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The Examination of Sports Injury and Career Anxiety Levels of Football Players

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Abstract

This study aims to investigate the relationship between sport injury anxiety and career anxiety of amateur football players in Turkey. The study group of the research consists of 392 Amateur football players, 59 women, and 333 men, who are actively participating in the competitions of the Turkish Football Federation in the 2021-2022 season. In this study, the "Sport Injury Anxiety Scale (SIAS)" and the "Career Anxiety Scale (CAS)" were used as data collection tools. The study used descriptive statistical methods (percentage, frequency, mean, standard deviation), independent sample T-test, One-Way ANOVA analysis, and Pearson Correlation to analyze the data. Depending on the findings there was a significant difference according to the being injured before and league variables in the SIAS mean scores of the participants, but there was no significant difference in the variable of family income in the SIAS mean scores of the participants. On the other hand, a statistically significant difference was found in the variables of family income and league in the CAS mean scores of the participants. And no statistically significant difference was found in the CAS mean scores of the participants according to the being injured before variable. The results of the correlation analysis showed that the mean scores of SIAS were in a significant, positive, and moderate relationship with the mean scores of CAS. In conclusion, it has been revealed that as the sports injury anxiety level of amateur football players increases, their career anxiety levels also increase.
Keywords: Football, İnjury, Career, Anxiety

Özet
Futbolcuların Spor Sakatlığı ve Kariyer Kaygı Düzeylerinin İncelenmesi

Bu çalışmanın amacı, Türkiye'deki amatör futbolcuların spor yaralanması kaygısı ile kariyer kaygısı arasındaki ilişkisini incelemektir. Araştırmanın çalışma grubunu 2021-2022 sezonunda Türkiye Futbol Federasyonu müsabakalarına aktif olarak katılan 59 kadın ve 333 erkek olmak üzere 392 amatör futbolcu oluşturmaktadır. Bu çalışmada veri toplama aracı olarak "Spor Yaralanmaları Kaygı Ölçeği (SYKÖ)" ve "Kariyer Kaygısı Ölçeği (KKÖ)" kullanılmıştır. Verilerin analizinde tanımlayıcı istatistiksel yöntemler (yüzde, frekans, ortalama, standart sapma), bağımsız örneklem T-testi, Tek Yönlü ANOVA analizi ve Pearson Korelasyonu kullanılmıştır. Bulgulara göre

katılımcıların SYKÖ ortalama puanlarında daha önce sakatlık geçirme değişkenine ve lig değişkenine göre anlamlı bir farklılık bulunurken, katılımcıların SYKÖ ortalama puanlarında aile geliri değişkenine göre anlamlı bir farklılık bulunmamıştır. Öte yandan, katılımcıların KKÖ ortalama puanlarında aile geliri ve lig değişkenlerine göre istatistiksel olarak anlamlı bir farklılık bulunmuştur. Daha önce sakatlık geçirme değişkenine göre katılımcıların KKÖ ortalama puanlarında istatistiksel olarak anlamlı bir farklılık bulunamamıştır. Korelasyon analizi sonuçları SYKÖ ortalama puanlarının KKÖ ortalama puanları arasında anlamlı, pozitif ve orta düzeyde bir ilişki olduğunu göstermiştir. Sonuç olarak, amatör futbolcuların spor yaralanması kaygı düzeyleri arttıkça kariyer kaygı düzeylerinin de arttığı ortaya çıkmıştır.

Anahtar Kelimeler: Futbol, Yaralanma, Kariyer, Kaygı

INTRODUCTION

"Football is my life" (23), "Football is one of the most beautiful things in the world" (13) we often come across such statements in our daily lifes. Football is one of the most popular sports branches in the world, with millions of players and billions of fans (24). Because of its popularity, football is not just a game for many people, it plays an important role in the daily life of them. For example, some people plan their daily lives according to their team's match schedules (27).

Besides the interest of the fans, football has become a major economic field. Players' salaries have grown exponentially, their TV contracts have generated income on a scale unimaginable just a few years ago, many football fields have been completely rebuilt, and the commercial sponsorship and sales profile has increased above normal. However, some clubs have become companies. Football has become a commercial area, making headlines regularly, and newspapers devote pages to the financial aspects of sports (1). The fact that football has become such a big economic factor also affects the income of the players. Especially in men's football, players can make a living by playing football. For example, the famous Argentinian football player Messi earned 130 million dollars from football between May 2021 and May 2022 (33).

Women's football has also developed rapidly in the last two decades, transforming from being a purely amateur sport to a professional sport that offers economic capital for female football players all over the world (19), nevertheless, the financial income of female football players is lower than the income of male football players (17). As an example, the female football player Giulia Gwinn, who plays for the German national team, earns $ 8200 per month, which makes an average of $ 100,000 annually (4).

As in every sports branch that requires physical contact, injuries occur also in football. While some injuries can heal easily, some injuries can force athletes to end their careers. Among the most common injuries in football are knee injuries (22); (28). As some injuries can be serious, it is assumed to be normal for some footballers to have anxiety to be injured. Demir (9) observed that the anxiety levels of injured football players are higher in sports injury anxiety and disappointment compared to the non-injured players. In addition, the support of the social environment of an athlete is very important in cases of injuries (7).

It is assumed that for athletes who are living with football, it is very important to play regularly without getting injured because serious injuries can negatively affect their football careers. In this case, the career anxieties of injured football players may arise. In this context, this study aims to investigate the relationship between sport injury anxiety and career anxiety of amateur football players in Turkey.

METHOD

Research Model

The correlational survey model, a quantitative research technique, was employed in this study. This model seeks to identify the presence of covariance between two or more variables (18).

Participants

The sample group consists of 392 amateur football players who are actively competing in the Turkish Football Federation championships in the 2021–2022 season, including 59 women and 333 men. The convenience sampling approach was used to choose the study group. Members of the target population who

fit specific practical requirements, such as being conveniently accessible, are included in the sampling process and are suitable for the research's objectives (12).

Data Collection Tools

To collect data, three data collection tools were used. The first tool included personal questions like family income, league level, and injury history. The other data collection tools are presented below.

Sport Injury Anxiety Scale (SIAS)

The "Sport Injury Anxiety Scale" was developed by Rex and Metzler (2016) and adapted into Turkish by Caz et.al (6). This scale consists of 19 items, and 6 sub-dimensions, and is a 5-point Likert type. The sub-dimensions are anxiety associated with (a) loss of athleticism, (b) being perceived as weak, (c) experiencing pain, (d) loss of social support, (e) letting down important others, (f) reinjury, and (g) having an impaired self-image.

The Cronbach Alpha coefficients of the subscales are 0.724 for the anxiety of loss of athleticism, 0.645 for the anxiety of being perceived weak, 0.780 for experiencing pain, 0.876 for letting down important others, 0.608 for reinjury anxiety, and 0.812 for the anxiety of losing social support. Accordingly, it was determined that the scale and its sub-factors had a high level of internal consistency and therefore reliability (3).

Career Anxiety Scale (CAS)

"Career Anxiety Scale" which was developed by Gündüz and Yılmaz (16) was also used in our study. The "Career Anxiety Scale" consists of 14 items and is in a 5-point Likert type. This scale has 2 sub-dimensions; career anxiety for family effect and career anxiety for career choice. In the original scale, the Cronbach Alpha reliability coefficient for career anxieties because of the family was found to be 0.742, and for career concerns about career choice was found to be 0.797 (32).

Data Collection And Analysis

Online data collection was done using Google Forms. The data were analyzed and the calculated values were discovered using the SPSS 21 statistical package application. It was determined that the data for each independent variable displayed a normal distribution based on the kurtosis and skewness values that were collected. Descriptive tables for the variables were made using frequency and percentage analyses. The Cronbach Alpha value was used to assess the dependability of the research data. The Cronbach Alpha internal consistency coefficient of this research was founded 0.88 for the whole scale. After that T-Test, One-Way ANOVA analysis, and Pearson Correlation were used to analyze data. The level of significance was taken as 0.05.

RESULTS

Table 1. Descriptive Statistics of the Variables

Scales	Number of Items	N	X	Sd	Skewness	Kurtosis	Min	Max	Cronbach Alpha
SIAS	14	392	2.32	0.79	0.03	0.18	1	4	0.87
CAS	19	292	2.24	0.54	0.22	-0.3	1	5	0.91

Table 1 demonstrates that the arithmetic mean of the individuals' scores on the SIAS and CAS is 2.32 and 2.24. The participants' mean scores on the SIAS and CIAS have standard deviations of 0.79 and 0.54. The participants' lowest and highest scores on the SIAS were 1 and 4, while their greatest and lowest scores on the CAS were also 1 and 4. The SIAS's internal consistency according to Cronbach's alpha is 0.87 in this study, while the CAS' internal consistency is 0.91.

Table 2. T-Test Results By The Being Injured Before Status Of The Participants

Scales	Being injured before	N	X	Sd	t	p
SIAS	Yes	230	2.34	0.55	4.19	**0.000***
	No	162	2.11	0.50		
CAS	Yes	230	2.35	0.81	1.02	0.306
	No	162	2.27	0.77		

*p < 0.05.

According to the been injured before variable, there is a statistically significant difference in the participants' SIAS mean scores, as shown by the T-test findings for independent samples in Table 2 (t=4.19; p<0.01). The mean scores of the participants who had prior injuries are greater than those of the participants who had no prior injuries. It can be claimed that athletes who have previously been harmed fear getting hurt during sports more than athletes who have not.

The T-test results showed also that the CAS mean scores of the participants did not differ statistically according to the being injured before variable. (t=1.02; p>0.05).

Table 3. ANOVA Results of The Family Income Variable

Scales	Groups	Variables	N	X	Sd	F	p	Difference
SIAS	Family Income	Low	120	2.29	0.54	1.04	0.355	-
		Middle	258	2.23	0.53			
		High	14	2.11	0.67			
CAS	Family Income	Low	120	2.47	0.76	3.31	**0.037***	Low > Middle, High
		Middle	258	2.25	0.80			
		High	14	2.29	0.91			

*p < 0.05.

According to the ANOVA results by the family income variable shown in Table 3, the participants' CAS mean scores varied significantly depending on the family income variable (F=3.31; p<0.05), One of the post-hoc tests, LSD, was employed to determine whether groups had significant differences after a one-way ANOVA. It was shown that the individuals with low family income had higher mean scores than those with medium and high family incomes. Or, to put it another way, professional worry rises when family income levels fall.

It was also revealed that there was no statistical difference in the SIAS mean scores of the participants according to the family income variable (F=1.04; p>0.05).

Table 4. ANOVA Results Of The League Variable

Scales	Groups	Variables	N	X	Sd	F	p	Difference
SIAS	Leagues	Youth	170	2.17	0.55	2.83	**0.038***	Youth < Regional and super amateur (men) and Women's leagues
		Regional and super amateur (men)	115	2.32	0.54			
		1. and 2. amateur (men)	62	2.22	0.49			
		Women's leagues	45	2.37	0.53			
CAS	Leagues	Youth	170	2.12	0.84	6.10	**0.000***	Youth < Regional and super amateur (men), 1. and 2. amateur (men) and Women's leagues
		Regional and super amateur (men)	115	2.46	0.73			
		1. and 2. amateur (men)	62	2.49	0.67			
		Women's leagues	45	2.44	0.78			

*p < 0.05.

Table 4 displays the football players' ANOVA findings by league variable. The findings show that the SIAS scores are significantly different (F= 2.83; p<0.05). One of the post-hoc tests, LSD, was employed to identify the locations where significant differences between the groups were found after one-way ANOVA. The participants' mean scores in the women's and men's regional super amateur leagues were both higher than their respective participants' mean scores in the youth league. Finally, there is an increase in sport injury fear as the league level rises.

As shown in Table 4, there is also a significant difference in the CAS mean scores of the participants according to the league variable (F= 6.10; p<0.05). Participants in the regional super amateur men's leagues, women's leagues, and 1. and 2. amateur men's leagues had mean scores that were higher than those of participants in the young league. As a result, it may be claimed that career anxiety increases as the league level rises.

Table 5. Pearson correlation results of the mean scores of scales.

Scales	SIAS	CAS
SIAS	1	0.430**
CAS	0.430**	1
Sig. (2-tailed)	0.000*	0.000*
N	392	392

*p < 0.05.

The relationship between the football players' career anxiety levels and their sport injury anxiety levels was examined using correlation analysis. As demonstrated in Table 5, the analysis findings indicated that there was a moderately significant, moderate, and positive correlation between career anxiety and sports injury anxiety (r=0.43, p<0.01). In conclusion, football players' career anxiety rises along with their fear of sports-related injuries.

DISCUSSION AND CONCLUSION

When the sports injury anxiety mean scores of the participants were examined according to the variable injured before, the participants who were injured before had higher mean scores than the participants who were not injured before. Cassidy (5) found out that varsity athletes who had been injured at least three times had a substantially higher score on pain-related anxiety than athletes who had not been injured before. Tanyeri (30) conducted a study on athletes who were interested in different sports branches. He compared participants who had a sports injury before and those who were not injured ever. In his study, a significant statistical

difference was found in favor of those who had a sports injury before. Considering the findings obtained in our study and some findings in the literature, it can be said that athletes who experience sports injuries are more concerned about sports injuries than those who do not.

There are also studies in the literature that contradict our study. Güler (15) found that there was no statistically significant difference in the previous injury statuses of sports science faculty students. An explanation of this different result could be because the study group was different from our study. Due to the career anxiety mean scores of the participants according to the injured before variable, there was no statistically significant difference. Wolanin et al. (31) examined that athletes who were injured had higher mean scores for depression and anxiety than athletes who were not injured before.

When the career anxiety mean scores of the participants were examined according to the family income variable, The participants with a low family income had higher mean scores than the participants with medium and high family income. There are findings in the literature that support our study. In a study conducted by Kula and Saraç (20) on university students, it is seen that as the family income level of the families increases, the anxiety score averages of the students decrease. There are also findings in the literature that contradict our study. Ekin and Bülbül (11) conducted a study on badminton players and they did not find any differences who were depending on the average family income according to career anxiety. Çalı and Doğar (8) did also not find any variables depending on the average family income according to career anxiety. Though studies supporting and opposing our study exist in the literature, this situation could be explained by the fact that the studies had different study groups.

According to the findings of our study, the mean scores of the participants playing in the regional, super amateur men's leagues and the women's leagues were higher than the mean scores of the participants playing in the youth league. As the league level rises, there is an increase in sport injury anxiety. This can be explained by the fact that especially men's football has turned into an industrial area (10). Changes in the structure of the sports world and the economic and social environment had an impact on the financial sustainability of many amateur sport clubs in the world (2). Another explanation for this situation may be the age difference between the youth and senior leagues. Namlı and Buzdağli (25) revealed that as the age of the participants increased, their sports injury anxiety increased also. They explain this with the fact that healing slows down with age.

The findings obtained that the mean scores of the participants playing in the regional, super amateur men's leagues, in the women's leagues, and the 1. and 2. amateur men's leagues were higher than the mean scores of the participants playing in the youth league. As a result, it can be said that as the league level rises, there is an increase in career anxiety. The higher the league level, the higher the performance level. Therefore, when the desired performance is not shown in higher leagues, the probability of being out of the game may be higher. This could explain the career anxiety levels of the participants playing in higher leagues. Especially in the case of women's football, according to Hjelm (17) "conditions of amateur sports" are valid for the vast majority of female football players. Female football players have to acquire another profession besides football. This may explain their career anxiety levels.

The correlation analysis results showed a significant, positive, and moderate relationship between sports injury anxiety and career anxiety. It can be said that as the sports injury anxiety levels of football players increase, there is an increase in their career anxiety levels. Injury is a very serious issue in the sports world. Football players may encounter the situation of quitting football in case of serious injuries (14); (21); (28); (29). It can be said that serious injuries can end football careers. This situation can explain the relationship between sport injury anxiety and career anxiety.

In conclusion, it has been revealed that as the sports injury anxiety level of amateur football players increase, their career anxiety levels also increase.

This result indicates that factors influencing athlete performance and psychology are interrelated. For amateur football players, sports injuries can play a significant role not only in terms of physical health but also concerning their career and psychological well-being. Besides that, recognizing the importance of addressing both physical and psychological aspects of injuries is essential in promoting the long-term success and well-

being of athletes. Through comprehensive support systems, sports organizations can help athletes effectively cope with injuries, manage career anxieties, and foster a positive and thriving athletic environment.

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Analysis of Relationship Between Foot Morphology and Static Balance in Female Athletes

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Abstract

This study was conducted to investigate the relationship between the morphological structure of the foot and female athletes' static balance levels. 51 female athletes with an average age of 22.25±0.38 years participated in the research. The foot morphology was evaluated in 4 parameters. Balance scores were evaluated in 8 parameters. Spearman and Pearson correlation tests were used to determine the relationship between parameters ($p<05$). According to the results, it was observed that in the right foot there was a negative significant correlation between foot index (FI) parameter and standard deviation of forward and backward sway (FBSD), average forward backward speed (AFBS), used perimeter (P), used area (A) balance scores. In the left foot, there was a positive correlation between the FI parameter and the pressure to the average central y axis (COPY) balance score, and a negative significant relationship between the FI parameter and the FBSD and AFBS balance scores. It was determined that there was a positive significant correlation between the Chippaux Smirak index (CSI) and Staheli index (SI) parameters of both feet and the pressure to the average central x point (COPX) balance score. The results can be interpreted that the anatomical structure of the foot is important in the static balance characteristics of athletes.

Keywords: Foot Morphology, Static Balance, Female Athletes

INTRODUCTION

In today's world, the effects of morphological and anthropometric characters on achieving high sportive performance and optimum success are the issues that researchers focus on (1,2,3). The anthropometric and physical characteristics of the athletes play a decisive role as a prerequisite for performance, and it is thought that a physical structure specific to the branch should be first in order to achieve a high-impact sports efficiency. The anthropometric and physical characteristics of the athletes play a decisive role as a prerequisite for performance, and it is thought that a physical structure specific to the branch should be a priority in order to achieve a high-impact sports efficiency (4). In particular, it is emphasized that the structural changes in the anatomical components of the foot, located at the end point where all the stress applied to the body is transferred to the floor, is important for the successful execution of motor skills (5,6).

The foot is the last segment of the locomotor chain and has a complex anatomical structure. Foot and ankle biomechanics are dynamic structures that are directly related to other parts of the lower limb. While the foot works as an absorbent organ in transferring body weight to the ground in an elastic way, it also adapts to weight and ground changes and becomes a rigid lever when necessary. While the foot carries the body weight against gravity with these features, it is known that foot posture and morphology have important effects on walking, standing and balance (7,8,9,10,11,12).

Another important factor in terms of sporting performance is the ability to balance (13). Balance is the process of keeping the position of the body's center of gravity vertically (14). It is known that balance skill, which is at the center of the conditional abilities that form the basis of performance, plays an important role in successful exhibiting of many sports skills, changing direction, stopping, starting, holding, moving the object and maintaining a certain body position (15). Although the physical structure alone is not decisive in maintaining the balance, it is among the factors that create the balance (16).

Studies are continuing to determine the most ideal physical structure in order to reach high performance limits in sports. At this point, the idea that the ability to protect the body's position against gravity may be related to the structural differences in the foot constituted the subject of this research.

Many studies have emphasized the importance of foot anatomical structure and balance skills in sportive performance (17,18). However, it has been observed that there are limited number of studies on the relationship between these two factors, which are known to be important in terms of sports efficiency.

For these reasons, this study was conducted to investigate the relationship between the morphological structure of the foot and female athletes' static balance levels.

METHODS

Study Method. This research is a descriptive and analytical study to determine the relationship between foot morphology and female athletes' static balance levels.

Study Group. 51 female athletes from different branches (football n:14, volleyball n:12, basketball n:9, handball n:5, taekwondo n: 8, table tennis n:3) with a mean age of 22.25±0.38 years participated voluntarily in the study. Those with a pathological history of the foot and ankle in the last year and those with a body mass index above 30 were not included in the study. The research was carried out in accordance with the Declaration of Helsinki with the decision of Giresun University Social Sciences, Science and Engineering Research Ethics Committee dated 5/10/2022 and numbered 27/16.

Data Collection Tools

Determination of Morphological Structure of Foot. Footprint analysis method obtained from the foot plantar pressure was used to determine the foot morphology. Footprint method is a technique used in the evaluation of foot morphology and classification of foot types (19,20,21). The relevant researchers recommend that multiple parameters should be used when evaluating the foot type (22). In this study, footprint measurement was performed by footprint metric analysis method using 4 morphometric parameters in order to evaluate foot structure. The footprint method, which measures the sole pressure of the foot, is a very good way of understanding where the load is coming from and which tissues are under extreme mechanical stress (23). Chinesport brand podoscope was used for footprint measurements.

Footprint Measurement and Parameters. Foot plantar pressure images of all volunteers were taken from the podoscope by using a camera in the footprint analysis. Morphometric measurements were made on the images and cm was used as the metric unit. The application was made for both feet as right and left.

Parameters

Foot Index (FI): Obtained by dividing the transverse breadth (FB) of the foot by longitudinal length (FL) and multiplied by 100. FI=(FB/FL)*100 (24). **Chippaux-Smirak Index (CSI):** It is the ratio of the minimum width of the middle arch area of the foot (B) to the maximum width of the metatarsal region (C). CSI=(B/C)*100 (21). **Staheli Index (SI):** It is the ratio of the minimum width of the middle arch area of the foot (B) to the maximum width of the posterior region of the foot (A). SI=B/A (25). **Clark Angle (C°):** It is the angle between the line connecting the most medial metatarsal point and the most medial heel region and the line connecting the inner medial arch point (concavity of the arch) and the most medial metatarsal point (20).

