on the MTS is the ability to cope with difficulties, confidence and success motivation, targeting and mental preparation, being open to learning, concentration, getting rid of worries, and ability to perform well under pressure. In the T-test results regarding the significance of the coefficients, it was seen that the ability to cope with difficulties, being open to learning, confidence and success motivation, targeting and mental preparation variables were meaningful (significant) predictors of MTS. Additionally, it was seen that the effects of concentration, ability to perform well under pressure, and getting rid of worries were not significant.

RESULT AND DISCUSSION

In this section, the similarities and differences between the studies in the literature and the current study, which aims to analyze the relationships of athlete students' mental toughness and psychological skills in sports with each other and with some variables, are revealed and interpreted.

As a result of the analyses, no significant differences were found between the mental toughness levels of male and female athlete students according to the gender variable. On the other hand, a significant difference was found in favour of male athletes in the sub-dimension of "Ability to perform well under pressure", one of the sub-dimensions of the Athletes' Psychological Skills Scale, while no significant difference was found in other sub-dimensions (Table 2). Accordingly, it can be said that the mental toughness levels of male and female athletes are similar. Any significant difference was not found between the gender and the mental toughness of Taekwondo athletes (Sarı et al., 2020), table tennis athletes (Kalkavan et al., 2017), elite wrestlers (Dede, 2019) and triathlon athletes (Güvendi et al., 2020). Again in the literature, there are studies reporting that mental toughness does not differ according to gender in research conducted on different groups (Şahinler & Ersoy, 2019; Tekkurşun-Demir & Türkeli, 2019). However, unlike the studies men-

tioned, some studies in the literature (Demir & Çelebi, 2019; Kılınç & Gürer, 2019; Menteş & Saygın, 2019; Nicholls et al., 2009; Masum, 2014) indicate that mental toughness differs depending on the gender variable. As can be seen, the research findings are generally supported by the literature findings. Considering that women are more sensitive by nature, it can be said that females' ability to withstand external pressures is lower than that of males in terms of the ability to perform well under pressure. Güvendi (2020) revealed in his research that the dimension of athletes' ability to perform well under pressure differed in favour of male athletes. In the study of Çağlar (2021), a significant difference was found only in the dimension of concentration, one of the sub-dimensions of psychological skills in sports, in favour of male participants depending on the gender variable. Güler (2015) stated in his research that the psychological skills of male athletes in general were higher than those of female athletes. In these aspects, the literature findings are in line with the present study. Contrary to the findings, Yıldız & Erhan (2019) reported that psychological skills did not differ statistically between male and female participants.

It was detected that the income level, which is the other variable of the study, and the mental toughness levels of the athlete students did not differ significantly (Table 3). When the literature is examined, studies stating that there is no significant difference between the monthly income level and mental toughness of athletes in different sports branches (Şahinler & Ersoy, 2019) and amateur league football players (Uçar & Kaplan, 2020) support the results of the current research. The fact that Güven (2022) states that as the income status of tennis players changes, so does their mental toughness is one of the different results in the literature. In addition, another finding of the current research is that athlete students differ statistically significantly in the dimensions of "targeting and mental preparation" and "getting rid of worries" from the sub-dimensions of psychological skills in sports in terms of income level (Table 3). It is believed that material income reduces some of the concerns of people about plans for the future. Therefore, it can be said that the less anxiety of the athlete in this sense ensures that his psychological skills in terms of goal setting and mental preparation are more positive.

According to the sleep pattern variable, which is another of the research variables, significant differences were detected between the sleep patterns and mental toughness of the athlete students in favour of the athlete students who sleep 8 hours or less per day. Furthermore, a significant difference was found in favour of the athletes who sleep 8 hours or less per day in all sub-dimensions, except for the dimension of "getting rid of worries" in the Athletes' Psychological Skills Scale (Table 4). When examining the research studies related to psychological skills and mental toughness in sports in the literature, it may be mentioned that there is a lack of studies on the sleep pattern variable, but there are studies in the literature examining the effect of sleep on mental performance. Simpson et al. (2016) stated

that sleep, in general terms, has undeniable importance on human health in terms of physical, and cognitive performance and well-being. Wright et al. (2006) stated in their research that individuals' getting the sleep necessary for their bodies and starting the day vigorously in their biological time has an important role in mental performance. Gorman et al. (2015) state that the quality of sports performance is related to motor and psychological skills such as neuromotor performance, functional cortical control, mental, motor memory, coordination, imagery, balance, concentration, cardiorespiratory endurance, hormonal control, and effective energy metabolism. In the present study, as stated by Gorman et al. (2015) the fact that psychological skills such as targeting and mental preparation and concentration are involved in the factors that determine the quality of athlete performance supports the relationship between athlete performance and psychological skills. In addition, it is stated that sports performance will be significantly affected by sleep as sleep affects cardiorespiratory endurance (Azboy & Kaygısız, 2009), neuromotor performance (Boonsta et al., 2007), emotional state, concentration and metabolism (Luke et al., 2011). When the quality of daily sleep is considered in terms of quality and quantity, low-quality sleep can affect concentration problems, sudden mood changes, hallucinations, and accordingly, people's work life, social life, economic situation, general health and mental health status (Günaydın, 2014; Roth et al., 2006). It is possible that mental problems such as anxiety, depression, stress, loss of self-esteem and deterioration of body image due to deterioration of sleep quality may also have a negative physical effect. In this direction, considering the current study, sleep problems may be caused by the active course load of the athlete students and their social life with training and competition. The importance of daily sleep time is clearly evident in terms of the high sports performance of athletic students. It is compatible with scientific realities to see the sleep state, which affects the general health of people in terms of cognitive, physiological and flexibility, as a supporter of quality performance in sports. The positive effect of vigour and energy on human psychology can also positively affect the competition or training performance of the athletes during the day. In this respect, considering that physiological components alone cannot be sufficient for a successful sports performance, the importance of psychological components emerges.