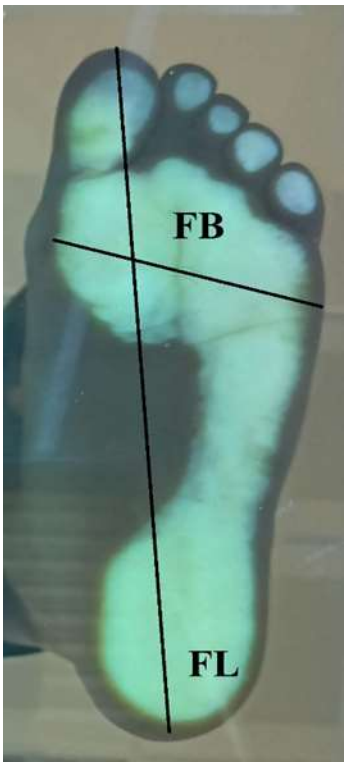

Fig 1. Foot İndex

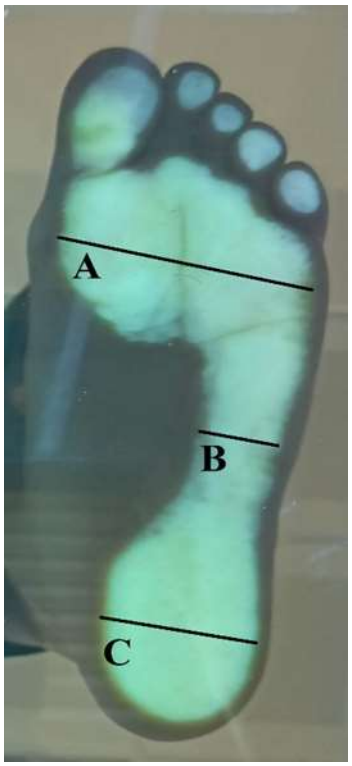

Fig 2. CSI and SI

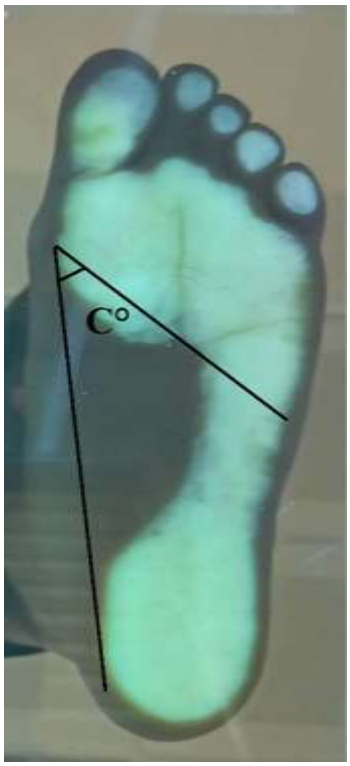

Fig 3. C°

Table 1. Foot descriptive statistics

FOOT PARAMETERS	FI		CSI		SI		C°	
	Mean	SD(±)	Mean	SD(±)	Mean	SD(±)	Mean	SD(±)
RIGHT FOOT (n:51)	37,16	2,25	30,27	0,08	0,51	0,14	56,19	5,39
LEFT FOOT (n:51)	37,16	1,95	29,76	0,11	0,50	0,18	54,49	6,35

FI: Foot index, CSI: Chippaux-Smirak index, SI: Staheli index, C°: Clarke angle

Determination of static balance levels. CSMI TecnoBody PK-252 isokinetic balance system measuring device was used to determine the balance levels of the participants. TecnoBody PK-252 device, which can measure static and dynamic balance, can objectively measure balance measurements and allows us to obtain measurable data. The data provided by the device can be monitored and recorded instantly from the screen on the device. Since this system calculates the balance score with oscillation scores relative to the central point on a certain analytical plane, the further one moves away from the centre, that is, the 0 value, the higher the score will be. Therefore, as the balance score moves away from 0, the balance of the individual is assumed to be bad, and as the score approaches 0, the balance is assumed to be good (26).

In the balance measurement, the device was first calibrated and the system was introduced to the volunteers. The "Static Stability Assessment" module of the device was selected, and the volunteers' feet were

placed on the platform with reference to the x and y lines on the platform. In the measuring position, the hands are drooping and the feet are bare. Measurements were made for 30 seconds with bipedal and eyes open. The results were evaluated in 8 parameters.

Static balance parameters

COPX: Pressure to the average central x point. **COPY:** Pressure to the average central y axis. **FBSD:** Standard deviation of forward and backward sway. **MLSD:** Standard deviation of medial-lateral sway. **AFBS:** Average forward backward speed. **AMLS:** Average medial lateral speed. **P:** Used perimeter. **A:** Used area.

Fig 4. Static Balance Measurement System

Table 2. Static balance descriptive statistics

BALANCE PARAMETERS	Mean	SD(±)
COPX	0,69	0,99
COPY	-1,04	1,79
FBSD	5,98	3,15
MLSD	2,86	1,41
AFBS	9,45	3,12
AMLS	7,41	2,67
P	287,73	218,30
A	408,61	115,26

Data analysis. SPSS package program was used in the analysis of the data. First, the detection of normality was tested with the Kolmogorov-Smirnov test. It has been determined that the Standard deviation of medial-lateral sway (MLSD) data, which is one of the balance parameters, does not show a normal distribution. Spearman correlation test was used in the analysis of the relationship between MLSD and all other parameters. Since the data of all other foot and balance parameters showed normal distribution, the relationship between them was examined by applying the Pearson correlation test. Results were evaluated at $p < 0.05$ significance level.

RESULTS

Table. 3 The relationship between foot parameters and balance levels.

		FI		CSI		SI		C°	
		RIGHT FOOT	**LEFT FOOT**	**RIGHT FOOT**	**LEFT FOOT**	**RIGHT FOOT**	**LEFT FOOT**	**RIGHT FOOT**	**LEFT FOOT**
COPX	**r**	0,033	-0,181	**0,364****	**0,306***	**0,365****	**0,280***	-0,161	-0,214
	p	0,816	0,202	**0,009**	**0,029**	**0,008**	**0,046**	0,260	0,132
COPY	**r**	0,165	**0,322***	-0,029	0,014	-0,031	0,036	0,113	0,037
	p	0,248	**0,021**	0,839	0,921	0,829	0,803	0,431	0,797
FBSD	**r**	**-0,345***	**-0,288***	-0,047	0,071	-0,123	0,034	-0,149	0,030
	p	**0,013**	**0,040**	0,745	0,619	0,391	0,814	0,296	0,840
MLSD	**r**	-0,149	-0,120	0,125	0,134	0,078	0,142	-0,052	- 0,018
	p	0,295	0,391	0,380	0,347	0,590	0,319	0,720	0,898
AFBS	**r**	**-0,372****	**-0,284***	-0,014	0,100	-0,112	0,056	-0,230	-0,032
	p	**0,007**	**0,044**	0,921	0,486	0,435	0,697	0,100	0,826
AMLS	**r**	-0,113	-0,002	0,030	0,146	-0,019	0,134	-0,143	-0,169
	p	0,431	0,990	0,833	0,307	0,894	0,347	0,316	0,236
P	**r**	**-0,300***	-0,166	-0,032	0,124	-0,119	0,107	-0,034	0,020
	p	**0,033**	0,245	0,824	0,385	0,407	0,455	0,812	0,870
A	**r**	**-0,297***	-0,178	0,009	0,141	-0,072	0,109	-0,215	-0,110
	p	**0,034**	0,211	0,948	0,323	0,615	0,446	0,129	0,450

p<05. FI: Foot index, CSI: Chippaux-Smirak index, SI: Staheli index, C°: Clark angle COPY: Pressure to the average central y axis, FBSD: Standard deviation of forward and backward sway, MLSD: Standard deviation of medial-lateral sway, AFBS: Average forward backward speed, AMLS: Average medial lateral speed, P: Used perimeter, A: Used area.

When the relationship between foot parameters and balance levels is examined in Table 3, it was observed that there was a negative significant correlation between the right foot FI parameter and FBSD, AFBS, P and A balance scores. In the left foot, there was a positive correlation between the FI parameter and the COPY balance score, and a negative significant relationship between the FI parameter and the FBSD and AFBS balance scores. In addition, it was determined that there was a positive significant correlation between the CSI and SI parameters of both feet and the COPX balance score.

DISCUSSION

As a result of developing technology and increasing financial resources, the competition in reaching sports goals is increasing day by day. In this process of elitism and professionalization in sports, the issue of maximizing sports efficiency increases the demands on scientists. For these reasons, scientists are constantly investigating the key factors and characteristics required for successful athletic performance. In line with the researches, it is seen that morphological variables are important in determining potential successful athletes (27,28,29,30). Among these morphological factors, it is important to comprehensively reveal the relationship between foot structure and sportive performance since the foot is the last point of the locomotor chain and is the structure that transfers the load of the whole body to the ground. It is thought that providing the necessary postural control in order to show the expected performance in athletes and transferring the pressure applied to the body correctly to the ground is related to the anatomical structure of the foot.

According to the results of this study, which tried to determine the relationship between some components in the foot anatomical structure and static balance performance in female athletes, a significant negative correlation was found between the right foot FI parameter and FBSD, AFBS, P and A balance scores. In the left foot, there was a positive correlation between the FI parameter and the COPY balance score, and a negative correlation between the FI parameter and the FBSD and AFBS balance scores (p<05, table 3).

In the literature review, it was seen that researchers generally focused on arch structure when examining the relationship between foot structure and sportive performance. Foot index (FI) was used in this study to indicate the importance of other components involved in foot biomechanics.

Foot index is one of the parameters that gives an idea about the foot structure and is accepted by researchers (31,32). It is calculated by dividing the width of the metatarsal region by the length of the foot (24,

Fig 1). The relationship findings between foot index and balance in this study can be interpreted that an improvement is visible in balance scores with an increase in the ratio of metatarsal width to foot length.

In this study, it was observed that there was a significant positive correlation between the CSI and SI parameters of both feet and the COPX balance score ($p<05$, table 3). CSI and SI parameters are important parameters used by many researchers to determine the height and lowness of the medial longitudinal arch of the foot. CSI and SI parameters are important parameters used by many researchers to determine the height level of the medial longitudinal arch of the foot. In CSI 1-29,9 values (33) and in SI 0,30-0,59 values (25) are accepted as normal arch. The CSI and SI findings in this study are at or close to values considered normal by the researchers (Table 1).

When the relevant literature was reviewed, in a study conducted by Harrison and Littlewood (2010) on fifteen healthy adults, it was stated that static balance levels improved as the level of flat feet decreased (34). Lin et al. (2006) also found that there was a significant relationship between footprint parameters and postural balance ability in a study on children, and that as the arc height increased, the sway field decreased (35). In addition, Kim et al. reported in one of their studies that individuals with low arc had higher COPX values than individuals with normal arc (36). It is seen that the results of previous studies regarding the relationship between arch height and postural control support our results.

As a result of the study, significant values between some foot parameters and some static balance parameters can be interpreted as the importance of the anatomical structure of the foot in the static balance characteristics of athletes.

We believe that these results will shed light on other studies to reveal the relationship between foot structure and body biomechanics.

These research results can be used in determining the ideal physical structure and criteria for athlete talent selection. In addition, these results can be taken into consideration during training processes in increasing sportive performance and determining preventive measures to protect athletes' health.

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An Overview of Football Interpreting in Turkey and Interpreters' Views

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Abstract

Sports area, where many different nations and cultures come together, has been one of the biggest factors that increase intercultural communication. Football, one of the biggest fields in terms of sports, succeeds in bringing together the different cultures on a common ground. It has always attracted the most attention for years and has become an international industry. This interest of humanity in football has enabled the sector to reach very large masses financially. The language of sports and football has its own technical terms and jargon. People who will work in this field should have not only the terminology of this area but also a background knowledge of the field. As a field of study that brings together different nations, it is one of the most important sectors where translators and interpreters are needed the most. In this study, football interpreting has been mentioned as an important translation area and sector. The main aim of this study is to inform the new interpreters in the field of football interpreting about this sector, the subtleties and achievements of the profession. The main data of this research consists of interview questions and answers received from professional football interpreters. This study not only aims to provide information, but also analyses the translator profile with real one-to-one interviews. With the extensive information provided by the professional interpreters in the field, the details of the process have been clarified and the mastery of the work has been revealed. As a result of the interview, some conditions provided to translators while working in sports clubs, not much known information until now about the first entry of interpreters into the profession, types of contracts in the profession, financial gain, professionalism of this sector, professional association, advantages/disadvantages of the profession and social rights of translators have been revealed.

Key words: Interpreting, Sports Interpreting, Football Interpreting, Profession, Sports Clubs

Türkiye'de Futbol Tercümanlığına Genel Bir Bakış ve Tercüman Görüşleri

Özet

Birçok farklı milletin ve kültürün bir araya geldiği spor alanı, kültürlerarası iletişimi artıran en büyük etkenlerden biri olmuştur. Spor anlamında en büyük alanlardan biri olan futbol, farklı kültürleri ortak paydada buluşturmayı başarmıştır. Yıllardır her zaman en çok ilgiyi çekmiş ve uluslararası bir sektör haline gelmiştir. İnsanlığın futbola olan bu ilgisi sektörün finansal olarak çok geniş kitlelere ulaşmasını sağlamıştır. Spor ve futbol dilinin kendine has teknik terimleri ve jargonu vardır. Bu alanda çalışacak kişilerin sadece bu alana ait terminolojiye değil, aynı zamanda alan bilgisine de sahip olması gerekmektedir. Farklı milletleri bir araya getiren

bir çalışma alanı olarak mütercim ve tercümanlara en çok ihtiyaç duyulan en önemli sektörlerden biridir. Bu çalışmada önemli bir tercüme alanı ve sektörü olarak futbol tercümesine değinilmiştir. Bu çalışmanın temel amacı futbol tercümanlığı alanına yeni başlayan tercümanları bu sektör, mesleğin incelikleri ve kazanımları hakkında bilgilendirmektir. Bu araştırmanın ana verilerini profesyonel futbol yorumcularından alınan mülakat soruları ve cevapları oluşturmaktadır. Bu çalışma sadece bilgi sağlamayı amaçlamamakta, aynı zamanda çevirmen profilini gerçek bire bir görüşmelerle analiz etmektedir. Futbol tercümanlığı olan alanda profesyonel tercümanlar tarafından sağlanan kapsamlı bilgilerle sürecin detayları netleştirilerek işin ustalığı ortaya çıkarılmıştır. Mülakat sonucunda tercümanların spor kulüplerinde çalışırken sağladığı şartlar, tercümanların mesleğe ilk girişi hakkında bugüne kadar pek bilinmeyen bilgiler, meslekte sözleşme türleri, maddi kazanç, bu sektörün profesyonelliği, meslek birlikteliği, mesleğin avantaj/dezavantajları ve çevirmenlerin sosyal hakları ortaya konmuştur.

Anahtar Sözcükler: Çeviri, Spor Çevirisi, Futbol Çevirisi, Meslekleşme, Spor Klüpleri

INTRODUCTION

Sports is a national activity where cultures come together while incorporating many disciplines. Intercultural interaction, which emerged with the development and spread of sports in the globalizing world, has begun to require interpretation between different languages and interpreters to be employed in this field. Dozens of cultures in this area need a communication bridge. The profession of interpreting undertakes this bridge in two separate ways, both written and oral. Sports interpreting as both written and oral emerges as a sub-branch of the field of interpreting and thus, interpreters have an important role in this area. As Uyanık (11) outlined it should not be forgotten that the role of an interpreter is basically to enable people or groups from different cultures to communicate with each other. Interpreters have to keep themselves alive and dynamic in sports. Besides, as Ünsal (12) stated, each branch of sport has its own technical and special vocabulary, its own jargon, cliché and even slang. Sports translator comes into play to convey these technical terms to the audience outside the profession.

Interpreters working in this industry not only perform translation duties, but also become a part of the technical committee of the football club or act as an assistant of a football player. A football interpreter should always keep an equal distance from teachers, managers and players, and should not take any sides. He/she needs to master the language and be able to manage stress well. An interpreter of a foreign player or coach who comes to the team is in the position of being hand and foot from the moment that player or coach arrives in the country. His/her translation service is not only the translation of the directives given during the match, but also continues to provide translation services in environments other than sports.

Sports clubs need an interpreter within their own club, as they do work for which large budgets are allocated. A sports interpreter can be a salaried employee who is on duty whenever the club needs it. Since foreign athletes have to solve their language problems, they work in every relevant environment, from training to meetings, from press releases to interviews on television. The comforting aspect of this interpretation field is that since the parties involved in the interpretation process such as interpreters, trainers and team members are not variable, content and terminology may not vary as much as other fields; however, it is an area with a high level of stress because it is a business with big money.

This study deals with football interpreting, which is the most well-known and most common business field of sports interpreting in the field of interpreting. When we consider today's conditions, football interpreting is both a fun and an interesting field. The task of the interpreter is to ensure that the parties with different cultural backgrounds understand each other (6). As Linell (7) stated, “the speaker communicates within the framework of certain situations and contexts in his own physical and social environment and conveys his message to the other person”. This situation reveals the need for translators. From this point, it is important to understand the level of professionalism of football interpreting, which is a part of sports interpreting, and the duties undertaken by this profession in Turkey. In this direction, the ways of meeting the interpreting needs of the clubs and football federations that compete at the highest level in the national leagues and their translation policies are tried to be discussed.

Sport Interpreting as a Profession

In the case of many sports teams, a specific type of such formal - or forced - multilingual setting exists. These have recently started to rely more heavily on players from other countries. Because of the inflow of international players into national leagues, most national sports organizations now have a quota on the number of foreign players who can play in teams. The team's makeup is then determined not only by the players' appropriateness (and financial availability), but also by nationality politics, with players periodically switching citizenship to comply with external laws. Professional sports teams might be thought of as unique examples of multilingual workplaces. This is because multilingual and multinational groups are created in the same way: individuals are brought together based on their talents and availability rather than their own social preferences. Sports teams, in this sense, are formal groups, as opposed to informal social organizations, in which, an individual normally selects his or her participation as a result of a reasonably free decision (2). In order to reach a common goal, sports teams are similar to work teams in that all players must coordinate their activity. Having multilingual and multinational groups cause the need of interpretation. Consequently, interpreters are needed in all international sports events, as a companion/host in international sports organizations such as the Olympics, winter games, summer games, or when experts and players speaking different languages are brought together, such as press conferences and panels. (1).

If sports interpreting is considered theoretically, in this subtype there are two types of modals. These are 'mode' and 'modality'. The former one refers to ways of how it is done and it includes both verbal and oral sports interpreting. On the other hand, the latter one refers to its context. Interpreter has to know not only one nation's language but also its cultural items because interpreter must ensure communication between different cultures at most accurate level. In addition, a sports interpreter must have the terminology of field, technical knowledge and variety of fields thanks to its interdisciplinary nature as well. Most of the sports associations and translation offices that provide translators to the sports industry emphasize that it is very important for the translator to have knowledge of the field of work and the terminology in this field (4).

Sports interpreters can do consecutive interpreting (interpreting after a speaker), liaison interpreting (interpreting between and after speakers) or simultaneous interpreting ("interpreting almost as the same time as the original speaker from a booth or whispering in the ear of the client" (4). They can translate at press conferences, sports clinics, on the field or in the race. They can be placed next to the athlete or translated from a television studio. Most of the sports interpreting that we can observe as viewers takes place in front of a television camera, in some countries this activity is sometimes carried out by sports commentators or television presenters or even former players who speak the target language and are experienced as communicators (4) and these translations made in the field of sports are followed or watched by many people. Therefore, translation or interpreting, especially in the field of sports, is a profession that requires care and must be done elaborately by the experts.

Football Interpreting as the Subtype of Sport Interpreting

When we consider the transformation of football based on its historical process, it has been revealed that football has become a more organized and appealing phenomenon to the masses with its institutions and organizations established in the process. As a result of these changes, football players have become global players, and both linguistic, cultural and economic changes have occurred in the field. Football interpreters have started to appear especially in our country as a consequence of all the developments in the field. Football interpreters have determined their own positions with their duties and responsibilities at many points of the field.

The importance of the language phenomenon in the field of football is increasing day by day. Football players, managers, broadcasters, sports writers, clubs are the global representatives of this field. One of the obstacles encountered in this area is communication. Although there is a perception that the language of football is common in general, when football players make a new transfer, they need to communicate from their daily lives to their professional lives in the adaptation to the new country they transfer to. In this communication, the main mediators are the interpreters however, they should be aware of the importance of

their own profession and the need of their own presence. From this point, the need for interpretation and interpreters, especially in international tournaments, is very high, which is highlighted by the fact that football has a lot of culture. At the 2014 World Cup, there were 32 national teams and 15 different languages spoken by these teams. This multicultural situation has become very important for the interpretation sector and it has created the need for interpreter. Interpreters were divided into two as volunteers and experts, and they worked in many areas to facilitate the operation of this multicultural organization. When we look at the employment of interpreters in Europe, we see companies that cooperate with clubs. These companies are large companies that have gathered the profession of football and interpreting under one roof and will develop and carry forward football interpreting, which is a sub-branch of sports interpreting. The wide range of players brought by the cultural diversity in Europe has highlighted a scenario that requires an interpreter for many foreign languages. In this process, it is seen that they use former players, existing players, language courses or rarely professional interpreters in intra-club communication rather than using contracted interpreters. Until recent years, the profession of football interpreter in Turkey was referred to as "the interpreter of the team", "the interpreter of the player", "the interpreter of the X coach" and there was no term such as "sports/football consecutive interpreter" (1). This situation in Turkey shows that football interpreting is still not official. Interpreters are under the titles called technical staff, administrative staff or support team of the clubs. Football interpreting in Turkey is carried out by employing contracted interpreters who will work full-time or by employing full-time interpreters to meet the interpretation needs of the Turkish Football Federation for international meetings and events. At this point, the importance of being aware of football interpreters as a profession emerges. As Katar (5) expressed, “Translating Professional Standards” published in the Official Gazette in 2013, which have an explanatory and decisive quality on subjects such as the definition of the profession, its place in international classification systems, working environment and conditions, are extremely important for football interpreting, as in every branch of translation. As a matter of fact, a football interpreter who is aware of these standards and cooperates with his colleagues and other stakeholders in the field of translation will be more conscious of his rights and will be able to act appropriately in possible problems he may encounter regarding the working environment, job description or other issues.

In football press conferences, the whole range of interpreting modes is available, but the most popular choice is consecutive interpreting, which is reasonably straightforward to organize and does not require any specialized equipment. Simultaneous interpretation in the booth is also uncommon in pre- and post-match news conferences in domestic league games, as well as during official player presentations: just a few prominent teams have the appropriate equipment in their stadiums such as Real Madrid CF, FC Barcelona, FC Bayern Munich, and Arsenal FC. Simultaneous interpreting, on the other hand, is often favoured in the final rounds of international tournaments: because these events are really multilingual, simultaneous interpreting is the only realistic way to present many language versions at the same time FIFA and UEFA each have their own Chief Interpreters who hire conference interpreters with the necessary language combinations and coordinate with interpreting equipment and technical support providers (8, 9). In fact, above all, football interpreting fits the definition of liaison interpreting, especially in press conferences and intra-club communication. Despite the wide range of situations, the interpreter's role in press conferences appears to be fairly straightforward: if a foreign player or coach does not speak the official language of the press conference (L1), the interpreter interprets the questions into the foreign language (L2) and the interviewee's responses into official language (L1); similarly, if questions are asked in L2 by a foreign reporter (and answered in the same language by the coach or player), they are interpreted into L1(8, 9). Thus, as Uyanık (11) indicated, “sports interpreting is a consecutive interpreting service provided by an interpreter working for a team, coach or a player in sports clubs and sports organizations. There is a need to define the place where sports interpreting finds itself among the types of interpreting.

Beyond all this, as Dinar (3) expressed, ensuring that the players learn the language of the country they live in can be another solution. However, despite all these differences and difficulties, the fact that a football player who has transferred to any country has a command of the language of the country he is in at least enough to fulfill the basic communication requirements, whether through the club's service or his own will and possibilities, is important both in communication within the club and in relations with the media. It will be useful in the social relations of the football player. Therefore, the method of getting help from the

language teacher, which is one of the solutions for the communication problem of the clubs, is mostly shaped by the personal interest and desire of the football player (3).

As can be seen, football interpreting is an important field that closely concerns the whole world and the football industry. For this reason, it is essential that this field is professionalized and that translators are given the necessary rights. From this point of view, in this study, based on the views of translators, various opinions will be put forward on points such as the pros and cons of the profession.

METHOD

The method of this study, in which research was conducted on football interpreting, is a qualitative research and a questionnaire was applied with open-ended interview questions directed to interpreters working in the football interpretation sector. In the survey, questions were asked to the interpreters of the teams whose names are widely heard in the football industry. Serkan Gürbüz, whose name will be the first to be heard when the roots of the industry are explored among these interpreters, also answered the questions posed. In addition, interviews were held with the translators of Beşiktaş, which is extremely successful in the Turkish Super League ranking in today's football community. In addition to the four big sports clubs, translators working with the very successful and frequently heard clubs Çaykur Rizespor and Konyaspor also responded to the survey. The interpreters contributed to the research in a very sincere and helpful way. With the answers given to these interview questions, findings about the professionalism, advantages and disadvantages of the profession in the football interpreting sector, the economic situation offered by the sector to interpreters and social rights have been revealed. In this part of the study, the data obtained from the interviews with interpreters working freely or affiliated with a club in the football sector will be mentioned. Questions about the processes of starting the profession, whether they are contracted or not, the income they provide from the profession, social rights (health insurance, compensation, retirement, etc.), professionalism, association of profession and the advantages and disadvantages of the profession will be presented in this section and the answers to these questions will be discussed in the conclusion section of the study.

After the subject of the study was chosen, necessary research was carried out. This process took approximately two weeks. After this step of the study, the implementation phase was started. First of all, the method to be used in this implementation was decided as an interview message, then the names, social media or e-mail addresses of the interpreters working in the teams were searched. After all this information was obtained, it was said that they wanted to interview one by one. This process took some time. The waiting time to receive feedback from translators even reached two weeks. As the last step, interview questions were sent to football interpreters via e-mail. They conveyed their answers to the questions digitally. The interview, which is one of the main data collection methods of the study, includes important opinions and thoughts of the football interpretation sector and interpreters about the profession.

In this study conducted for the football interpreting sector, the number of interpreters who answered the interview questions was sufficient to collect the data intended to be obtained from the interpreters currently working in the field, although it was very few. In the light of these data, it is thought that the findings obtained for the football interpretation sector will contribute to the literature and other academic studies to be conducted in football area.

Data Collection

Within the scope of the interview conducted for football interpreters, seven questions were asked to the interpreters, and the questions were gathered under four main headings as shown in Part 3. In this context, six different interpreters were reached and answers to the related questions were received.

Data Analysis

The general purpose of the questions in the interview is to obtain information about the profession in the light of the experience gained by the interpreters working in the field and to raise the awareness of the new interpreters who will participate in the field.

The first question asked how football interpreters entered the sector. In this question, it is aimed to find out how interpreters first started the sector, how they decided to enter this sector, whether they were interested

in this field before and whether they received training in this field. In the second question, they were asked whether they worked as freelance interpreters in the sector or as contractual with a club. This question aims to determine whether interpreters are freely exercising this profession or are in agreement with a club. Another purpose of the question is to find out whether the profession requires the contract. The third question is about whether their income from the profession is sufficient or not. Considering today's economy, it was tried to reveal with this question whether the income obtained from this profession is sufficient to satisfy the interpreter beyond meeting the needs of the interpreter. The fourth question asked to football interpreters is what kind of social rights (health insurance, compensation, retirement, etc.) they have and what improvements can be made in this regard. This question aims to reveal what social rights the profession offers interpreters, the differences arising from clubs and the type of contract, and how the interpreter is affected by it. In the fifth question, the professionalism level of the sector and how professional they found football interpreting as a profession were asked. This question aims to reveal how professionally perceived by those who perform the profession of football interpreter and the effect of the responsibilities of the profession. In the sixth question, whether there is a professional association for football interpreters and, if any, the membership status of interpreters was asked and afterward they were asked whether they are satisfied with the services and cooperation provided by the association to get information about the sector and membership status of interpreters. Finally, in the last question, the advantageous and disadvantageous aspects of the profession were asked. This question aims to comprehensively address the positive or negative aspects of this profession by those who perform the profession for interpreter candidates who are interested in the profession and are considering doing this profession in the future.

FINDINGS

Interpreters Stepping into the Profession

The entry of the six interpreters interviewed into the sector is different from each other. In general, many of the interpreters entered the profession spontaneously at an unexpected time. However, the situation of the remaining interpreters is slightly different. Generally, it comes to mind that those who perform the interpretation profession have graduated from the relevant department. However, when we look at the answers given by the interpreters, it has been seen that their aptitude for foreign languages can be effective in their inclusion in this field. In this case, of course, among the interviewed interpreters, there are exceptional ones who have been involved in the field with their diplomas. In line with their interest in the field, some of them have been trained in this process and some of them have started to work with different tasks in the field of football. However, the common point that they all meet is that they eventually undertake the task of interpreting in this field. After starting this task, they all progressed with love for the profession in general terms.

Contract Type and Financial Gain

Considering the type of contract, most of the interpreters said that the football interpreters were not contracted but an insured employee, like a salaried staff of the club. Since their insurance is based on a high amount, this is considered as a contract for them in a way. However, an interviewee interpreter stated that she worked freely, performed simultaneous and consecutive interpretations in many different fields, and saw football interpreting as only one department in a wide range. Freelance interpreter stated that she does not earn a satisfactory level because she is not affiliated with any club, while a translator working under a contract with a club that had a good season stated that his earnings were quite sufficient. It is seen that the common opinion of the interpreters who are affiliated with a club is at a satisfactory level especially in large clubs in terms of financial gain. There are also interpreters who think that a football interpreter receives extras in addition to the fee, and when they come together, they think that a good income is earned. Of course, when we look at the beginning times of the history of the football translation industry, this financial gain is higher, but when we consider the impact of the economy in today's conditions, it is seen that this situation has decreased now.

Professionalism and Association of the Profession

The opinions of the six interpreters interviewed about the professionalism are different from each other. The opinion of one of the interpreters on this issue is that football interpreting is not professional enough, the

functioning of the system is simpler than it should be, but this situation can be resolved very quickly with the necessary inspections and developments. The common view of some of the interpreters is that the interpreter does not only work as an interpreter in the club, but is also assigned as the assistant of the players in the club. They think that the perspective of the clubs is important at this point. They also say that the interpreter should be on an equal footing between the club, players and club officials. On the subject of association, the common answer of interpreters is that there is no association. Many interpreters think that a step should be taken in this regard. They say that the association will both help the interpreters to make their voices heard and make the sector more professional and institutional in itself.

Advantages/Disadvantages of the Profession and Social Rights of Interpreters

As the advantages of the profession, the answers given by the interpreters are within the framework of financial gain, the environment provided by business life, working with qualified people and travelling. Interpreters stated that financial gain is higher than most of the sectors if they had a successful season. They also stated that they like the working environment offered by this industry and that people who like to appear in front of the camera can be satisfied with this profession. Interpreters, who watched TV as a child and got together with the football players they admired, stated that the industry is very exciting in this regard. Travelling is seen as both an advantage and a disadvantage. Because while some of the interpreters are married and even have children, some of them live a single life.

In terms of disadvantages of this sector, interpreters state that although the profession looks like a fairy tale from a distance, it also has disadvantages that can be gathered under a few headings such as the opposite of the profession to family life, the profession creating too much stress and the interpreter being in a very critical position, sometimes not being able to have a settled life, and not having specific days.

Considering social rights, interpreters state that they have the same rights as employees in other corporate professions. They can benefit from opportunities such as compensation, retirement, health insurance. They also expressed that they do not have any rights specific to them, they are not privileged because they are interpreters, and because they are a part of the technical team, the labour law comes into play in compensation and similar issues.

CONCLUSION

As a result of the method applied throughout the study, together with the findings obtained about the subject under investigation, it can be concluded that football interpreting is more dominant than other types of sports interpreting in line with the findings worldwide and focused on this field. The findings obtained in line with the answers given by the interpreters to the questions are as follows. First of all, considering today's economy, it has been concluded that financial gain is at a lesser level than in the past, but this situation may change if a good season is spent within the club. In general, when working hours are evaluated, financial gain is actually at a more satisfactory level than many other professions. Another point where the answers received from the interpreters meet in the common denominator is that they generally work without a contract. It has been revealed that there is no difference from other professions in terms of insurance and other social rights. Thirdly, the answers received in terms of professionalism of the profession differ when Turkey and abroad are considered separately. Indicating that the situation in Turkey can be improved, the interpreters stated that there is no association in the field. They said that an association to be established would also improve the professionalism. Finally, regarding the advantages/disadvantages of the sector, the most emphasized issues are financial gain and the business environment brought by the sector.

As a result, this study, which has been added to other studies in the field of interpreting and football interpreting, is based on scientifically obtained data from the field and while it outlines the functioning of the profession, it contains information that will guide the interpreters who will be new to the field.

It is seen that the common point that emerged from the answers of the interpreters who worked in different clubs working as professionals in our country is that football interpreting is now a professional sector and a professional job definition should be made as in other professions.

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Double-pyramid and Reverse step resistance training effectiveness on physical fitness factors among female handball players

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Abstract

Due to the necessity of resistance training for athletes conditioning, loading patterns in order to improve training outcomes have received more attention in recent decades. Accordingly, the purpose of this study was to assess the impact of 8-week resistance training performed with double pyramid (DP) and reverse step (RS) systems on some physical fitness components of elite female handball players. Thirty young female handball players are randomly assigned to the three groups of DP (age: 17.43±1.63 year, weight: 70.28±10.14 kg, fat percentage: 15.60±1.17), RS (age: 17.13±1.32 year, weight: 67.80±7.78 kg, fat percentage: 15.40±1.69), and control groups (age: 17.33±1.71 year, weight: 61.04±6.61 kg, fat percentage: 16.50±1.43). Training programs was performed for an eight-week, 3 sessions per week with loading pattern of DP or RS. Measurements including fat percentage, anaerobic power (RAST), agility (Illinois), Speed (45 meter sprint), strength (1RM), and muscle endurance (60% 1RM) are taken before and after the training course. After the training period, DP and RS groups had significant effects on the mean power, upper and lower body muscular endurance, fat percentage, agility and speed ($p<0.05$). Moreover, DP had a significantly greater improvement in upper body strength than RS groups, whereas RS revealed a significantly greater improvement in lower body strength than DP groups ($p<0.05$). Also, comparison of DP and RS groups showed a significant difference in lower and upper body muscle endurance between the two groups ($P<0.05$); While, there was not a significant difference in anaerobic power, upper and lower body strength, fat percentage, speed, and agility tests between training groups. DP resistance training appears that to have more impact in improving anaerobic power, upper body strength and speed. While, RS ones showed a greater effect on increasing the lower body strength, muscular endurance, agility and fat percentage of female handball players. Therefore, DP and RS resistance training have positive effects on physical fitness factors among elite female handball players.

Keywords: Resistance training, double pyramid, reverse step, loading pattern, physical fitness.

Özet

Sporcuların kondisyonlanması için dayanıklılık eğitim gerekliliği nedeniyle, antrenman sonuçlarını iyileştirmek için yükleme kalıpları son yıllarda daha fazla ilgi görmüştür. Buna göre, bu çalışmanın amacı, çift

piramit (DP) ve ters adım (RS) sistemleri ile yapılan 8 haftalık direnç antrenmanının elit bayan hentbolcuların bazı fiziksel uygunluk bileşenleri üzerindeki etkisini değerlendirmektir. Otuz genç bayan hentbolcu DP (yaş: 17.43±1.63 yıl, ağırlık: 70.28±10.14 kg, yağ yüzdesi: 15.60±1.17), RS (yaş: 17.13±1.32 yıl, ağırlık: 67.80±) olmak üzere üç gruba rastgele atanmıştır. 7,78 kg, yağ yüzdesi: 15,40±1,69) ve kontrol grupları (yaş: 17,33±1,71 yıl, ağırlık: 61,04±6,61 kg, yağ yüzdesi: 16,50±1,43). Antrenman programları, DP veya RS yükleme paterni ile sekiz haftalık, haftada 3 seans olarak uygulandı. Antrenman öncesi ve sonrasında yağ yüzdesi, anaerobik güç (RAST), çeviklik (Illinois), Sürat (45 metre sprint), kuvvet (1RM) ve kas dayanıklılığı (%60 1RM) ölçümleri alınır. Antrenman periyodundan sonra DP ve RS gruplarının ortalama güç, üst ve alt vücut kas dayanıklılığı, yağ yüzdesi, çeviklik ve hız üzerinde anlamlı etkileri vardı ($p<0.05$). Ayrıca, DP, üst vücut gücünde RS gruplarına göre önemli ölçüde daha fazla gelişme gösterirken, RS, alt vücut gücünde DP gruplarına göre önemli ölçüde daha fazla gelişme gösterdi ($p<0.05$). Ayrıca, DP ve RS gruplarının karşılaştırılması, iki grup arasında alt ve üst vücut kas dayanıklılığında anlamlı bir farklılık gösterdi ($P <0.05$); Antrenman grupları arasında anaerobik güç, üst ve alt vücut kuvveti, yağ yüzdesi, hız ve çeviklik testlerinde anlamlı bir fark bulunmadı. DP direnç eğitiminin anaerobik gücü, üst vücut gücünü ve hızı iyileştirmede daha fazla etkiye sahip olduğu görülmektedir. RS olanlar ise bayan hentbolcuların alt vücut kuvvetini, kas dayanıklılığını, çevikliğini ve yağ yüzdesini arttırmada daha fazla etki göstermiştir. Bu nedenle, DP ve RS direnç antrenmanlarının elit bayan hentbolcular arasında fiziksel uygunluk faktörleri üzerinde olumlu etkileri vardır.

Anahtar Kelimeler: Direnç antrenmanı, çift piramit, ters adım, yükleme modeli, fiziksel uygunluk.

INTRODUCTION

Handball is a power-speed field and one of the most beautiful sports, which has been one of the Olympic Games since the 1972 Olympics. The player's initial acceleration, jumping, and the agility to change direction, start, and stop quickly are all crucial elements of fast play (12). It requires a combination of aerobic power and anaerobic capacity that will allow the frequent repetition of short-duration high-intensity actions, interspersed with brief recovery intervals (10) Therefore, the physiological needs of this sport include aerobic fitness, strength and power, agility, and speed (20). One of the most important needs of handball is power and strength, as well as the speed of throwing, and the reason for the beauty and excitement of playing handball is due to the existence of these movements, which are performed consecutively and repeatedly during the game. One type of exercise that improves these needs is resistance training. Resistance training has been used to perform skills effectively and to endure fatigue, reduce injury, improve motor function, improve jumping, speed, muscle endurance (11), and anaerobic power (20). However, in resistance training, a combination of variables such as type of muscle activity (introverted and extroverted), training volume (number of turns and repetitions of movements) and intensity of training, type of movement selected and muscle groups involved in training, movement sequence performed, rest intervals between turns and movements, repetition speed, training frequency, range of motion and energy system involved (19 – 22,25). In addition to the above, the effectiveness of training to increase strength, muscle endurance, power, and etc. depends on the type of training system (loading pattern) used in weight training (8). Although there are different systems for weight training, the use of each of them depends on the goal and the instructor's belief in that training system. For example, some coaches believe that using different loads instead of fixed loads leads to better results. Because it is believed that using constant loads in each training session causes the desired load and tension to be applied to the muscle, but it may prevent effective training stimulation due to the use of low repetitions in each turn, limited training volume, and muscle tension time by reducing stimuli such as fatigue (23). The use of different loads, in addition to following the principle of diversity, seems to increase the volume of exercise, causing the production of various metabolites such as lactate, potassium, free phosphate and creatine, which are the factors that stimulate greater adaptation (26, 27). Therefore, in the present study, two different and common loading patterns in promoting muscle capabilities, namely RS pattern and DP pattern, were examined. In the RS pattern, the load is reduced from step to step. But the DP pattern consists of two pyramids, one of which is inverted on top of the other pyramid; as the number of repetitions decreases from the bottom to the top of the pyramid, it then increases again in the second pyramid (6). First, this training system was proposed to increase strength. Because it was believed that a training load of 80 to 85% in the final cycles would cause the application of force to occur faster and this would improve strength. However, when the final cycles are performed, the central nervous system and the muscles involved may reach the point of exhaustion,

in which case these cycles will not bring the anticipated benefits (3); fatigue in the rapidly contracting fibers will increase muscle volume instead of increasing strength (5). Now, considering that handball is a sport in the form of endurance in power, endurance in speed, endurance in jumping, etc., and since it seems that these two training methods increase strength (one of the factors of improving power performance) and muscular endurance, the present study intended to compare the effect of two DP and RS loading patterns on anaerobic power, strength, muscle endurance, body composition, agility and speed of young female handball players.

METHOD

Participants. The present study was quasi-experimental with pre-test and post-test design in three experimental groups. The subjects of this study were 30 female handball players of Qazvin city who were randomly divided into three groups: DP (n=10), RS (n=10), and control group (n=10) (Table 1). The sample size was determined by the G power (Ver. 3. 1. 9. 2) software package to be 30 specified for ANOVA at the error level of $\alpha = 0.05$, effect size f= 0.25, and $\beta = 0.80$, but it was increased to 30 individuals to have the same number of subjects in each group(24). These individuals had at least four years of membership in handball teams at Iranian club League 1 level, and voluntarily participated in this study. All subjects were aware of the risks and benefits of participating in this study and signed the consent form before starting the study and all experimental protocols were approved by University of Zanjan Ethics Committee, all methods were carried out in accordance with relevant guidelines and regulations (IR.ZNU.REC.1401.007). Figure 1 presents a depiction of the recruitment and randomization process.

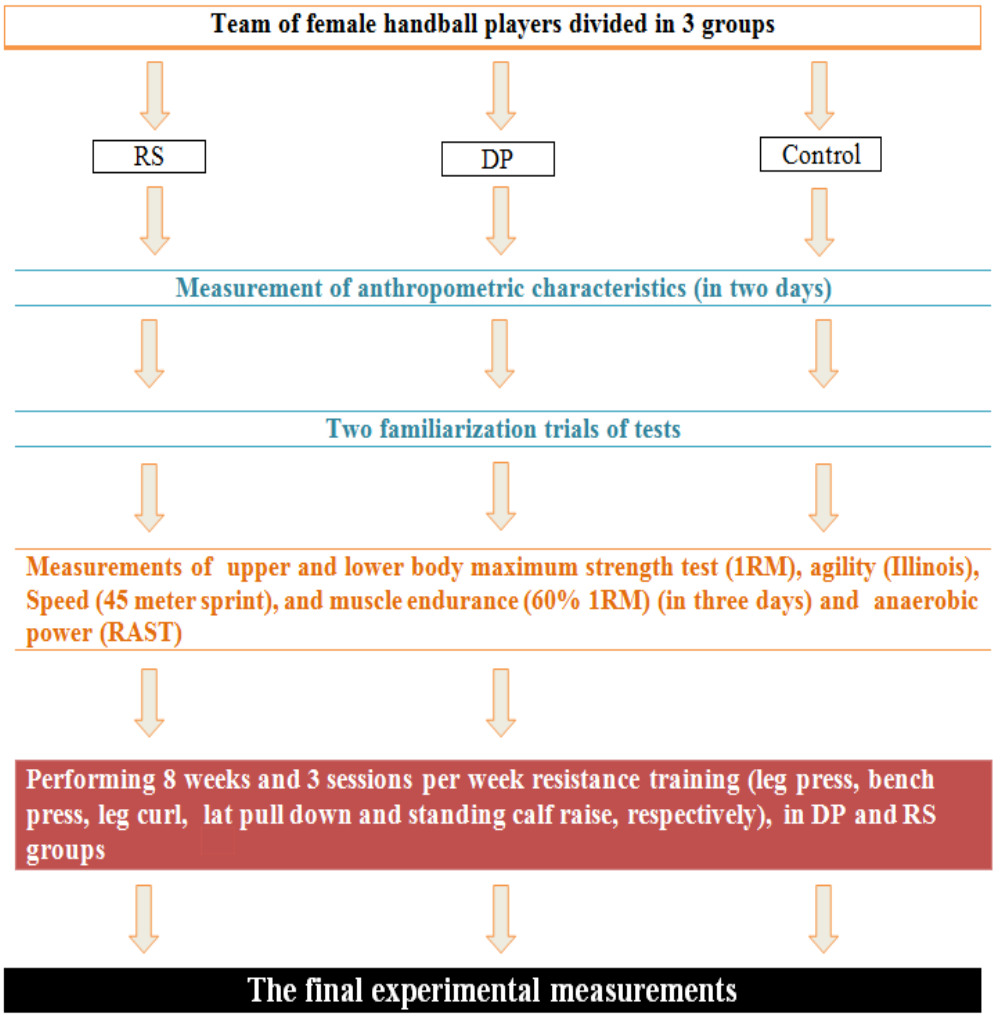

Figure 1. The diagram includes detailed information on the interventions received.