The results of the analysis show that mental toughness levels differ significantly according to the variable of reading books. According to this, the mean scores of the athlete students who have the habit of reading books are high. On the other hand, significant differences were determined in favour of athlete students who read books in the dimensions of "ability to cope with difficulties", "being open to learning", "confidence and success motivation", "ability to perform well under pressure", "getting rid of worries" of the Athletes' Psychological Skills Scale (Table 5). Reading is expressed as a complex process that creates new thoughts in the mind and consists of various development levels (Geçgel & Burgul, 2009; Yılmaz, 2010).

It has been stated that a person who successfully achieves the reading process gains the ability to think critically, establish effective interpersonal communication, and examine, explain and interpret the outside world (Kurulgan & Çekerol, 2008). The habit of reading, which is acquired at a young age, has a significant impact on the mental development and social maturation of individuals (Coşkun, 2003). Apart from accessing information, reading also offers people the opportunity to dream, think creatively, and widen their horizons (Akyol, 2012; Day & Park, 2005; Ünalan, 2006). It is observed that the habit of reading gives individuals some mental and psychological skills. Therefore, the fact that the mean scores of mental toughness and psychological skills of athlete students who have reading habits are also supported by the literature findings.

As a result of the research, it was revealed that psychological skills are an important predictor of mental toughness (44%). In addition, it has been observed that there is a moderate positive relationship between mental toughness and psychological skills such as the ability to cope with difficulties, being open to learning, concentration, confidence and success motivation, targeting and mental preparation, and ability to perform well under pressure. In other words, an increase in the level of the mentioned psychological skills means an increase in mental toughness and vice versa. Individuals with high mental toughness have skills such as being controlled, highly competitive, self-motivated, able to maintain concentration under pressure, able to turn unexpected changes into opportunities, and being determined in the face of uncertainty. Athletes with low mental toughness, on the other hand, tend to give up in the face of uncertainty (Crust & Clough, 2011; Güngörmüş, Okanlı & Kocabeyoğlu, 2015). Again, some research results show that athletes with high mental toughness spend more effort and have a higher ability to struggle and cope under anxiety, stress and pressure (Jones, 2002; Ekmekçi & Miçooğulları, 2018). These findings lead us to the conclusion that psychological skills such as the ability to cope with difficulties, mental preparation, and the ability to perform well under pressure are positively related to mental endurance in the current research. Again, there have been some studies in the literature including some psychological skills and mental endurance components. Thelwell et al. (2005) concluded that imagery and targeting skills have an effect on increasing mental toughness. Madigan and Nicholls (2017) found that athletes with high intrinsic motivation also have high levels of mental endurance. In another study, Crust and Azadi (2010) revealed that there are positive and significant relationships between goal setting and imagery and mental toughness.

As a result, in light of the findings of the research, it was determined that male athletes had a better ability to perform well under pressure, and income had an effect on getting rid of worries, targeting and mental preparation. It was found that those who sleep 8 hours or less a day had higher mental toughness and psychological skills than those who sleep for 8 hours or more. In other words, those who sleep

less than 8 hours have a more developed ability to cope with difficulties, be open to learning, concentration, confidence and success motivation, targeting and mental preparation, ability to perform well under pressure and get rid of worries. It was concluded that athletes who have the reading habit similarly have higher mental endurance and psychological skill. Moreover, one of the important results of the research is that being open to learning, ability to cope with difficulties, providing concentration, confidence and success motivation, targeting and mental preparation skills, which are among the psychological skills of athletes, explain 44% of the total variance in mental toughness. In other words, 44% of mental toughness is explained by psychological skills.

This research was conducted on 420 athlete students. By reaching a wider sample group, research on different groups of athletes and sports branches can contribute to the validity of the findings put forward on this topic. Besides, the inclusion of athletes from different cultures to reveal similarities or differences in cultural terms is also among the recommendations. Also, methodologically, examining a similar topic by preferring qualitative or mixed methods is another suggestion.

Conflıct Of Interest

There is no personal or financial conflict of interest between the authors of the article within the scope of the study.

Author Contrıbutıons

Research design: ÖFY

Data collection: BM, MK

Statistical analysis: BM

Preparation of the Article: ÖFY, BM, MK

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