Table 1. Characteristics of the participants in the three groups of control (n = 10), DP (n = 10), and RS (n=10)

Indices	RS group	DP group	Control group
Age (year)	17.13±1.32	17.43±1.63	17.33±1.71
Weight (kg)	67.80±7.78	70.28±10.14	61.04±6.61
Height (cm)	169.64±5.11	169.54±5.93	169.33±3.12
Body mass index (kg/m²)	23.32±1.83	24.51±3.36	21.84±2.52
Body fat (%)	15.40±1.69	15.60±1.17	16.50±1.43

Study Design—Testing Procedures. After dividing the subjects into different groups, weight, height, triangular subcutaneous fat (suprailiac, triceps and thigh) and limb circumference were measured and recorded in two consecutive days. Then, within 3 days, the measurements related to the upper and lower body maximum strength test (1RM) and 60% of the maximum strength, Illinois test, RAST and 45-meter speed were recorded. Weight (with the CAMRY scale EB9003 with an accuracy of 0.1 kg), height (in centimeters), and the percentage of three-point fat (Lafayette skinfold caliper) were measured by observing all conditions and using the Jackson and Pollack equation (below) (1). Also, to determine the body mass index, the values of weight and height of the subjects were placed in the following formula (14) and body mass index was calculated in kilograms per square meter:

Density = 1.10938 - (0.0008267 × SSF)

+ (0.0000016 × SSF) – (0.0002574 × Age)

SSF = Total subcutaneous fat at three points (suprailiac, triceps and thigh)

Percentage of fat = [4.95 ÷ body density - 4.5] × 100

Body Mass Index (BMI) = Weight (kg) ÷ Height raised to the power of 2 (square meters)

Dynamic strength and endurance tests

All subjects participated in a two-session explanatory training program prior to the measurements to get familiar with the training equipment and learn the correct movement techniques. The maximum strength of the subjects was measured using the 1RM test by McGuigan method (14); thus, before the test and after general warm-up, 5 repetitions with 30% (2 minutes rest), 4 repetitions with 50% (2 minutes rest), 3 repetitions with 70% (3 minutes rest), and 1 repetition with 90% (3 minutes rest) were performed to warm up. After performing the last turn with 90% of 1RM, the load was added in the next rounds with the feedback of the subjects based on the amount of weight shifted to obtain 1RM (2.5 to 10 kg after each successful attempt). To obtain 1RM, after determining 90% of 1RM, three test steps were performed and 4 minutes rest was considered between each attempt.

After determining the subjects' 1RM, 60% of their 1RM in each movement was calculated individually and they were asked to perform the maximum repetition with that calculated weight (60% of 1RM). The number of repetitions performed was considered as local muscle endurance.

Anaerobic power measurement (RAST)

RAST test was used to measure anaerobic power with lactic acid. In this test, the subjects had a complete rest for 3 minutes before the test. To perform this test, the player performed a distance of 35 meters 6 times with a 10-second break between repetitions, and then according to the time obtained from each 35 meters, the power of each repetition was obtained according to the following formula (2).

Power = [weight × (distance)2 / (time)3]

Fatigue index = maximum power – minimum power / (total time of six repetitions)

Speed test

After familiarization, subjects performed a maximal, linear 45-m sprint after a 25-min profound, individual warm-up on an outdoor tartan surface. The subject had to repeat the sprint test twice with at least 4 min of recovery between tests. subjects were encouraged to complete the sprints as fast as they could. Consistent verbal support was given to the players during each sprint. The test was performed from an

individually chosen standing position with the subjects front foot one meter behind the start line. Players were instructed to adopt a forward lean and start voluntarily. Test scores were recorded by recording the test run time in seconds and tenths of a second from start to finish (using a Citizen stopwatch) (13).

Agility test

Illinois test was used to measure agility. This test was performed in a space of 10 by 5 meters and 8 cones and a stopwatch were used to perform it. The distance of the cones from each other (4 cones in the middle of the ground) was set at 3 meters and 30 centimeters. The athlete first lay on the ground facing forward (head towards the starting point) and, as instructed by the coach, quickly got up from the starting point (start) and started running at maximum speed in the direction of movement shown in the following figure. After passing through the cones and passing the end point, the stopwatch was stopped and the elapsed time was recorded as the athlete's record (Figure 2) (21).

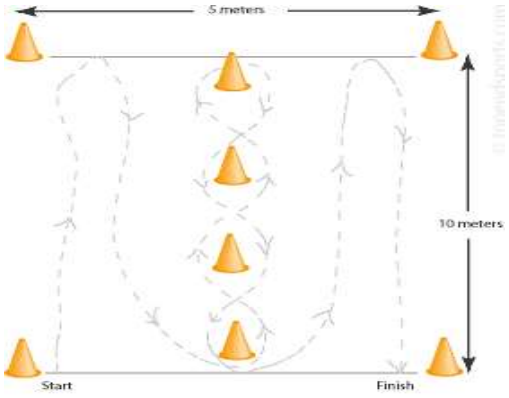

Figure 2. Details of the Illinois test (agility)

Resistance training program

After performing the initial measurements, the subjects were trained for 8 weeks using the two selected loading patterns. Two training protocols were designed for the subjects; the first group practiced using DP protocol (80% (4), 85%(3), 90%(2), 95%(1), 95%(1), 90%(2), 85%(3), 80%(4)), in which they did 4 repetitions the first time with 80% of 1RM, and after this stage the training load was increased progressively, i.e. 5% was added to the training load at each stage. After reaching one movement at a load of 95%, the load decreased and the number of repetitions increased to reach the initial stage rate of 80% with 4 repetitions. In total, each muscle was trained 8 times in the DP protocol (figure 3)(4).

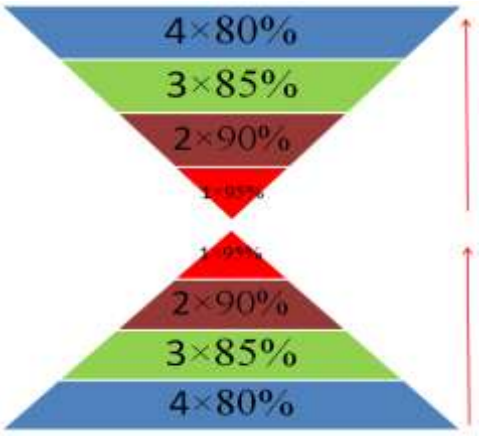

Figure 3. Dubble Pyramide Loading Pattern (DPLP)

The second group practiced using the RS protocol (90%(2), 75%(10), 60%(15), 90%(2), 75%(10), 60%(15)) in which after performing one turn with 90% of 1RM, and 2 repetitions in the next two turns, the repetition increased, but the load decreased. At the beginning of the fourth turn, the load increased again, so that it reached 90% of its value, i.e. 2 repetitions. The next two steps, as before, the load decreased and the repetitions increased (75% of 1RM with 10 repetitions and 60% of 1RM with 15 repetitions, respectively). After each exercise, the subject rested for 2.5 to 3 minutes (figure4) (1).

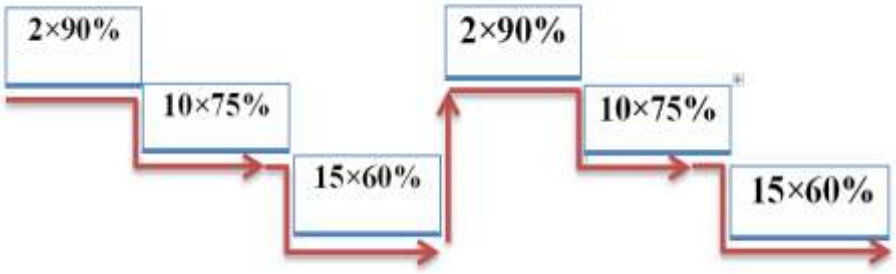

Figure 4. Reverse Step Loading Pattern (DPLP)

Subjects performed leg press, bench press, leg curl, lat pulldown and standing calf raise, respectively, for 8 weeks and 3 sessions per week; so that all the muscles active in these movements were trained in each session. In each training session, the researcher supervised the subjects and once every two weeks, the maximum strength or maximum repetition (1RM) test was taken from the subjects, and according to the amount of weight shifted, a new program was given to the subject to observe the principle of overload.

Statistical analysis

To compare the physiological changes after 8 weeks of resistance training between the three groups, one-way analysis of variance (ANOVA) and Bonferroni post-hoc test were used for pairwise comparison. Dependent t-test was also used for within-group comparison between pre-test and post-test stages. All data analysis was performed using SPSS software version 22. Significance level in this study was considered 0.05.

RESULT

The values for Paired Sample 't' test the control group showed that no significant difference was observed in any of the pre and post tests; while the values for Paired Sample't' test for the DP group showed a significant improvement in fatigue, anaerobic power, upper body strength, lower body muscle endurance, upper body muscle endurance, fat percentage, agility and speed ($P < 0.05$), while no significant difference was observed in any of the pre and post tests lower body strength. The values for Paired Sample't' test for the RS group indicated that this group had a significant improvement in anaerobic power, lower body strength, lower body muscle endurance, upper body muscle endurance, fat percentage, agility and speed. While no significant change was observed in fatigue and upper body strength indices. Paired comparison, obtained from one-way analysis of variance and Bonferroni post hoc test between DP and RS groups showed that after the training period, a significant difference was observed between lower body muscle endurance and upper muscle endurance of DP and RS groups, while there was no significant difference in indices of anaerobic power, upper and lower body strength, fat percentage, agility, and 45-m speed. The results of paired comparison of the DP and the control groups confirmed a significant difference in the indices of anaerobic power, upper body strength, fat percentage, agility and 45-m speed; while no significant difference was observed between the DP and the control groups in lower body strength, lower body muscle endurance and upper body muscle endurance. Also, based on the results of paired comparison between the RS and control groups, a significant difference was observed in lower body strength, upper body muscle endurance, lower body muscle endurance, fat percentage, agility and 45-m speed. While no significant difference was observed in upper body strength (Table 2 and Figure 5).

Table 2. Changes in physical fitness factors and limb circumference before and after double pyramid and reverse step resistance training among the three groups

Group	DP group		RS group		Control group	
	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
Lower body muscular endurance (reps)	16.60±1.89	18.10±1.66*	17.00±1.98	23.40±2.23*¥	16.70±1.15	16.80±1.31
Upper body muscular endurance (reps)	15.90±1.28	17.20±1.31*	17.10±1.19	21.80±2.97*¥	16.50±1.17	16.70±1.05
Upper body strength (kg)	28.50±6.25	35.00±6.66*	25.00±5.27	28.00±5.86	28.00±5.86	27.00±6.74
Lower body strength (kg)	102.00±8.56	104.00±10.48	96.30±3.19	102.50±4.08	103.00±8.88	103.50±8.18
45-m speed (s)	8.10±0.61	7.63±0.52*	7.93±0.03	7.11±0.62*	7.58±0.64	7.85±0.54
Agility (s)	19.56±0.85	19.05±0.84*	19.80±1.01	19.01±0.94*	19.51±1.19	19.16±1.05
Fatigue index (watts per second)	6.40±1.26	5.27±1.43*	5.28±1.01	5.07±1.23	5.06±1.54	5.88±1.48
Average power (w)	554.16±74.37	606.8±74.04*	547.90±61.64	573.76±56.8*	592.88±74.39	573.12±81.32

*: Significant difference between pre-test and post-test values (P<0.05)
¥: Significant difference between double pyramid and reverse step groups (P<0.05)
DP = Double Pyramid, RS= Reverse Step

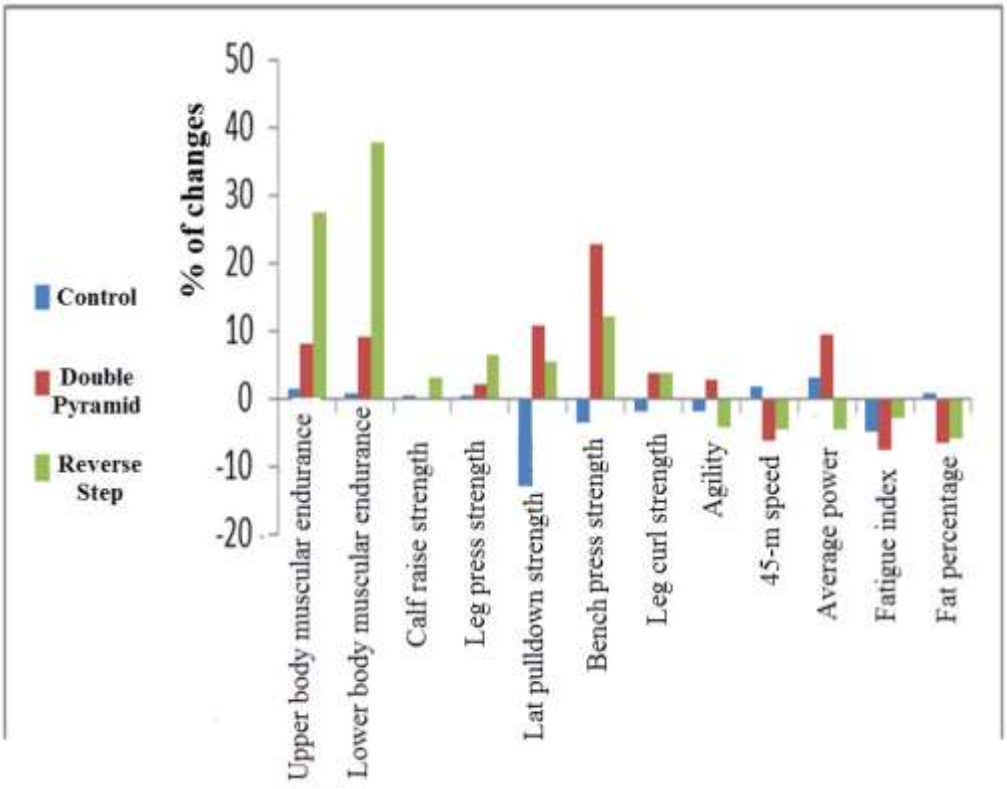

Figure 5. Percentage of changes in physical fitness factors among the three (control, DP and RS) groups.

DISCUSSION

The main purpose of this study was to investigate the effect of two weight training loading patterns (DP and RS) on some physiological abilities of elite female handball players. The research findings indicated that the type of loading pattern used is an influential factor on the factors required for handball (strength, endurance and speed). Intra-group comparison of data showed that in the DP loading group, lower body muscular endurance in leg press movement (9.03%), chest press muscular endurance (8.17%), agility (2.67%) and mean anaerobic power (9.50%) improved significantly from before to after the test; while the intra-group comparison showed a significant decrease for fat percentage (6.73%), fatigue index (8.17%) and 45-m speed (6.15%). Intra-group comparison of RS loading pattern showed a significant decrease of average power (-4.71%), fat percentage (-5.84%), agility (-4.15%), and 45-m speed (-4.61%) from before to after the test. However, a significant improvement was observed in maximal lower body strength in leg press movement (6.43%), lower body muscular endurance (37.64%), and upper body muscular endurance (27.48%); no significant change was observed in the control group before and after the test. The results of the present study showed that both types of RS and DP loading pattern are effective on muscle endurance and have significantly increased the upper and lower endurance of young female handball players after eight weeks. The pairwise comparison of the groups was significant for lower body muscular endurance and upper body muscular endurance and showed that there was a significant difference in lower body muscular endurance index in control, DP, and RS groups; there was a significant difference in upper body muscular endurance index of DP and RS groups. Comparison between means showed that the RS loading pattern is more effective than other loading patterns. A comparison of RS and DP groups showed that the RS loading pattern would increase muscle endurance more than the DP loading pattern due to the high repetitions in 4 stages of this DP pattern. Because according to the theory of strength and endurance continuity, the higher the repetition with medium load, the better effect will have on muscle endurance (15). The results of the present study are consistent with the results of Hosseini et al. who used 8 weeks of resistance training with a DP pattern and RS on 22 wrestlers (14) and are inconsistent with the results of Weiss (28).

The results showed that the DP loading pattern improved the upper body strength and the RS loading pattern increased the lower body strength, which can be attributed to the fact that the lower body muscles have better muscular endurance than the upper body; therefore, a weakness of the step pattern that these exercises cause muscle fatigue and decrease muscle strength as they use maximum loads in first stages and decrease loads in the later stages (4), has less effect in the present study and this improves lower body strength. This is contrary to the results of Hosseini et al. on increasing the strength of the upper body with a step loading pattern (14), which can be attributed to the difference in the type of exercise of the subjects (handball versus wrestling); because wrestling athletes have good upper body muscular endurance, and this has led to the RS pattern resist against fatigue and consequently involve more movement units as well as larger movement units (according to the size principle), which improves upper body strength. More increase of upper body muscles in the DP pattern compared to RS and inconsistency of these results with Hosseini et al. may be due to less strength of upper body muscles of female handball players. While most wrestlers have good lower body strength, this is why, according to the principle of first size, female handball players with less upper body strength are more improved. As expected from the DP pattern (due to the use of high training loads), it has improved strength. Probably because most wrestlers have high body strength, the DP scheme has not been able to increase their strength. Other possible reasons for the difference in increase in upper and lower body muscle strength can be the use of smaller upper body muscle mass than the lower body (22). Comparison of the RS group and control group showed a significant increase in strength in the RS group, which may be due to this reason. In the RS loading pattern, maximum weights are used in the first periods of training, which causes muscle overcompensation and stimulates the increase of strength by calling more movement units (9). Studies also show that when the athlete is tired, more movement units are used, so the continuation of the muscle activity of these stimuli increases strength, which is true in the DP and RS loading pattern (26).

The results of the present study showed that both types of loading patterns had a significant effect on agility and speed index. A two-by-two comparison of the DP and RS groups with the control group at 45-m speed and agility test was significant. These results are consistent with the significance of the maximum strength of the leg muscles and are consistent with the results of Hosseini et al. However, Johns et al. showed that high-speed high-intensity training with moderate load was more effective than speed training with low-

speed training (16). This is inconsistent with the results of the present study, because the RS has a better average in speed and agility.

The results of the present study showed that the resistance training program with a DP and RS loading patterns had an effect on the average power and as a result, a significant increase was observed after eight weeks of training. A pairwise comparison between the groups showed that there was a significant difference in the average power only between the DP group and the control group, which is in line with the results of Kotzamanidis et al., who effect of a combined high-intensity strength and speed training program on the running and jumping ability of soccer players (18) and inconsistent with the results of Hosseini et al., which may be due to the different levels of readiness of athletes.

Another finding of the present study showed that both types of DP and RS loading patterns had a significant effect on body composition and reduced the percentage of subcutaneous fat. Comparison of the means indicated that RS group exercises were more effective on the fat percentage of young handball players, which may be due to the endurance nature of the RS model to the DP. The results of this study are consistent with Faramarzi and Kargarfard (7, 17) and are inconsistent with Hosseini's results, which may be due to the gender difference and difference of athletes' fields. The results are inconsistent with the results of Hermassi who used eight weeks of heavy resistance training for male handball players (13), which can be attributed to the intensity and different patterns of weight training, as well as the different genders of the subjects.

CONCLUSION

The results of this research showed that, in general, resistance training is effective in improving the anaerobic power of young elite female handball players. But, when comparing the DP and the RS pattern and normal handball exercises, the DP pattern is more effective than the RS pattern. Considering this issue, handball coaches can use resistance exercises, especially DP resistance exercises, in order to improve the explosive performance of handball players. Also, both patterns are effective for improving speed and agility. In addition, it seems that using the DP pattern is more effective for improving upper body strength, and the RS pattern is more effective for improving lower body strength, lower body muscular endurance, agility, and reducing body fat percentage.

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Conflict of Interest

There is no any conflict of interests among the authors.

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An Investigation of the Effects of Some Parameters on the Shooting Performance of Air Rifle Shooters in Terms of Gender and Level of Competition

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Abstract

The purpose of this study is to compare the effects of some parameters on the shooting performance of air rifle shootersin terms of gender and level of competition. To achieve this, 20 air rifle shooters who ranked in the Air Guns Turkey Cup and Air Guns Turkey Championships volunteered for the study. In this study, the height and body composition of the participants were measured, and then grip strength, back and leg strength, heart rate, flexibility, vital capacity, static balance, dynamic balance, and reaction time tests were performed. One (1) series, which included ten (10) shots was fired to determine the shooting success of the participants. There found a positive and high statistical significance between the scoresof the elite shooters in a series of shots and their expected vital capacity measurements (r=.656; p<0.05), between the scores of the junior shooters in a series of shots, their measured vital capacity (r=.820; p<0.01), their vital capacity percentage (r=.686; p<0.05), and their right-hand grip strength (r=.703; p<0.05). Furthermore, while a negative and high significance was acquired between the male participants' scores in a series of shotsand the right foot dynamic balance (r= -790; p<0.05), there was a positive and high correlation between the scores of female participants in a series of shots and their expected vital capacity (r=.704; p<0.05). As a result, it was concluded that some performance parameters in terms of gender and level of competition affected the shooting performance of the participants.

Keywords: Air Rifle, Shooting Success, Performance

Özet

Havalı Tüfek Sporcularının Atış Performansı Üzerinde Bazı Parametrelerin Cinsiyet ve Yarışma Kategorisine Göre Etkisinin Araştırılması

Bu araştırmanın amacı, havalı tüfek sporcularının atış performansı üzerinde bazı parametrelerin cinsiyet ve yarışma kategorilerine göre karşılaştırılmasıdır. Bu amaç doğrultusunda, çalışmaya Havalı Silahlar Türkiye Kupası ve Havalı Silahlar Türkiye Şampiyonasına katılan ve derece yapan toplam 20 havalı tüfek atış sporcusu gönüllü olarak katıldı. Bu çalışmada, katılımcıların boy ve vücut kompozisyonları ölçüldü ve daha sonra el kavrama kuvveti, sırt- bacak kuvveti, kalp atım hızı, esneklik, vital kapasite, statik denge, dinamik denge ve reaksiyon süresi testleri yaptırıldı. Katılımcıların atış başarısını belirlemek için bir (1) seri, yani on (10) atış yaptırıldı. Analiz sonuçlarına göre, bir seri atış puanı ve bir seri nişan alma süresi bakımından cinsiyet ve yarışma kategorileri arasında istatistiksel olarak anlamlı farklılık yoktur (p>0,05). Yıldızlar kategorisindeki katılımcıların bir seri atış

puanları ile beklenen vital kapasite ölçümleri (r=,656; p<0,05) arasında; gençler kategorisindeki katılımcıların bir seri atış puanları ile ölçülen vital kapasite (r=,820; p<0,01) yüzdelik vital kapasite (r=,686; p<0,05) ve sağ el kavrama kuvveti (r=,703; p<0,05) ölçümleri arasında pozitif ve yüksek seviye istatistiksel olarak anlamlı bir ilişki olduğu elde edilmiştir. Ayrıca, erkek katılımcıların bir seri atış puanları ile sağ ayak dinamik denge (r-,790; p<0,05) ölçümleri arasında negatif ve yüksek seviyede; kadın katılımcıların bir seri atış puanları ile beklenen vital kapasite (r=,704; p<0,05) ölçümleri arasında pozitif ve yüksek seviyede istatistiksel olarak anlamlı bir ilişki olduğu elde edilmiştir. Buna karşılık hem cinsiyet hem de kategoriler bakımından bir seri atış puanları ile diğer ölçüm sonuçları arasında istatistiksel olarak anlamlı bir ilişki yoktur (p>0,05). Sonuç olarak, cinsiyet ve yarışma kategorisine göre bazı performans parametrelerinin katılımcıların atış performansını etkilediği sonucuna ulaşılmıştır.

Anahtar Kelimeler: Havalı Tüfek, Atış Başarısı, Performans

INTRODUCTION

Since the beginning of time, humanity has sought various ways and methods to acquire a shelter, nutrition, and safety; in other words, we have tried to survive, and over time, this struggle with nature has turned into a sportive activity. Shooting is one of these activities (1). It is an extremely sensitive sport in which people shoot at moving or stationary targets with pistols, rifles and shotguns used for sports purposesand that requires mental performance and maximal control of all body movements (2). Gun stability is very critical for determining performance in shooting sports. For a good shot, the techniques in grip, aiming and trigger control must be flawless (3). The most important indicators of a successful performance are the athlete's shooting score and their rank in competitions. Therefore, it is very important for athletes to score and rank in the tournaments in order to achieve better results.

Technical knowledge and mental focus are applied simultaneously while shooting with an air rifle, and factors such as physical strength and endurance help athletes to hold the rifle in the desired position during the competition (4). While athletes prepare for competitions, the physical factors should be given the same level of importance as the technical factors and should not be neglected by the trainers. As far as we know, there is limited comprehensive study on which factors affect the shooting success of air rifle shooters. For shooters, physical preparation is a component that requires equal attention by their trainers during the competition preparation process. Neglecting the general physical preparation of the athletes or applying the wrong physical training will have a direct impact on the performance of the athletes as well as on the results of the competition. Being fit while competing is very important for athletes to be able to move and to carry out doing the activities that they perform in training as being fit, in other words, physical preparation, makes a difference between the success or failure of air rifle shooters in competitions (3). Muscle strength and endurance, cardiorespiratory endurance, and flexibility are required to improve the physical fitness of athletes. Heart, lungs, and blood circulation are essential for cardiovascular respiration as muscles gather the energy they need through blood. A well-functioning organism helps an athlete to adapt themselves while training. Therefore, a good training program should cover all components such as strength, endurance, speed, flexibility, reaction time, coordination, balance, and agility. To perform a good shot, as well as technical and mental preparation, target-oriented physical training should be applied (5, 6).

In the literature, it has been seen that the research on air rifle shooter is limited, and the factors affecting the shooting performance of air rifle or air rifle shooters have been investigated (7-14). As far as we know, there is limited study in which the effects of physiological and motoric characteristics on the air rifle shooting performance of athletes in the junior and elite levels are investigated in detail. The most distinctive feature of this study that distinguishes it from the existing studies in the literature is that some physiological and motoric characteristics, which are thought to have an impact on shooting performance, are examined in terms of both gender and level of competition. The results to be obtained with this study is thought to provide valuable information to the trainers, conditioners and athletes who design target-oriented training programs in order to train successful athletes in the air rifle shooting sport and to the sports scientists whomay conduct research on the air rifle shooting in the following years.

MATERIAL AND METHOD

Design and Procedures

A total of 20 air rifle shooters (12 females and 8 males) from the provinces of Erzincan and Gümüşhane, competing in the elite and junior levels, volunteered in the study. Some physical characteristics of the participants in terms of their gender and level of competition are given in Table 1. The participants were the athletes who participated in the Air Guns Turkey Cup and Air Guns Turkey Championships and achieved a rank. These participants were provided the Voluntary Consent Form (a parent consent form was taken from the athletes under the age of 18) stating that they voluntarily participated in the study. This study was approved by the Scientific Research and Publication Ethics Committee of Iğdır University (2021/09) and was conducted in accordance with the Declaration of Helsinkinki.

Table 1. Descriptive Statistical Values for Some Physical Characteristics of The Participants According to Their Age and Level of Competition

Variables			n	Minimum	Maximum	Mean (±sd)
Gender	Age (year)	Male	8	13	20	15.75 ± 2.43
		Female	12	13	20	15.75 ± 2.14
	Height (cm)	Male	8	1.48	1.75	166.0 ± .09
		Female	12	1.56	1.74	164.0 ± .05
	Weight (kg)	Male	8	35.50	86.10	63.75 ± 16.93
		Female	12	40.90	71.00	57.48 ± 8.21
Level of Competition	Age (year)	Elite	11	13	15	14.09 ±.70
		Junior	9	16	16	17.78 ± 1.56
	Height (cm)	Elite	11	1.48	1.48	164.0 ± .07
		Junior	9	1.58	1.58	166.0 ± .06
	Weight (kg)	Elite	11	35.50	35.50	59.19 ± 13.66
		Junior	9	45.50	45.50	60.96 ± 11.48

An Experimental Approach to the Problem

The measurements for this study were taken within two days, each day one test, in the provinces of Erzincan and Gümüşhane. Measurements in both provinces were completed taking the same measurement sequence and procedures into account. Heart rate, performance and reaction measurements of the participants were taken before noon, and other measurements were taken onthe same day in the afternoon. All participants were informed on the test proceduresin detail, and their personal information was documented in the data collection form. The participants were given enough time to warm up before the measurements were taken, and they were given a trial test to get used to the test procedures.

Procedures

Height and Body Composition

The height of the participants was determined in centimeters with their feet bare and body weight evenly distributed on both feet using an electronic measuring toolbranded Seca 769 (Seca Corporation Hamburg, Germany) with a precision of 0.001m.The weight, skeletal muscle weight and body fat ratio values of the participants were taken in kilograms (kg) using a body composition analyzer (Inbody 720, Biospace, Seoul, Korea) while they were wearing clothes that would not affect their body weight significantly.

Grip Strength

Participants' grip strength was measured for both right and left hands using a digital strain gauge dynamometer (Takei TKK5401 Takei Scientific Instruments, Tokyo). During the measurements, the participants were asked to apply maximal pressure for at least two (2) seconds until a significant value was taken by grasping the dynamometer with their dominant handwhile standing without the dynamometer and their arms touching their bodies. Then, the same process was performed with participants using the non-dominant hand. The moving part of the dynamometer arm was adjusted to overlapwith the proximal phalange of the ring finger (15). Two (2) trial rounds were performed with both hands, and the best results were documented with an accuracy of 0.1 kg.

Back and Leg Strength

Back and leg strength values of the participants were determined by a back and leg dynamometer (Takei TKK5402 Takei Scientific Instruments, Tokyo). The participants placed their feet on the dynamometer, they pulled the dynamometer bar vertically upwards with their arms stretched, their backs straight and their bodies slightly bent forward. During this process, leg strength was measured when the knees were bent, and the back strength was measured when the knees were stretched (15). Measurements were taken twice (2) for each movement, and the best results were documented with an accuracy of 0.1 kg.

Heart Rate

The average, maximal and resting heart rate values of the participants were obtained using a telemetric heart rate monitor (Polar FT1 TRA/BLK, Polar Electro, Finland). Participants were kept sitting for 20 minutes after wearing the heart rate monitor, and the lowest heart rate measured in the last 5 minutes was recorded as their resting heart rate (HRrest). Participants were not allowed to do any activities such as talking, playing with a mobile phone, that could increase their heart rate while they were sitting. While the average heart rate obtained during the measurement was recorded as the mean heart rate (HRmean) of the participants, the highest heart rate values measured at the end of the measurement were recorded as the maximal heart rate (HRmax).

Flexibility

Flexibility values of the participants were measured using a portable sit-reach box (Baseline, BSL-121085, United States). During the measurement, the participants were seated on the floor with their bare feet, their legs together and the soles of the feet flat on the box. Then, they reached for the indicator on the box with both hands together (palms facing the ground, one hand on top of the other) without bending their knees, pushed the indicator as far as possible and waited for two seconds. The maximum reach of the participants was recorded in cm.An assistant prevented the participants from bending their knees. The test was performed twice (2), and the highest value was recorded for the statistical analysis (16, 17).

Vital Capacity

The vital capacity of the participants was measured using a portable spirometer device (Spirolab III, MIR, Italy). The measurements were taken as the amount of air that could be expelled after a maximal breath. This procedure was repeated by the participants twice (2), and the best value was documented (18).

Static Balance

The static balance values of the participants were obtained using an electronic evaluation platform (Desmotec E-Board, Italy) connected to a computer with a portable and specific software. Before the test, the age, height, and body weight values of the participants were entered on the software, and then the participants were positioned on the e-board with both their bare feet together at 30 degrees. With the help of application on the e-board, the participants were asked to stayat the plus (+) sign on the test screen for 50 seconds while keeping their position. The procedurewasperformed twice (2) and the best results were recorded as mean anterior static and posterior static balance, along with mean right, left, and total static balance.

Dynamic Balance

Dynamic balance values of the participants were determined using a portable dynamic balance and training system (Challenge Disc, TCD006, Togu, Germany). After the participants stood on the test disc, the test which was downloaded via Google Play was started on the tablet. During the test, the participants were first asked to balance the disc with both feet for a minute, and then, they were asked to keep the disc in balance for 30 seconds for both the right and left feet as the second test procedure. Measurements were taken twice (2) for each movement, and the best results were documented.

Determining the Shooting Score

The shooting scores of the participants were determined using a portable 10-meter air rifle (LG400 cal. 4.3 mm, Carl Walther GmbH, Germany) (Figure 1) viaa special software system in the rangeand viaelectronic

evaluation platform interconnecting the target line (SA951 Electronic Scoring Systems, Sius Ag, Switzerland) and the firing line (HS10Hybridscore Electronic Scoring Systems Sius Ag, Switzerland) (Figure 2).

Figure 1. The Portable Air Rifle

Shooting rules of the International Shooting Sports Federation (ISSF) were taken into consideration in the test procedures. Therefore, the 10 m air rifle shots of the participants were performedwhile standing 10 m away from a target. The participants were positioned with their air rifles at the firing line and with other shooting accessories on (trousers, shooting jacket, shoes, gloves, belt, rifle tripods). Before the participants performedthe shots, physical warm-up and mental relaxation exercises were done for 30 minutes in the presence of trainers. During the pre-procedure practices, after 15 minutes of positioning, focusing on the target, breathing and trigger exercises, preparations and trials were performed for 15 minutes with no scores given, and participants were allowed unlimited number of shots. After 30 minutes of preparatory practices, the participants performed10-meterair rifle shots. They were asked to fire one (1) series of shots (10 shots in total), and their shooting scores were documented.

Figure 2. Firing and Target Lines

Determining the Shooting Reaction Time

A shooting trajectory recorder (SCATT USB, SCATT, Moscow, Russia) was mounted on the 10m air rifle to determine the reaction times (aiming times in the series) of the participants, and the data were collected by an electronic software system (SCATT Shooting Performance and Analysis System, Zao SCATT Moscow Russia) (Figure 3). Shooting reaction time, which is the average reaction time (aiming time) of ten (10) shots that were included in the shooting performance (the series of shots) was recorded in seconds. During the shooting performance, 4.5 mm air rifle bullets suitable for the international competition system (RWS R-10 Match Heavy, Umarex Sportwaffen GmbH, Fort Smith, AR, USA) were used, and the muzzle trajectory and duration were recorded.

Figure 3. The Shooting Training System and Software (SCATT)

Statistical Analysis

In this study, SPSS 25.0 (SPSS Inc., Chicago, IL) was used for the data analysis. Kolmogorov-Smirnov normality test was used to determine whether the quantitative variables showed normal distribution or not. The Independent Samples T-Test was used to compare the measurement results of the participants in terms of gender and level of competition, and Pearson correlation analysis was used to examine the relationship between scores in a series of shooting and the measurement results. Simple linear regression analysis was used to study the effect of measurement results on thesuccess from the series of shooting. A value of $p<0.05$ was considered to show statistically significant results.

FINDINGS

Table 2. Comparison of the Shooting Performances of the Participants ın terms of Gender and Level of Competition

Variables	Gender	N	X	StD	t	p
The scores in a series of shots	Male	8	961.2	53.5	.718	.482
	Female	12	941.8	62.6		
Aiming Time in a series of shots	Male	8	2.55	2.56	-.693	.497
	Female	12	3.47	3.10		
Competition Level						
The scores in a series of shots	Elite	11	935.6	50.4	-1.193	.248
	Junior	9	966.6	65.9		
Aiming Time in a series of shots	Elite	11	3.23	2.60	.214	.833
	Junior	9	2.94	3.31		

*p>0.05

The comparison of the measurements in terms of the gender and competition levels of the participants is given in Table 2, and the results from Pearson correlation analysis showing the relationship between the scores in the series of shots and the measurements are given in Table 3. According to the results of the analysis, there is no statistically significant correlation between the gender and the competition levels in terms of both thescores from series of shots and the aiming times from the series ($p>0.05$). It was found that there was a positive and statistically high significant relationship between the scores inthe series of shotsof the elite shooters and their expected vital capacity measurements ($r=.656$; $p<0.05$).Furthermore, there was a positive and statistically high significant correlation among the vital capacity ($r=.820$; $p<0.01$), vital capacity percentage ($r=.686$; $p<0.05$) and right-hand grip strength ($r=.703$; $p<0.05$) measurements obtained inthe series of shotsof the junior shooters. In addition, the correlation between male participants' scores inthe series of shots and their right foot dynamic balance ($r=-.790$; $p<0.05$) was statistically negative and high; however, the correlation between female participants' scores in the series of shots and their expected vital capacity ($r=.704$; $p<0.05$) was statistically positive and high. There was also no statistically significant correlation between the scores in the series of shots and other measurement results in terms of both gender and competition levels ($p>0.05$). Results from simple linear regression analysis done to discover the effect of the measurements on the scores inthe series of shots were given in Table 4 (elite shooters), Table 5 (junior shooters), Table 6 (male shooters), and Table 7 (female shooters).The effect that the expected vital capacity of elite shooters on their scores in a series of shots was 39.5% ($r2=.395$; $p<0.05$, Table 4). The effect of measured vital capacity results of the junior shooterson theirscores from a series of shots was 62.3% ($r2=.623$; $p<0.01$, Table 5). There was also found a correlation between the right foot dynamic balance of male participants and their shooting scores (61.2% effect: $r2=.612$; $p<0.05$, Table 6). Similarly, the correlation between expected vital capacity measurement of female participants and their shooting scores was statistically significant (53.8% effect: $r2=.538$; $p<0.05$, Table 7). Nevertheless, it has beenrevealed that other parameters did not have a statistically significant effect on the shooting scores.

Table 3. Results Showing Relationship Between the Scores in the Series of Shots and The Measurement Results in Terms of Gender and Competition Levels of the Participants

Variables	The scores inthe series of shots			
	Competition Level		Gender	
	Elite	Junior	Male	Female
Aiming Time in the series of shots	-.433	.013	-.012	-.322
Skeletal Muscle Weight	-.282	.634	-.247	.372
Body Fat Ratio	-.391	-.418	-.647	-.224
Expected Vital Capacity	**.656***	.412	.419	**.704***
Measured Vital Capacity	-.082	**.820****	.455	.413
Vital Capacity Percentage	-.282	**.686***	.323	.105
Resting Heart Rate	-.009	-.084	-.275	-.280
Average Heart Rate	-.091	.201	-.367	-.182
Maximum Heart Rate	-.182	-.259	-.359	-.281
Flexibility	.473	.324	.467	.539
Left Hand Grip Strength	.009	.594	.347	.508
Right Hand Grip Strength	.027	**.703***	.380	.503
Leg Strength	-.009	.544	.407	.448
Back Strength	.173	.510	.252	.566
Dynamic Balance of Both Feet	-.591	.042	-.419	-.431
Right-Foot Dynamic Balance	.009	-.251	**-.790***	.070
Left-Foot Dynamic Balance	-.336	-.059	-.299	.231
Path Length on the Disc	.364	.042	-.252	.385
Total Static Balance	-.373	.117	-.371	-.028
Right-Foot Static Balance	-.373	.092	-.371	.035
Left-Foot Static Balance	-.373	.117	-.371	-.028
Anterior Static Balance	-.374	.117	-.371	.014
Posterior Static Balance	-.373	.117	-.371	-.025

Table 4. Results of Simple Linear Regression Analysis Revealing the Effect of Measurement Results of Elite Shooters on Their Scores in the Series of Shots

Variables		ANOVA		Coefficients				
	r^2	F	p	B	Std Error	β	t	p
Aiming Time in the series of shots	.165	1.78	.214	961.13	24.06		39.95	.000
				-7.9	5.92	-0.41	-1.34	.210
Skeletal Muscle Weight	.031	0.29	.605	981.06	86.18		11.38	.000
				-0.2	0.37	-0.18	-0.54	.610
Body Fat Ratio	.220	2.54	.145	1021.37	55.6		18.37	.000
				-0.31	0.19	-0.47	-1.59	.150
Expected Vital Capacity	**.395***	5.88	.038	660.99	113.97		5.8	.000
				92.61	38.2	0.63	2.42	.040
Measured Vital Capacity	.001	0.00	.990	934.67	75.22		12.43	.000
				0.31	23.87	0	0.01	.990
Vital Capacity Percentage	.121	1.24	.295	1021.76	78.89		12.95	.000
				-0.83	0.74	-0.35	-1.11	.300
Resting Heart Rate	.014	0.13	.731	978.9	122.95		7.96	.000
				-0.37	1.05	-0.12	-0.36	.730
Average Heart Rate	.049	0.46	.514	1010.92	112.02		9.03	.000
				-0.62	0.92	-0.22	-0.68	.510
Maximal Heart Rate	.021	0.20	.668	991.42	126.65		7.83	.000
				-0.42	0.95	-0.15	-0.44	.670

Flexibility	.235	2.77	.131	805.9	79.25		10.17	.000
				3.63	2.18	0.49	1.66	.130
Left-Hand Grip Strength	.022	0.21	.661	896.08	88.54		10.12	.000
				1.49	3.27	0.15	0.45	.660
Right-Hand Grip Strength	.032	0.29	.601	890.92	83.96		10.61	.000
				1.61	2.98	0.18	0.54	.600
Leg Strength	.002	0.02	.893	945.72	74.77		12.65	.000
				-0.16	1.18	-0.05	-0.14	.890
Back Strength	.022	0.20	.662	906.47	66.45		13.64	.000
				0.41	0.9	0.15	0.45	.660
Dynamic Balance of Both Feet	.305	3.95	.078	1037.36	52.9		19.61	.000
				-33.88	17.05	-0.55	-1.99	.080
Right-Foot Dynamic Balance	.001	0.00	.979	933.9	66.05		14.14	.000
				0.56	20.76	0.01	0.03	.980
Left-Foot Dynamic Balance	.191	2.12	.179	1016.73	57.49		17.69	.000
				-29.58	20.3	-0.44	-1.46	.180

Table 5. Results of Simple Linear Regression Analysis Revealing the Effect of Measurement Results of Junior Shooters on Their Scores in the Series of Shots

Variables	**r^2**	**ANOVA**		**Coefficients**				
		F	**p**	**B**	**StD Error**	**β**	**t**	**p**
Aiming Time in the series of shots	.025	0.18	.687	975.87	31.93		30.56	.000
				-3.13	7.45	-0.16	-0.42	.690
Skeletal Muscle Weight	.250	2.34	.170	796.21	113.33		7.03	.000
				0.68	0.45	0.5	1.53	.170
Body Fat Ratio	.183	1.57	.250	1045.42	66.32		15.76	.000
				-0.32	0.25	-0.43	-1.25	.250
Expected Vital Capacity	.225	2.03	.197	685.42	198.44		3.45	.010
				86.33	60.58	0.47	1.43	.200
Measured Vital Capacity	**.623****	11.55	.011	651.82	93.78		6.95	.000
				88.06	25.92	0.79	3.4	.010
Vital Capacity Percentage	.297	2.96	.129	739.55	133.47		5.54	.000
				2.06	1.2	0.55	1.72	.130
Resting Heart Rate	.013	0.09	.774	1007.27	138.24		7.29	.000
				-0.38	1.28	-0.11	-0.3	.770
Average Heart Rate	.002	0.01	.916	946	190.73		4.96	.000
				0.19	1.71	0.04	0.11	.920
Maximal Heart Rate	.008	0.06	.819	1023.75	241.34		4.24	.000
				-0.44	1.86	-0.09	-0.24	.820
Flexibility	.139	1.13	.323	816.22	143.13		5.7	.000
				3.85	3.62	0.37	1.06	.320
Left-Hand Grip Strength	.346	3.70	.096	841.07	67.99		12.37	.000
				3.52	1.83	0.59	1.92	.100
Right-Hand Grip Strength	.316	3.23	.115	849.45	68.03		12.49	.000
				3.38	1.88	0.56	1.8	.120
Leg Strength	.279	2.70	.144	840.58	79.25		10.61	.000
				1.49	0.9	0.53	1.64	.140
Back Strength	.168	1.42	.273	896.97	62.36		14.38	.000
				0.78	0.66	0.41	1.19	.270
Dynamic Balance of Both Feet	.015	0.11	.754	1016.26	154		6.6	.000
				-17.79	54.61	-0.12	-0.33	.750
Right-Foot Dynamic Balance	.094	0.73	.422	1058.3	109.64		9.65	.000
				-34.59	40.52	-0.31	-0.85	.420

Left-Foot Dynamic Balance	.020	0.15	.714	926.7	107.4		8.63	.000
				14.16	37.14	0.14	0.38	.710
Path Length on the Disc	.026	0.19	.680	984.55	47.65		20.66	.000
				-0.5	1.17	-0.16	-0.43	.680
Total Static Balance	.031	0.22	.653	903.77	135.95		6.65	.000
				0.99	2.12	0.18	0.47	.650
Right-Foot Static Balance	.038	0.28	.614	898.94	130.51		6.89	.000
				2.1	3.98	0.2	0.53	.610
Left-Foot Static Balance	.031	0.22	.652	903.27	136.43		6.62	.000
				2.01	4.26	0.18	0.47	.650
Anterior Static Balance	.041	0.30	.603	892.5	138.34		6.45	.000
				2.39	4.39	0.2	0.54	.600
Posterior Static Balance	.020	0.15	.714	916.94	132.24		6.93	.000
				1.55	4.04	0.14	0.38	.710

**p<0.01; *p<0.05

Table 6. Results of Simple Linear Regression Analysis Revealing The Effect of Measurement Results of Male Shooters on Their Scores In The Series of Shots

Variables	**r^2**	**ANOVA**		**Coefficients**				
		F	**p**	**B**	**StD Error**	**β**	**t**	**p**
Aiming Time in the series of shots	.001	0.01	.941	962.92	29.83		32.28	.000
				-0.65	8.53	-0.03	-0.08	.940
Skeletal Muscle Weight	.001	0.00	.994	961.96	95.47		10.08	.000
				0	0.37	0	-0.01	.990
Body Fat Ratio	.214	2.09	.198	1049.56	63.57		16.51	.000
				-0.34	0.23	-0.51	-1.45	.200
Expected Vital Capacity	.247	1.97	.210	791.83	121.93		6.49	.000
				54.21	38.6	0.5	1.4	.210
Measured Vital Capacity	.255	2.05	.202	810.96	106.42		7.62	.000
				42.74	29.85	0.51	1.43	.200
Vital Capacity Percentage	.001	0.22	.658	889.48	155.45		5.72	.000
				0.64	1.37	0.19	0.47	.660
Resting Heart Rate	.067	0.49	.512	1059.29	142.17		7.45	.000
				-0.82	1.18	-0.27	-0.7	.510
Average Heart Rate	.081	0.53	.494	1075.11	157.43		6.83	.000
				-0.9	1.24	-0.29	-0.73	.490
Maximal Heart Rate	.168	1.21	.313	1146.52	169.44		6.77	.000
				-1.35	1.23	-0.41	-1.1	.310
Flexibility	.340	1.82	.226	846.11	87.29		9.69	.000
				3.25	2.41	0.48	1.35	.230
Left-Hand Grip Strength	.128	0.88	.385	904.68	63.33		14.29	.000
				1.72	1.83	0.36	0.94	.390
Right-Hand Grip Strength	.078	0.51	.504	909.18	75.88		11.98	.000
				1.59	2.24	0.28	0.71	.500
Leg Strength	.144	1.01	.353	898.23	65.44		13.73	.000
				0.77	0.77	0.38	1.01	.350
Back Strength	.065	0.42	.542	92557	58.59		15.8	.000
				0.38	0.59	0.26	0.65	.540
Dynamic Balance of Both Feet	.169	1.22	.312	1052.28	84.55		12.45	.000
				-31.87	28.87	-0.41	-1.1	.310
Right-Foot Dynamic Balance	**.612***	9.48	.022	1126.43	55.15		20.43	.000
				-61.46	19.97	-0.78	-3.08	.020
Left-Foot Dynamic Balance	.086	0.56	.481	1015.18	74.46		13.63	.000

				-18.97	25.28	-0.29	-0.75	.480
Path Length on the Disc	.101	0.35	.577	977.26	33.66		29.03	.000
				-0.41	0.7	-0.23	-0.59	.580
Total Static Balance	.060	0.38	.560	1011.64	84.02		12.04	.000
				-0.76	1.24	-0.24	-0.62	.560
Right-Foto Static Balance	.061	0.39	.556	1012.22	84.18		12.03	.000
				-1.54	2.47	-0.25	-0.62	.560
Left-Foot Static Balance	.058	0.37	.565	1010.74	83.61		12.09	.000
				-1.5	2.47	-0.24	-0.61	.570
Anterior Static Balance	.044	0.27	.620	1004.96	85.96		11.69	.000
				-1.35	2.57	-0.21	-0.52	.620
Posterior Static Balance	.076	0.49	.508	1016.74	81.35		12.5	.000
				-1.65	2.35	-0.28	-0.7	.510

**p<0.01; *p<0.05

Table 7. Results Of Simple Linear Regression Analysis Revealing the Effect of Measurement Results of Female Shooters on Their Scores in The Series of Shots

		ANOVA		Coefficients				
	r^2	F	p	B	StD Error	β	t	p
Aiming Time in the series of shots	.118	1.34	.273	965.98	27.4		35.25	.000
				-6.96	6.01	-0.34	-1.16	.270
Skeletal Muscle Weight	.427	2.23	.167	764.4	120.18		6.36	.000
				0.79	0.53	0.43	1.49	.170
Body Fat Ratio	.214	2.73	.129	1031.51	56.82		18.16	.000
				-0.34	0.2	-0.46	-1.65	.130
Expected Vital Capacity	**.538***	11.62	.007	460.17	141.87		3.24	.010
				156.47	45.9	0.73	3.41	.010
Measured Vital Capacity	.122	1.39	.266	844.69	84.31		10.02	.000
				30.74	26.08	0.35	1.18	.270
Vital Capacity Percentage	.001	0.00	.967	937.75	98.31		9.54	.000
				0.04	0.94	0.01	0.04	.970
Resting Heart Rate	.067	0.72	.416	1048.19	126.68		8.28	.000
				-1	1.18	-0.26	-0.85	.420
Average Heart Rate	.089	0.98	.346	1087.76	148.62		7.32	.000
				-1.33	1.34	-0.3	-0.99	.350
Maximal Heart Rate	.010	0.10	.755	1000.27	183.17		5.46	.000
				-0.46	1.45	-0.1	-0.32	.760
Flexibility	.340	5.14	.047	693.85	110.42		6.28	.000
				6.45	2.84	0.58	2.27	.050
Left-Hand Grip Strength	.372	5.93	.035	801.96	59.36		13.51	.000
				4.79	1.97	0.61	2.44	.040
Right-Hand Grip Strength	.344	5.24	.045	818.25	56.12		14.58	.000
				4.18	1.83	0.59	2.29	.050
Leg Strength	.158	1.88	.200	841.51	75.17		11.2	.000
				1.52	1.11	0.4	1.37	.200
Back Strength	.278	3.86	.078	801.21	73.37		10.92	.000
				2	1.02	0.53	1.97	.080
Dynamic Balance of Both Feet	.138	1.61	.234	1040.79	80.06		13	.000
				-33.67	26.57	-0.37	-1.27	.230
Right-Foot Dynamic Balance	.019	0.19	.670	907.81	79.71		11.39	.000
				11.25	25.62	0.14	0.44	.670
Left-Foot Dynamic Balance	.101	1.12	.314	906.82	37.6		24.12	.000
				0.98	0.92	0.32	1.06	.310

Path Length on the Disc	.002	0.02	.881	955.19	88.79		10.76	.000
				-4.88	31.71	-0.05	-0.15	.880
Total Static Balance	.001	0.00	.962	948.76	141.46		6.71	.000
				-0.12	2.35	-0.02	-0.05	.960
Right-Foot Static Balance	.005	0.05	.833	914.18	129.17		7.08	.000
				0.91	4.22	0.07	0.22	.830
Left-Foot Static Balance	.001	0.01	.930	954.35	140.01		6.82	.000
				-0.42	4.65	-0.03	-0.09	.930
Anterior Static Balance	.001	0.01	.931	954.29	141.15		6.76	.000
				-0.43	4.77	-0.03	-0.09	.930
Posterior Static Balance	.001	0.00	.985	944.6	141.44		6.68	.000
				-0.09	4.6	-0.01	-0.02	.990

**p<0.01; *p<0.05

DISCUSSION

In this study, the effects of some parameters on the shooting performance of the participants who were in the air rifle shooting sport, in terms of gender and competition levels were investigated. Ihalainen et al. (19) stated that athletes participating in international competitions had better shooting scores, more stable hold of the gun, cleaner trigger pulls, and better aiming accuracy than athletes participating in national competitions, and that at all the time intervals that were analyzed, these athletes had a more controlover the first stage of pull and over the second stage at the last second before the shot. It was found that men had higher scores inthe series of shots than females, but there was no statistically significant correlation between these values in terms of genders and competition levels. Erten (20) stated that due to this matter, the high level of strength and endurance is not needed in shooting sports as it isin some other sports. It is actually more important to try to control the external factors that affect the weapon, to use strength in a balanced way, to maintain a great position and to gain a sense of rhythm. Similarly, factors such as motivation, attention, knowledge, acceptance of victory and defeat, and coping with stress havean important place in shooting performance. It has been stated that a successful shot cannot be acquired with only strength or technique but can be made by combining them with mental exercises. Timing of the breath and high attention levels of shooters can particularly contribute to increased performance (21, 22). Shooters should control their breath at the time of shooting. They need to maintain sighter alignment while breathing and hold their breath while finishing aiming and firing (23).

In this study, it was found that female athletes had higher scores than male athletes in terms of average shooting time in the series of shots (reaction), but there was no statistically significant correlation in these shooting-related values in terms of gender and competition levels. Hitting the target is expected to improve performance because the further away the target is from the center, the higher the probability of making a shot in the middle. Since 3 seconds is believed to be the standard rule, these three seconds before the shot have been studied to evaluate the effects of mechanical measurements of the shot (24). Reinkemeier et al. (25) suggested that since the time to fire an air rifle and the time to perform a soft trigger pull in pistol shots is about 3 seconds, the evaluation period should be between 2 and 4 seconds. Köykkä et al. (26) explained thatwithout taking the physical stress into account, biathlon prone shooting performance, stability of hold, aiming accuracy, trigger cleaning and trigger timing are the most important factors. In addition, it was stated that the variables defining trigger cleaning, aiming accuracy and trigger timing affect 80% of the mean firing performance. It has also been mentioned that grip stability is both directly and indirectly related to firing performance and trigger cleaning. Moreover, the studies of Erten (20) and Çetinkaya (27) showed that the athletes with a lot of experience and higher shot counts were resilienttowards pressure, and their shooting success was better due to their higher training age and competition experience.

Considering the relationship between the scores inthe series of shots and the measurement results of the elite shooters, it was found that there was a positive and high statistical correlation between the scores in the series of shots and the expected vital capacity measurements. However, it was found that there was no statistically significant correlation between the scores in the series of shots and the results from other measurements. Additionally, it was found that there was a positive and high statistical correlation between

the measured vital capacity, vital capacity percentage and right-hand grip strength scores of the junior shooters, and their scores in the series of shots, but there was no statistically significant correlation with other measurements.

In Ortega and Wang's study (28) including airgun shooters with an average age of 13.4 years, it was found that heart rate had a positive correlation with self-efficacy and performance, and it was an important predictor of shooting performance. Additionally, advanced shooters had a significantly lower average heart rate before taking a shot and used more self-talk, relaxation, sight, and automaticity than novice and intermediate shooters. It has been suggested that changes in heart rate is useful in determining a person's pre-competition physiological state, so with that, practical strategies can be determined by trainers and athletes to improve pre-performance physiological state as a way of optimizing performance.

When the relationship between scores intheseries of shots and the measurement results of male participants was inspected, it was found that there was a negative and high statistical correlation between the scores in the series of shots and the right foot dynamic balance measurements, whereas there was a positive and high statistically significant relationship between the scores in the series of shots and the expected vital capacity values of the female participants. Furthermore, it was found that there was no statistically significant relationship between the scores of both males and females in the series of shots and other measurement results. In a study of Konttinen et al. (22) with elite and non-elite male shooters, it was found that there was a decrease in theirpreparatory heart rate that did not change even after the shooting scores of each shooter.Much of this change was determined to be greater in non-elite shooters than in elite shooters. It has been suggested that this is due to heart rate patterns reflecting skill-related aspects of preparation performance. Sobhani et al. (14) investigated the effects of some variables on shooting performance of elite and non-elite air pistol athletes. They found statistically significant correlation in Y Balance Test with participants' left foot back between the resting heart rate and intrinsic motivations ofelite and non-elite participants and suggested that women's pistol shooting performance could be affected by dynamic balance, core endurance, resting heart rate, and motivation.

CONCLUSIONS

As a result, it was concluded that some performance parameters affected the shooting performance, the average HR values of the female participants in the shooting time were higher than the men, and the participants in the youth category showed better shooting performance than the athletes competing in the stars category.

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Investigation of the Effects of Reformer Pilates Exercises on Posture Disorder in Sedentary Women

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Abstract

Sedentary people have some chronic diseases such as diabetes, hypertension and obesity also postural disorders. Postural disorders effect the quality of life of the person negatively and increase the risk of musculoskeletal problems. The aim of this study was to investigate the effect of reformer pilates excersise on posture in sedentary women with posture disorders. The study included 18 sedentary women with posture disorder (age mean. 21.11±.832 years; height mean. 162.22±5.745 cm; body weight mean. 55.94±9.352 kg) were included. An exercise programme was applied to the participants 3 days a week (90 minutes/day) for 8 weeks. Posture assessment of the participants for pre- and post-tests was performed using computerised photogrammetry and the obtained photographs were analysed in PostureScreen® (PostureCo Inc., Trinity, FL, USA) mobile application. The data obtained as a result of the study were analysed with SPSS 23.0 statistical package programme. Shapiro-Wilks test was used to determine the conformity of the variables to normal distribution, and Paired Samples T-Test was used for pre- and post-exercise comparisons. As a result of the analysis; a statistically significant difference was found in the total posterior angle values of the participants ($p<0.05$). In conclusion, it is thought that regular reformer pilates exercises can provide positive effects in improving posture in sedentary women with postural disorders.

Keywords: Woman, posture, anthropometry, exercise, health

Özet

Sedanter Kadınlarda Reformer Pilates Egzersizlerinin Postür Bozukluğuna Etkilerinin Araştırılması

Sedanter kişilerde diyabet, hipertansiyon, obezite gibi kronik hastalıkların yanı sıra postür bozuklukları da sıklıkla görülmektedir. Postür bozuklukları kişinin yaşam kalitesini olumsuz yönde etkileyerek kas iskelet sistemi rahatsızlıklarının görülme riskini artırmaktadır. Bu çalışmanın amacı, postür bozukluğu olan sedanter kadınlarda reformer pilates egzersizlerinin postür bozukluğuna etkisinin araştırılmasıdır. Çalışmaya gönüllülük esasına dayalı olarak postür bozukluğu tespit edilen 18 sedanter kadın (yaş ort. 21.11±.832 yıl; boy uzunluğu ort. 162.22±5.745 cm; vücut

ağırlığı ort. 55.94±9.352 kg) dahil edilmiştir. Katılımcılara 8 hafta boyunca haftada 3 gün (90 dakika/gün) egzersiz programı uygulanmıştır. Katılımcıların egzersiz öncesi ve sonrası postür değerlendirmesi bilgisayarlı fotogrametri kullanılarak yapılmış ve elde edilen fotoğraflar PostureScreen® (PostureCo Inc., Trinity, FL, USA) mobil uygulamasında analiz edilmiştir. Çalışma sonucunda elde edilen veriler SPSS 23.0 istatistik paket programı ile analiz edilmiştir. Değişkenlerin normal dağılıma uygunluk durumunu belirlemek için Shapiro-Wilks testi; egzersiz öncesi ve sonrası karşılaştırmalarında ise, Paired Samples T-Testi kullanılmıştır. Analiz sonucunda; katılımcıların total posterior açı değerlerinde istatistiksel olarak anlamlı fark bulunmuştur. ($p<0.05$). Sonuç olarak, düzenli yapılan reformer pilates egzersizlerinin postür bozukluğu olan sedanter kadınlarda postürün iyileştirilmesinde olumlu etkiler sağlayacağı düşünülmektedir.

Anahtar Kelimeler: Kadın, postür, antropometri, egzersiz, sağlık

INTRODUCTION

Physical activity is defined as any body movement produced by skeletal muscles that result in energy expenditure can be measured in kilocalories. Exercise is not synonymous with physical activity: It is a subcategory of physical activity. Exercise is a physical activity that is planned, structured, repetitive, and purposive for the improvement or maintenance of one or more parts of physical fitness (7). Pilates exercises, created by Joseph Pilates in the 1920s, are an exercise approach that aims to control the body, consisting of stretching and strengthening exercises (16;23). The pilates method, which consists of 6 basic principles: centering, concentration, control, precision, flow and breathing, can provide core stabilization (23). The pilates exercises has become popular in recent years, complex and effective exercises with a focus on muscle strength and realignment, core stability and control, flexibility, and posture (11). Lee et al. found that pilates exercises applied 3 times a week for 10 weeks reduced pain and disability and improved the craniovertebral angle in their study on people with forward head posture (17). In another study, the effects of 16 sessions of pilates exercises to the postural alignment in healthy adults was evaluated. In the study, where they found that pilates exercises had a positive effect on postural alignment, it was stated that more studies are necessary about the effects of pilates on posture.

Posture expressed as "positura" in Latin and "posture" in French; it is the placement of each part of the body in the most appropriate position relative to the adjacent segment and the whole body (19). Good posture is stated as the balance between musculoskeletal components and is related to movement without pain and other musculoskeletal health (21;25;32). Sedentary lifestyle, lack of ergonomic equipment and body awareness, emotional stress may cause postural alignment problems (8). Physiotherapists and physicians commonly evaluate posture in people with musculoskeletal, neurological, and cardiopulmonary diseases (12). Visual observation, plumbline, goniometer, photography, radiography, 3D motion analysis systems, photogrammetry are posture analysis methods that are commonly used (28). Recently, smart mobile devices such as phones and tablets are widely used in posture analysis due to their widespread accessibility, ease of use, and affordable (13;14). PostureScreen Mobile (PSM) (PostureCo, Inc., Trinity, Florida) is an economic, user-friendly app available for iOS platforms (eg, iPad, iPhone) that is created as a screening tool for healthcare professionals who evaluate patients for postural misalignments.

The effects of Pilates as an exercise type on body composition parameters (1;29), many health parameters (2;20;26;31) have been investigated. However, there is limited research examining the effects of reformer Pilates exercises on posture. The aim of this study is to evaluate the changes in posture of reformer pilates exercises applied to healthy young women for 8 weeks. The findings of this study will inform basic knowledge and provide new evidence about the selection of appropriate exercise protocols in reformer Pilates applications in sedentary women.

MATERIAL AND METHOD

Research model: Our research was carried out in a quasi-experimental model. In accordance with the study design, a control group was not formed.

Participants: The study included 40 women studying at a university, who were diagnosed with postural impairment as a result of physiotherapist assessment and who met the inclusion and exclusion criteria. Inclusion criteria were being between 18-30 years old, be willing to participate in the study and be woman. Exclusion criteria were having orthopedic, neurological, cardiopulmonary problems and being pregnant. 2 participants declared that they wanted to stop the research due to personal reasons. One participant could not continue the exercise program as a result of an accident, and a total of 22 participants were excluded because the other 19 participants did not participate in the program regularly and were not included in the compensation training. 18 participants completed the study this research was approved by The Ethics Committee of Dumlupınar University. Written informed consent form was obtained from all participants.

Protocol: Before the exercise program, age, height, and weight of the participants were evaluated. After postural analysis the subjects were included in the exercise program. After the content of the exercise program was determined individually by the experienced trainer, the exercises were performed individually in the pilates hall of the Faculty of Sport Sciences in accordance with the health and safety rules. An instructor is designated for each participant. Trainings were held at times that were convenient for the participant and the trainer. In the first stage, as stated in the exercise program (Table 1), it was started from the lowest levels and the repetition, duration and spring levels were increased over time. The participants were free to out of any part of the study with their consent. The study data has not been used in any way other than for scientific purposes. With the financial support provided by the Kütahya Dumlupınar University Scientific Research Projects Unit with the project number 2022-26, the necessary materials for the study were procured.

Exercise Program: The reformer pilates intervention consisted of three 90-min sessions per week for 8 weeks. Each session was planned as 20 minutes of warm-up, 55 minutes of exercise and 15 minutes of cool-down (Table 1). The exercise program was continued by changing the number of springs and repetitions and it was completed after 8 weeks.

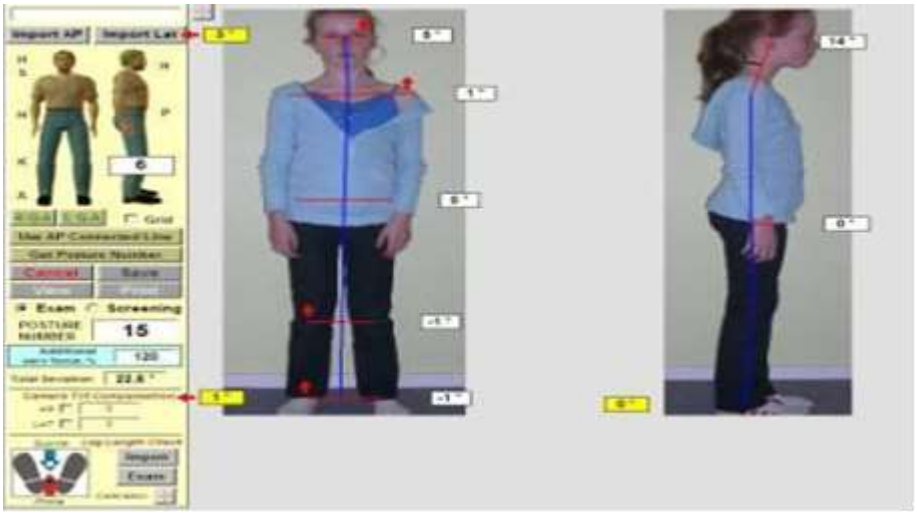
Table 1. Exercise program

EXERCISE PROGRAM		
Exercises	**Coil Spring**	**Repeat**
Double Leg Press Dorsiflexed		
Close Stance	2-4 Spin	8-12 repeat
Close Stance External Rotation	2-4 Spin	8-12 repeat
Wide Stance External Rotation	2-4 Spin	8-12 repeat
Double Leg Press High Toe	**Position Plantar Flexed**	**Repeat**
Close Stance	Position Plantar Flexed	8-12 repeat
Close Stance External Rotation	Position Plantar Flexed	8-12 repeat
Wide Stance External Rotation	Position Plantar Flexed	8-12 repeat
Single Leg Press Series	**Coil Spring**	**Repeat**
Table Top (Bent Knee) Feet Dorsiflexed or Plantar Flexed	2-4 Spin	8-12 repeat
Table Top (Single Leg Kick) Flex and Point	2-4 Spin	8-12 repeat
Leg is Straps	**Coil Spring**	**Repeat**
Double Leg Extension Double Leg Press	1-2 Spin	8-12 repeat
Leg Circles (Feet Turned Out – Feet Turned In)	1-2 Spin	8-12 repeat
Frogs (Ball Between Knees – Hells Circutor Frogs)	1-2 Spin	8-12 repeat
Seated Long Box Series	**Coil Spring**	**Repeat**
Open Rhomboid Squeeze (Cross Straps)	1-2 Spin	8-12 repeat
Latissimus Dorsi Row	1-2 Spin	8-12 repeat
Half Swan (Prone Long Box)	1-2 Spin	8-12 repeat

Swan (Prone Long Box)	1-2 Spin	8-12 repeat
Latissimus Dorsi (Pull Down)	1-2 Spin	8-12 repeat
Pulling Straps	1-2 Spin	8-12 repeat
Reverse Fly on the Box	1-2 Spin	8-12 repeat
Abdominal	**Coil Spring**	**Repeat**
100's Prep	1-2 Spin	8-12 repeat
Curl Up	1-2 Spin	8-12 repeat
Frogs with Curl Up	1-2 Spin	8-12 repeat
Quadruped	**Stretch**	**Repeat**
Cat / Cow	Stretch	8-12 repeat
Chest	Stretch	8-12 repeat
Triceps	Stretch	8-12 repeat
Eva Lunge	Stretch	8-12 repeat

Data Collection Tools

Posture Assessment: Posture was evaluated with the Posturescreen Mobile (PostureCo, Inc., Trinity, Florida) application. Anatomical points which are bilateral pupils, sternal notch, bilateral acromioclavicular joints, bilateral T8 ribs, bilateral anterior superior iliac spines, midpoint of bilateral anterior ankles, bilateral external auditory meatus, bilateral greater trochanters of femur, bilateral inferior ear lobes, bilateral posterior superior iliac spines, bilateral posterior superior iliac spines, bilateral Achilles tendons were marked with colored markers. Digital photographs were taken of the anterior, posterior, left and right lateral view of the participant with iPhone attached on tripods directly in front of the participant one meter away. Digital photographs were taken of the anterior, posterior, left, and right lateral view of the participant with an iPhone attached to a tripod in front of the participant one meter away. The marked anatomical points were determined on the PSM app. PSM then calculated the following 8 quantitative data points using proprietary algorithms: total anterior translation, total anterior angle (right), total lateral translation (right), total anterior angle (left), total lateral translation (left), total posterior translation, total posterior angle.



Picture 1. Posture analysis

Statistical Analysis: The data of the participants were analysed using IBM SPSS 23 package program. Pre- and post-test distributions of the variables were analysed according to the groups and the normality of the distributions and homogeneity of the variances were determined by Shapiro-Wilks Test. In-group pre-test and post-test comparisons regarding the training effect were analysed by Paired-Sample T-test. The significance level was accepted as $p<0.05$.

RESULTS

Demographic information of the participants is shown in Table 2.

Table 2. Demographic information of the participants

Demographic information	N	Mean ± sd
Age (years)	18	21.11 ± .832
Height (cm)		162.22 ± 5.745
Weight (kg)		55.94 ± 9.352

The values of the participants pre- and post-exercise program application are shown in Table 3.

Table 3. Pre- and post-test comparison of in-group posture analysis values of the participants

Parameters	Pre- Test	Post- Test	t	p
	Mean ± sd	Mean ± sd		
Total Anterior Translasyon	2.91 ± 1.656	2.90 ± .844	.014	.989
Total Anterior Angle	6.27 ± 3.357	4.96 ± 2.784	1.379	.186
Total Lateral Translasyon (Right)	9.39 ± 4.254	8.73 ± 2.896	.519	.610
Total Anterior Angle (Right)	20.65 ± 7.407	18.53 ± 5.996	1.047	.310
Total Posterior Translasyon	6.139 ± 2.696	5.87 ± 1.403	.403	.692
Total Posterior Angle	42.37 ± 14.899	22.31 ± 5.982	4.902	**.000***
Total Lateral Translasyon (Left)	6.85 ± 3.128	7.77 ± 2.412	-1.290	.214
Total Lateral Angle (Left)	15.86 ± 4.931	16.86 ± 5.440	-.793	.439

***p<0.05**

In Table 3, intra group posture analysis values were compared. In the table, it was seen that there was a statistically significant change between the total posterior angle values of the participants ($p<0.05$). No statistically significant difference was found in other posture analysis values ($p>0.05$).

DISCUSSION

In this study, the effects of reformer pilates exercises on posture were investigated in sedentary women with posture disorders. In this study, pilates exercises were applied to participants with posture disorders using a reformer device. Posture was evaluated before and after the exercise program. At the end of the 8-week exercise, it was determined that there were significant differences in the total posterior angle parameter, which is one of the posture components of the participants. Although there was no statistically significant difference in other parameters, improvements were observed.

Today, with the development of technology, people's daily physical activity levels are gradually decreasing. Pilates exercises are recommended by many physicians and physiotherapists in order to prevent, reduce or completely eliminate the discomforts associated with a sedentary lifestyle. It has been stated that pilates exercises strengthen the deep trunk muscles and increase their activities, provide lumbar and pelvic stability (10; 23), increase body awareness, flexibility, aerobic capacity and balance (4; 5; 30).

A limited number of studies have been found in the literature evaluating the effect of reformer pilates on posture. Otto et al. (24) applied reformer pilates exercises to one group and resistance exercises to the other group and determined that there were significant improvements in the total postural scores of the participants at the end of 12 weeks. Adıgüzel and Doğru (2) reported that 10-week reformer exercises had positive effects on scoliosis in their study on 23 sedentary women. Servililer (27) concluded that an 8-week reformer exercise program positively affects postural disorders in middle-aged and older individuals. Lee et al. (18) had 36 middle-aged female participants do pilates exercises 3 days a week for 12 weeks and showed that the postural alignments of the participants in the exercise group improved in the sagittal and horizontal planes at the end of the exercises. Researchers have stated that pilates exercises are performed symmetrically and strengthen the deep muscles, and that the preservation of the trunk postural alignment increases with the development of muscle mass. In a study by Kloubec (15), 12 weeks of pilates exercises were applied to young adults. At the

end of the study, there was no improvement in posture, but he reported that when postural deviations are large, exercise may have a positive effect in correcting misalignment.

In a study by Kloubec (15), 12 weeks of pilates exercises were applied to young adults. At the end of the study, there was no improvement in posture and the results were said to be stable, but when the postural deviations were large, he reported that exercise had a positive effect in correcting the misalignment, and even though the postural data were stable, a significant change in the height of the participants might have some structural changes in spinal alignment with exercise. According to McGill (22), improving muscular endurance has a more protective effect than improving muscular strength, and this ensures maintaining neutral vertebral posture under load. The Pilates method also advocates this approach (6; 9). According to McGill (22), improving muscular endurance has a more protective effect than improving muscular strength, and this ensures maintaining neutral vertebral posture under load. The effects of the Pilates method are similar to this approach (6; 9).

As a result, it is thought that reformer pilates exercises may be effective in improving postural disorders. It is thought that postural disorders can be improved with such reformer exercises applied to sedentary women. In addition, it is thought that reformer exercises will have a positive effect on women's health and improve their daily physical activity abilities, as well as their effects on posture. Therefore, sedentary women can be recommended to practice reformer exercises for a more comfortable daily life. However, due to the limited number of studies in the literature, the inconsistency in the results of existing studies and the need for randomized controlled studies, more studies are needed in this area.

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Examining The Attitudes of Amateur Football Players Towards Football

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Abstract

In this study, it is aimed to examine the attitudes of amateur football players towards football. The study group of the research consists of 194 football players who play football actively in Sivas and Yalova provinces in the 2021-2022 season. Data collection in the study consists of two parts. In the first part, the personal information form created by the researchers was used, and in the second part, the Football Attitude Scale (FUTÖ) scale was used. In the analysis of the data in this study, the SPSS 25.00 package program was used, and it was evaluated at the 95% confidence interval and at the 0.05 significance level. Descriptive statistics were calculated regarding age, gender, educational status, geographical region, province, and the position information of the participants in football. It was decided whether the data showed a normal distribution or not by looking at the kurtosis skewness values. In terms of statistics, Independent Sample t test, Anova test, frequency, percentage, and reliability coefficient calculations were made. As a result, When the attitudes of the participants towards football in the gender variable are examined, there is a statistically significant difference in favor of the female participants between the scale total score and the sub-dimensions of the scale, social effects, performance, and psychological effects. It was seen that there was a statistically significant difference in the sub-dimensions, and there was no statistically significant difference between the province and location variables, the total score of the scale and all sub-dimensions.
Keywords: Amateur, Football, Attitude, Footballer.

Özet
Amatör Futbolcuların Futbola Karşı Tutumlarının İncelenmesi

Bu araştırmada amatör futbolcuların futbola karşı tutumlarının incelenmesi amaçlanmıştır. Araştırmanın çalışma grubunu 2021- 2022 sezonunda Sivas ve Yalova illerinde amatör olarak aktif futbol oynayan 194 futbolcu oluşturmaktadır. Çalışmada verilerin toplanması iki bölümden oluşmaktadır. Birinci bölümde araştırmacılar tarafından oluşturulan kişisel bilgi formu, ikinci bölümde Futbol Tutum Ölçeği (FUTÖ) ölçeği kullanılmıştır. Bu araştırmada verilerin analizinde SPSS 25.00 paket programı kullanılarak %95 güven aralığında ve 0,05 anlamlılık

düzeyinde değerlendirilmiştir. Yaş, cinsiyet, eğitim durumu, coğrafi bölge, il ve katılımcıların futbolda oynadıkları mevki bilgilerine ilişkin tanımlayıcı istatistikler hesaplanmıştır. Verilerin normal dağılım gösterip göstermediği basıklık çarpıklık değerlerine bakılarak karar verilmiştir. İstatistiksel açıdan, Bağımsız Örneklem t testi, Anova testi, frekans, yüzde ve güvenirlik katsayısı hesaplamaları yapılmıştır. Sonuç olarak; Katılımcıların cinsiyet değişkeninde futbola yönelik tutumları incelendiğinde ölçek toplam puanı ile ölçek alt boyutlarından toplumsal etkiler, performans, psikolojik etkiler arasında kadın katılımcıların lehine istatistiksel olarak anlamlı bir farklılık olduğu, yaş, eğitim değişkenlerin de ortaokul öğrencileri, 13 yaş ve altı katılımcıların ölçek toplam puanı ve tüm alt boyutlarda istatistiksel olarak anlamlı bir fark olduğu görülmüş, il değişkeni ve mevki değişkenleri ile ölçek toplam puanı ile tüm alt boyutlar arasında istatistiksel olarak anlamlı bir farklılık görülememiştir.

Anahtar Kelimeler: Amatör, Futbol, Tutum, Futbolcu

INTRODUCTION

In general, when the literature is examined, football is defined as a game in which teams of 11 players, with feet and/or head and the soccer ball, are superior to each other by throwing the soccer ball into the goal, in such a way that the teams dominate each other. From the twentieth century to the present, the game of football has been active. When the sports in the twentieth century and earlier periods were examined, it was seen that football came to the fore. Football is a sport where people from everyone come together without making any distinction between rich and poor (14).

Football has been named as a sports branch with a high level of excitement and spectacle, where individuals come together without discriminating on economic status, religion, or politics (12). With the transition of individuals to modern life, many sports branches have gained popularity. Among these sports branches, the most popular sport has been football. Both in the past and today, football is increasing its popularity day by day (13).

When football is considered scientifically in the past and today, it is included in the literature as a subject in which individuals are dealt with theoretically and / or practically. It is known that these fictions, in which there are many fictions about football, are generally dealt with theoretically. Studies in the sense of football practicality have been scientifically proven from the past to the present and have guided football (5).

With the popularity of football in modern life, sports businesses have aimed to provide more economic income through football compared to other sports branches. Football is increasing its popularity and growing day by day, as a field that enables large organizations in economic, social, and cultural terms and the society to experience the same atmosphere together, regardless of their different cultures and economic situations (18).

When the literature is examined, it has been seen that football is the most common research in the field of sports. It is important for both spectators and athletes to stick to a certain team. It has been mentioned in the literature that athletes play football for the purpose of their work and / or health, social friendship, and self-development. Attitudes and motivations of individuals are very important in football (15).

In the literature, it has been seen that individuals do not participate in most of the sports branches and / or follow a single sport branch that they are not even aware of. In addition, it has been observed in the literature that the economic, educational, and cultural status of individuals who prefer football is low, and that their family, social and friend circles affect their following football (14, 11).

Attitude is defined as a situation that people pursue for the purpose of social, personal, emotional, motivational, objective and knowledge (8). Attitude is defined as a tray of positive and/or negative emotions. In addition, the reactive readiness of people is called attitude (4).

Competition in football affects the motivation of individuals. It is known that motivation affects the performance and attitudes of individuals who are actively involved in football. It is a branch that includes the attitudes, social values, performances and psychological states of individuals who are actively involved in football (6). Attitudes of individuals playing football is a situation that affects success (16). Although attitude is a concept in football, it also affects football culture (1). Our research was carried out with the aim of examining the attitudes of individuals who play football as an amateur towards football.

MATERIAL AND METHOD

Research Method

In our research, descriptive survey model was used within the scope of survey model. Descriptive research is research that aims to determine any situation in a subject (9).

Research Group

The study group of the research consists of 194 football players who play football actively in Sivas and Yalova provinces in the 2021-2022 season.

Data Collection

The scale applications were delivered to the participants via Google Form to be applied to the amateur football players, with the permission of their parents and to the coaches in different clubs, and participation was based on volunteerism. A total of 202 participants were reached, outliers in the data set and whether the multivariate normality assumption was met or not, were examined with the help of Mahalanobis distance values, and 8 data showing outlier values were removed from the data set and statistical analysis of 194 participants was made.

Data Collection Tools

Data collection in the study consists of two parts. In the first part, the personal information table created by the researcher was used, and in the second part, the Football Attitude Scale (FUTÖ) scale, which Kayapınar and Kaan's validity and reliability were made (2021), was used.

Personal Information Form

A personal information form consisting of 6 questions, created by the researcher, was used to determine the age, gender, educational status, geographical region, province and football position of the participants.

Football Attitude Scale

In the study, the Football Attitude Scale (FUTÖ) scale was used (2021), the validity and reliability of which was established by Kayapınar and Kaan. The scale is rated in a 5-point Likert type as (1) Never Disagree and (5) Always. The factor loading values included in the scale by Kayapınar and Kaan (2021); It was accepted that it was between 0.453 and 0.741 and adequately explained the factor load. The total variance of the scale was found to be 40,118%. The anti-image correlation values between the items ranged from 0.395 to 0.878. As a result of factor analysis, multiple ratios were set as 0.10 and a total of 4 dimensions were created. The scale consists of 21 positive and 5 negative items. Dimensions; Individual Effects (11 items), Social Interaction (8 items), Performance (4 Items), Psychological Effects (3 Items). While the reliability coefficients of the dimensions ranged between 0.337 and 0.760, the general reliability coefficient was determined as 0.738. Questions 1-11 are in the "Individual Effects" sub-dimension, questions 12-19 are in the "Social Interaction" sub-dimension, questions between 20-23 are in the "Performance" sub-dimension, and questions between 24-26 are in the "Psychological Effects" sub-dimension. Questions 17, 21, 22, 23, 24 were scored with reverse coding. In our study, Cronbach's alpha reliability coefficients were determined as 0.68 for individual effects, 0.61 for social interaction, 0.59 for performance, and 0.51 for psychological effects. The total reliability coefficient of the scale was determined as 0.75.

Analysis of Data

In this study, the analysis of the data was carried out with the SPSS 25.0 package program. Outliers in the data set and whether the multivariate normality assumption was met or not were examined with the help of Mahalanobis distance values, and 8 data showing outliers were removed from the data set. The kurtosis coefficients were found to be between +2-2 and parametric tests were used in the analysis (7). Statistically, linear regression analysis, frequency, percentage and reliability coefficient calculations, anova analysis and t tests were performed. During the analysis, the analysis was made according to the 95% confidence interval.

RESULTS

Table 1. Demographic Variables

Variables		f	%
Age	13 years and under	125	64.4
	14 years and older	69	35.6
	Total	194	100.0
Gender	Female	96	49.5
	Male	98	50.5
	Total	194	100.0
Educational Status	Secondary School	125	64.4
	High School	69	35.6
	Total	194	100.0
Geographical Region	Central Anatolia	99	51.0
	Marmara	95	49.0
	Total	194	100.0
Province	Sivas	99	51.0
	Yalova	95	49.0
	Total	194	100.0
Position	Keeper	21	10.8
	Defense	54	27.8
	Midfield	58	29.9
	Striker	61	31.4
	Total	194	100.0

When the statistical analyzes of the participants on the basis of demographic variables in Table 1 were examined, it was determined that the age variable was in favor of 13 years and younger (n=125 64.4%). When we look at the highest variables, male participants in the gender variable (n=98 50.5%); secondary school students in the educational status variable (n=125 64.4%); participants from Central Anatolia in the geographical region variable (n=99 51%); In the province variable, it consists of the participants from the province of Sivas (n=99 51%) and the participants playing in the forward position (n=61 31.4%).

Table 2. Reliability Analysis Results

Scale	Cronbach Alpha Coefficient
Individual Effects	.688
Social Interaction	.616
Performance	.595
Psychological Effects	.510
Football Attitude	.785

Table 2 shows the results of the reliability analysis obtained from the scales. According to these results, it is seen that all dimensions are sufficiently reliable.

Table 3. Descriptive values for the scales

Variables	Minimum	Maksimum	$\bar{x}$	Ss	Kurtosis	Skewness
Individual Effects	33.00	55.00	49.83	3.99	-1.279	1.803
Social Interaction	21.00	40.00	34.37	4.16	-.943	.558
Performance	8.00	20.00	16.51	3.13	-.808	-.056
Psychological Effects	6.00	15.00	12.66	2.05	-1.095	1.164
Football Attitude	78.00	129.00	113.38	9.56	-.875	.851

According to the descriptive statistics results of the scales in Table 3, the individual effects dimension score is very high ($\bar{x}$=49.8351); The social interaction dimension is very high ($\bar{x}$=34.3711); The performance dimension is very high ($\bar{x}$=16.5103); It is seen that the psychological effects dimension is at a moderate level ($\bar{x}$=12.6649) and the scale total score is at a very high level ($\bar{x}$=113,3814).

Table 4. Independent Sample T-Test Results Between Participants' Attitudes Towards Football and Gender Variable

Size	Gender	n	$\bar{X}$	SS	t	P
Individual Effects	Female	96	49.80	4.24	-.114	.910
	Male	98	49.86	3.75		
Social Interaction Female	Female	96	35.75	4.37	4.825	**.000***
	Male	98	33.02	3.45		
Performance	Female	96	18.10	2,36	8.112	**.000***
	Male	98	14.94	3,02		
Psychological Effects	Female	96	13.40	1.75	5.319	**.000***
	Male	98	11.93	2.07		
Football Attitude	Female	96	117.06	10.22	5.703	**.000***
	Male	98	109.77	7.29		
p<0,05*						

According to the result of the Independent Sample T Test conducted between the Participants' Attitudes Towards Football and the Gender scale, Death established a manager that they used as the aggressors of the Women's guides in the total score of the other sub-cells and policies, except for the Individual Effects sub-dimension (p<0.05).

Table 5. Independent Sample T-Test Results Between Participants' Attitudes Towards Football and Age Variable

Size	Age	n	$\bar{X}$	SS	t	p
Individual Effects	13 years and under	125	50.42	3.26	2.517	**.013***
	14 years and over	69	48.76	4.89		
Social Interaction	13 years and under	125	35.57	3.54	5.882	**.000***
	14 years and over	69	32.18	4.31		
Performance	13 years and under	125	17.43	2.77	5.986	**.000***
	14 years and over	69	14.84	3.08		
Psychological Effects	13 years and under	125	13.21	1.73	5.385	**.000***
	14 years and over	69	11.66	2.22		
Football Attitude	13 years and under	125	116.64	7.65	7.192	**.000***
	14 years and over	69	107.46	9.89		
p<0,05*						

When Table 5 is examined, a statistically significant difference was found in favor of the participants aged 13 and younger in all sub-dimensions and the total score of the scale, according to the independent sample t-test results between the Attitudes of the Participants Towards Football and the age variable (p<0.05).

Table 6. Independent Sample T-Test Results Between Participants' Attitudes Towards Football and Educational Status Variable

Size	Educational Status	n	$\bar{X}$	SS	t	p
Individual Effects	Middle school	125	50.42	3.26	2.517	**.013***
	High school	69	48.76	4.896		
Social Interaction	Middle school	125	35.57	3.54	5.882	**.000***
	High school	69	32.18	4.319		
Performance	Middle school	125	17.43	2.77	5.986	**.000***
	High school	69	14.84	3.08		
Psychological Effects	Middle school	125	13.21	1.73	5.385	**.000***
	High school	69	11.66	2.22		
Football Attitude	Middle school	125	116.64	7.65	7.192	**.000***
	High school	69	107.46	9.89		
p<0,05*						

Looking at Table 6, a statistically significant difference was found in favor of secondary school students in all sub-dimensions and scale total scores, according to the independent sample t-test results between the Attitudes of the Participants Towards Football and the variable of educational status (p<0.05).

Table 7. Independent Sample T-Test Results Between Attitudes of Participants Towards Football and Province Variable

Dimension	Province	n	$\bar{X}$	SS	t	p
Individual Effects	Sivas	99	50.16	3.99	1.164	.246
	Yalova	95	49.49	3.97		
Social Interaction	Sivas	99	34.52	4.03	.526	.600
	Yalova	95	34.21	4.30		
Performance	Sivas	99	16.45	3.27	-.252	.801
	Yalova	95	16.56	2.998		
Psychological Effects	Sivas	99	12.75	1.995	.641	.523
	Yalova	95	12.56	2.11		
Football Attitude	Sivas	99	113.89	9.90	.768	.443
	Yalova	95	112.84	9.23		
p<0,05*						

Looking at Table 7, no statistically significant difference was found in all sub-dimensions and the total score of the scale, according to the results of the independent sample t-test conducted between the Attitudes of the Participants Towards Football and the province variable (p>0.05).

Table 8. Results of Anova Analysis Between Participants' Attitudes Towards Football and Position Variable

Dimensions	Position	N	$\bar{X}$	SS	F	p
Individual Effects	Keeper	21	49.85	5.25	1.556	.202
	Defense	54	48.87	4.20		
	Midfield	58	50.17	3.89		
	Striker	61	50.36	3.27		
Social Interaction	Keeper	21	33.66	4.50	1.086	.356
	Defense	54	33.87	4.56		
	Midfield	58	34.32	3.60		
	Striker	61	35.09	4.14		
Performance	Keeper	21	17.00	2.73	1.552	.203
	Defense	54	16.14	3.52		
	Midfield	58	16.05	2.95		
	Striker	61	17.09	3.01		
Psychological Effects	Keeper	21	12.71	2.26	.165	.920
	Defense	54	12.61	1.83		
	Midfield	58	12.55	2.10		
	Striker	61	12.80	2.15		
Football Attitude	Keeper	21	113.23	11.09	1.598	.191
	Defense	54	111.50	9.47		
	Midfield	58	113.10	8.94		
	Striker	61	115.36	9.53		

p<0.05*

When Table 8 is examined, it is seen that there is no statistically significant difference in all sub-dimensions and scale total score as a result of the Anova analysis performed between the Attitudes of the Participants Towards Football and the position variable (p>0.05).

DISCUSSION AND CONCLUSION

In our research, in order to examine the attitudes of amateur football players towards football, in the provinces of Sivas and Yalova, on the basis of various variables, individuals who play football actively in the 2020-2021 season; The results of age, gender, education level, geographical region, province and football position are explained below.

In our study, when the statistical analyzes of the participants on the basis of demographic variables were examined, it was determined that the age variable was against the age of 14 years and older (n=69 35.6%). When we look at the variables, it is seen that male participants are more than female participants in the gender variable (n=98 50.5%); secondary school students are more than high school students in the education level variable (n=125 64.4%); In the geographical region variable, Marmara and Central Anatolia regions have more participants in the Central Anatolia Region (n=99 51%); In the province variable, compared to Yalova province, the participants participating in the research were more in Sivas (n=99 51%) and when the position distributions were examined, it was seen that the striker participants were more than the participants in other positions (n=61 31.4%), (Table 1). In addition, according to the descriptive statistics results in our study, it was found that the score of the Individual effects dimension was very high ($\bar{x}$=49.8351); The social interaction dimension is very high ($\bar{x}$=34.3711); The performance dimension is very high ($\bar{x}$=16.5103); It is seen that the psychological effects dimension is at a moderate level ($\bar{x}$=12.6649) and the scale total score is at a very high level ($\bar{x}$=113.3814), (Table 3).

It was seen that there was a significant difference in gender distribution and that men had more attitudes towards football than women. In general studies, it has been observed that men are more involved in gender distributions than women (3, 2). In our study, there was a statistically significant difference in favor of female participants in the Attitudes Towards Football and Gender Variable of the Participants in the sub-dimensions and the total score of the scale, except for the Individual Effects sub-dimension (p<0.05), (Table 4).

In the analysis made between the Attitudes of the Participants Towards Football and the age variable, a statistically significant difference was found in favor of the participants aged 13 and younger in all sub-dimensions and the total score of the scale ($p<0.05$), (Table 5)

A statistically significant difference was found in favor of secondary school students in all sub-dimensions and the total score of the scale when the Attitudes of the Participants towards Football and the variable of educational status were examined ($p<0.05$), (Table 6).

Did not find a significant difference when examining the provincial variables in his study. Again, similar results show similarities as a result of the study conducted (17). In our study, it was seen that there was no statistically significant difference between the attitudes of the participants towards football and the province variable (Table 7). This result shows that the results of the studies of Tutkun et al. (17) support the result of our study.

As the result of Anova analysis is observed in all infrastructure and scale total scores, statistical results are obtained between their attitudes towards football and position variable when there is no determinant ($p>0.05$), (Table 8). In conclusion, In the gender variables, there is an external variable between the participants' attitudes towards football, their total scores and the social effects, performance, psychological effects from the sub-dimensions of the scale, age, education variables include secondary school software, the total score of the administrators aged 13 and below, and all sub-strata. It was seen that there was a difference between the province and location variables, the total score of the scale and all sub-dimensions

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The Effect of Fans' Perceptions of Psychological Commitment to their Team on Respect and Hatred towards Opponents

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Ethical Statement: It is declared that scientific and ethical principles have been followed while carrying out and writing this study and that all the sources used have been properly cited.

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Abstract

The aim of this study is to determine the effect of fans' perceptions of psychological commitment to their teams on their respect and hatred towards opponents. The study group consists of 400 fans of clubs called as the Big Three (Beşiktaş, Fenerbahçe and Galatasaray) residing in Konya during the 2021-2022 Football Season. In the study in which survey and relational survey models were used, Personal Information Form, Fan Psychological Commitment Scale and Respect for Opposite Opinions and Self-Control Scale in Sports were used to collect data. As a result of the study, it was found that personal identity, resource cost and social obligation, which are the sub-dimensions of psychological commitment to the team, increase hatred towards the opponent, while affective commitment decreases hatred towards the opponent. In the Multiple Regression Analysis conducted to examine the extent to which psychological commitment to the team predicts hatred towards the opponent, it was found that 39% of hatred towards opponent was explained. In addition, it was found that regional tribalism, one of the sub-dimensions of psychological commitment to the team, increased the respect towards the opponent, while social obligation decreased the respect towards the opponent. In the Multiple Regression Analysis conducted to examine the extent to which psychological commitment to the team predicts respect towards opponent, it was seen that 8% of respect towards opponent was explained. It is considered that the findings of the study will contribute to the development of policies to increase sportsmanship and fairplay behaviours of fans and to prevent aggression.

Keywords: Fan, Hatred and respect towards opponent, psychological commitment

INTRODUCTION

The relationships between fans and sports teams are unique in that they can involve both strong feelings of intense love accompanied by passion and devotion of fans towards their favorite teams and deep feelings of hatred that lead to violence and aggression of fans against opposing teams (69). Fandom is not only limited to individual belonging to a particular team, but also brings about shared emotional and behavioural reactions (33). In addition, winning and losing are integral parts of the sports experience that significantly affect the feelings of fans (2, 72). In this sense, winning and losing have become a rivalry between fans rather than competition between teams. In this context, it would be appropriate to address the concept of respect and hatred of fans towards the other team not only as an emotion, but also in a way that includes group behaviours.

From the moment an individual starts to support a sports club/team, s/he is perceived as a fan and begins to act together with millions of fans who support the same sports club. In addition, an emotional bond is formed between the individual and the team he/she supports. As a result, s/he begins to exhibit behaviors together with other fans to benefit the team he/she supports and to make his/her team successful (11, 17, 18, 24, 32, 68, 73, 74). These feelings and behaviors bring about a unique relationship between the sports fan and the team s/he supports (69). Fan groups provide not just entertainment and show functions, but also a team and player-centered identification function in society by attending certain activities (7). As a result of this identification, fans may sometimes display undesirable behaviours by not being able to self-control. Self-control is defined as a person's ability to control himself/herself in displaying some undesirable behaviors (60). Individuals who can achieve self-control first learn to respect themselves, then the other team and its fans (30). Especially people with opposing views may sometimes have difficulty in respecting each other. Sports fandom gives individuals the opportunity to have good feelings as well as deep emotional experiences that sometimes result in disappointment (61). Sports fandom includes strong and intense emotions such as passion and loyalty towards the teams, players, fans and managers of the teams. It may also include feelings of hatred that results in violence and aggression towards the opponents, fans, players and managers of the teams (69).

The concept of hatred is considered as a negative emotional phenomenon and can also be defined as the consistent negative perception of a person or group towards other people or groups, elements of groups, and extreme negative behaviours towards opposing team fans and everything related to that team (21, 34). In fact, it is stated that the origin of intense negative emotions such as hatred among fans is that strategic sports such as football are based on the old war culture (26). The individual with a feeling of hatred perceives all elements in out-groups as similar and makes a clear distinction between out-groups and his/her own groups (21). Moreover, the concept of hatred, with its different levels, can be considered as a natural consequence of belonging to a group. Because it is argued that hating an out-group and favouritism towards the in-group are two inseparable phenomena, in other words, the attitude towards the in-group and the attitude towards the out-group mutually affect each other negatively (5). Accordingly, although individuals differ in terms of their willingness to benefit the the group they belong to or another group, when it comes to harming, it is the out-group to which the desire to harm is directed (5). When fans have strong negative emotions such as hatred towards a team, the target of such hatred is not limited to the team, but often the fans of that team also become the object of hatred (51). As a result, group behaviour, competition and the resulting hatred play an important role in sport competitions.

Tajfel (59) indicates that the effects of belonging to a group cause some psychological changes in individuals. When the subject is evaluated in this context, it can be stated that fan commitment directs fan behaviour. This proves why affective commitment is at the centre of our study. In the sport sciences literature, the concept of fan commitment is defined as the process of developing emotional and psychological attachment to an object (team, player, etc.) related to sports (22). In the context of sports teams, commitment represents the psychological meaning and value associated with the reactions and tendencies revealed by a sports team (23, 50). Commitment is manifested in the mind as specific tendencies or responses that involve strong internal relationships with the team or other team-related objects. This internal process helps to explain how the connection is established with external forms (e.g., success, stadium, etc.) and to adopt internal psychological significance (27). In fact, commitment is the most important actor in strengthening the emotional bonds between the fans and the team.

Studies on sports fandom generally aim to reveal the relationship between positive or negative attitudes of sports fans towards their teams and their fan behaviors. Funk and Pastore (23) revealed in their study that the psychological commitment of fans is very important in discovering their attitudinal loyalty. Regarding this situation, Krosnick (42) stated that attitudes have an important detail in revealing the subjective beliefs of individuals. In this case, commitment represents the psychological significance and value of an attitude towards an object. This situation emerges as a result of the process of identification of the fans' personal interests and social identities with their team (3). The possible outcome of this process may have a positive effect on the individual's interest in his/her team and his/her desire to attend more matches, while it may also bring about negative emotions such as hatred. Emotion-based relationships towards the favourite team are similarly hatred-based towards the opposing team. As revealed in the study, this is experienced at the level of fan commitment and identity. The results support the pioneering studies (9, 31, 68) related to team identity in the sport sciences literature and provide insights into the related phenomena in parallel with current approaches. In this context, revealing fan commitment and the structures associated with this commitment is of vital importance for the sustainability of football clubs.

When the literature is examined, it is observed that research on hatred in sports is generally focused on fan hatred (34, 43, 56, 61). When a person starts to hate the elements of the opposing team, he/she tends to show violent and aggressive behaviours, which are the consequences of hatred. In addition, when a person becomes a fan, s/he also has feelings of loyalty and passion towards the team s/he supports in contrast to the feelings of hatred s/he has for the elements of the opposing team (69). In addition, although it may seem contradictory, it is also true that hatred brings along some elements of respect or admiration for the opposing side (53). In other words, Sabah Çelik (53) emphasised in his study on Ankaragücü fans' hatred of Beşiktaş that some positive emotions and hatred may be intertwined. In this qualitative study, it was determined that Ankaragücü fans respect the team they hate and regard the fan group as an effective group.

The present study addresses the complex relationship between sports fans' psychological commitment to their teams and opponents. The model proposed in the study was constructed in accordance with social identity theory (58) and mixed emotions theory (Larsen et al., 2001). Social identity theory assumes that in-group love and hatred towards the out-group, the main competitor of the group, are mutually related (5). The stimulation of these mixed feelings of love and hatred can occur simultaneously in competitive situations where the opponent's victory is one's loss (28). However, by emphasizing that "group love is not a necessary precursor of out-group hatred", Brewer (5) argues that feelings of respect and hatred may be of different dimensions for different fans. Accordingly, in the study, the effect of psychological commitment dimensions (personal identity, affective commitment, resource cost, psychological cost, social obligation and regional tribalism) to their team, formed as a result of the meanings that the fans attribute to their group membership, on the respect and hatred towards opponents will be evaluated according to the social identity theory. In particular, although studies on this subject in the field of sports management have focused on the mechanisms of fan rivalry (1), positive effects (70) and negative effects, studies on variables that may affect the feeling of respect and hatred towards opponents are quite limited. These studies have shown that competition in the sports environment increases the emotional intensity of the fans, which may exacerbate negative fan behaviours based on in-group/out-group distinctions (47). Specifically, an increasing number of studies have shown that identification with a sports team predicts negative emotions such as schadenfreude (taking pleasure in misfortunes and unhappiness of others) (9). When the literature is examined, it is seen that the identification of football fans with their teams and the level of respect for opposing views are limited to studies examining demographic variables (15, 29, 75). In this respect, it is considered that the study will make an important contribution to the literature. Therefore, the aim of the study is to examine the effect of the fans' perceptions of psychological commitment to their teams on respect and hatred towards opponents.

METHOD

In this study, based on the quantitative research design, the general survey model and relational survey models, in which the whole population or a sample taken from a population consisting of many elements is scanned to reach a general judgment about the population, were used (36).

This study aims to examine the effect of fan psychological commitment on perceptions of hatred and respect towards opponents. Within the scope of the study, hypotheses were developed based on the explanations obtained through the literature review and the research model was formed as follows.

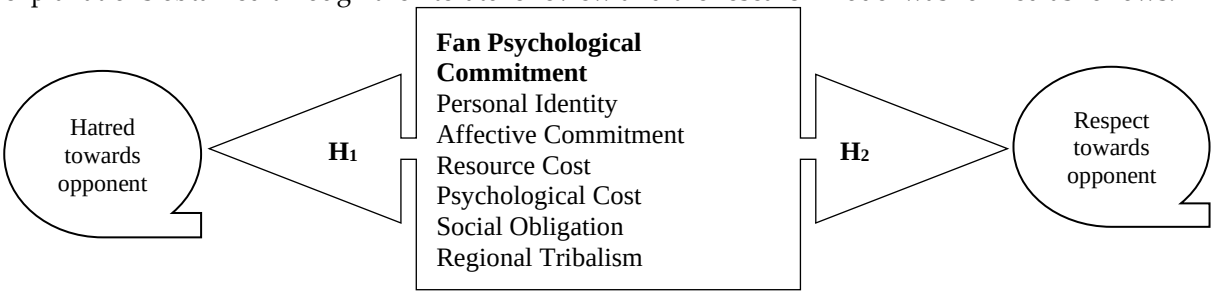

Figure 1. Research Model

H1: Fan psychological commitment affects the hatred towards opponent.

H1a: Fan personal identity affects the hatred towards opponent.

H1b: Fan affective commitment affects the hatred towards opponent.

H1c: Fan resource cost affects the hatred towards opponent.

H1d: Fan psychological cost affects the hatred towards opponent.

H1e: Fan social obligation affects the hatred towards opponent.

H1f: Fan regional tribalism affects the hatred towards opponent.

H2: Fan psychological commitment affects the respect towards opponent.

H2a: Fan personal identity affects the respect towards opponent.

H2b: Fan affective commitment affects the respect towards opponent.

H2c: Fan resource cost affects the respect towards opponent.

H2d: Fan psychological cost affects the respect towards opponent.

H2e: Fan social obligation affects the respect towards opponent.

H2f: Fan regional tribalism affects the respect towards opponent.

Study Group

The 2021-2022 Football Season was taken as a basis in the determination of the study group, and the fans of the clubs, described as the big three (Beşiktaş, Fenerbahçe and Galatasaray), residing in Konya constituted the population of the study. The survey was applied with the convenience sampling approach, and 500 participants were surveyed at the exits of the stores of these clubs. Before the questionnaire forms were distributed to the fans, detailed information was given about the purpose of the study, the data collection tool and the correct filling of the data collection tool. The principle of voluntary participation was taken as a basis in the study and only the fans who voluntarily wanted to participate in the study were given a questionnaire form. However, only 400 questionnaires were included in the analysis after the incomplete and incorrect ones were eliminated.

Table 1. The Demographic Information of the Participants.

		f	%
Gender	Female	196	49,0
	Male	204	51,0
Favorite football team/club	Galatasaray	145	36,3
	Fenerbahçe	129	32,2
	Beşiktaş	126	31,5
		Mean	**ss**
Age		25,18	8.00

A total of 204 male (51%) and 196 female (49%) fans between the ages of 16-60 (X = 25.18±8.00) participated in the study voluntarily. It was determined that 145 (36.3%) of the participants were Galatasaray fans, 129 (32.2%) were Fenerbahçe fans and 126 (31.5%) were Beşiktaş fans (Table 1).

Data Collection Tools

Personal Information Form

The Personal Information Form, which was created to collect data on the independent variables of the study, consists of four questions (gender, age, education level, occupation).

Respect for Opposite Opinions and Self-Control Scale in Sports

In the study, the "Respect for Opposite Opinions and Self-Control Scale in Sports", the validity and reliability of which was studied by Gülle (30), was used as a data collection tool. The scale was prepared according to the 5-point Likert-type rating method and consisted of a total of 15 questions. The scale consists of two sub-dimensions. These sub-dimensions are named as "respect towards opponent" and "hatred towards opponent". According to the results of Principal Components Analysis, there are six items related to the "Hatred towards opponent" factor of the scale, and the factor loading values of the items vary between .462 and .702 and the factor explains 28.68% of the total variance. The second factor is "Respect Towards opponent" and there are nine items related to this factor, and the factor loading values of the items vary between .519 and .782, and the factor explains 10.15% of the total variance. Accordingly, the amount of variance explained by the two factors was calculated as 38.83%. In the validity and reliability study of the scale, it was stated that the Cronbach's Alpha value of the hatred towards the opponent sub-dimension was calculated as (.80) and the Cronbach's Alpha value of the respect towards the opponent sub-dimension was calculated as (.81).

Fan Psychological Commitment Scale

"Fan Psychological Commitment Scale" was developed by Matsuoka 2001 year to determine the psychological commitment of fans. The Turkish adaptation, validity and reliability study of the scale was carried out by Bozgeyikli et al (4). "Fan Psychological Commitment Scale" consists of 30 items including Personal Identity (6 items), Affective Commitment (5 items), Resource Cost (4 items), Psychological Cost (4 items), Social Obligation (4 items) and Regional tribalism (7 items). Confirmatory factor analysis for the construct validity of the scale showed a good fit (x^2= 933,737, sd= 390, RMSEA= .055, CFI= .908, TLI= .898, SRMR=.055). Cronbach's Alpha coefficients calculated based on item analysis for the reliability of the scale were .86 for the personal identity factor, .84 for the affective commitment factor, .78 for the resource cost factor, .89 for the psychological cost factor, .81 for the social obligation factor, .87 for the regional tribalism factor, and .93 for the whole scale (4).

Analysis of Data

Skewness and kurtosis values of the data were analysed to determine their conformity to normal distribution. In the normality test, the skewness and kurtosis values of the data were taken as a base in the range of -1.5 + 1.5 (57). In our study, the Skewness and Kurtosis values are in the range of -1.5 +1.5. Based on this information, it was decided that the data were in accordance with the normal distribution. In addition, Pearson Correlation test was used to investigate the relationship between the level of identification with the team and the perception towards team image. Pearson correlation test results between “0.70-1.00” as an absolute value indicate the presence of a high level relationship, between “0.30-0.70” indicate a moderate level relationship, and between “0.00-0.30” indicate a low level relationship (6). Multiple Regression Analysis was

performed to determine the extent to which the sub-dimensions of psychological commitment to the team predicted hatred towards the opponent and respect towards the opponent.

FINDINGS

Table 2. Correlation Analysis of the Relationship between Football Fans' Respect and Hatred towards the Opponent and Their Psychological Commitment.

		Personal Identity	Affective Commitment	Resource Cost	Psychological cost	Social Obligation	Regional Tribalism
Hatred towards	r	,522**	,405**	,564**	,553**	,566**	,352**
Opponent	p	,000	,000	,000	,000	,000	,000
Respect towards	r	-,043	,007	-,142**	-,091	-,170**	,071
Opponent	p	,387	,886	,004	,068	,001	,158

It was determined that there was a positive moderate relationship between hatred towards opponent sub-dimension of Respect for Opposite Opinions and Self-Control Scale in Sports and personal identity (r=0.522; p<0.01) affective commitment (r=0.405; p<0.01), resource cost (r=0.564; p<0.01), psychological cost (r=0.553; p<0.01), social obligation (r=0.566; p<0.01), and regional tribalism (r=0.352; p<0, 01) sub-dimensions of Fan Psychological Commitment Scale. It was found that there was a low level negative relationship between respect towards opponent sub-dimension of Respect for Opposite Opinions and Self-Control Scale in Sports and the resource cost (r=-0.142; p<0.01) and social obligation (r=-0.170; p<0.01) sub-dimensions.

Table 3. Linear Regression Analysis for the Prediction of Hatred towards Opponent, a Sub-Dimension of Respect for Opposite Opinions and Self-Control Scale in Sports.

Predicted Variable	*Predicting Variables*	B	*Standard Error*	β	t	p
Hatred towards Opponent	(Stationary)	,753	,181		4,165	,000
	Personal Identity	,365	,101	,307	3,606	,000*
	Affective Commitment	-,199	,092	-,168	-2,160	,031*
	Resource Cost	,235	,068	,238	3,448	,001*
	Psychological Cost	,104	,096	,099	1,085	,278
	Social Obligation	,250	,080	,228	3,142	,002*
	Regional Tribalism	-,070	,073	-,056	-,957	,339
	Multiple R= .625 R^2=.391 Adj R^2 = .381 $F_{(6,393)}$ = 41.985, p=0.00 < .05					

p<0,05*

According to the findings of the study, hatred towards opponent sub-dimension of Respect for Opposite Opinions and Self-Control Scale in Sports forms a significant model with the sub-dimensions of Fan Psychological Commitment Scale. Personal identity, affective commitment, resource cost, psychological cost, social obligation and regional tribalism sub-dimensions of Fan Psychological Commitment Scale explain 39.1% of the total variance (R=.625 R2=.391, F (6,393) = 41.985, p=0.000 <.05) of hatred towards opponent sub-dimension of Respect for Opposite Opinions and Self-Control Scale in Sport. As a result of the Regression Analysis, it was found that there was a positive relationship between Hatred towards opponent and personal identity (β=.31, p<.001), resource cost (β=.24, p<.001) and social obligation (β=.23, p<.001) and a negative relationship between hatred towards opponent and affective commitment (β=-.17, p<. 001). It was also seen that the psychological cost (β=.01, p>.05) and regional tribalism (β=-.06, p>.05) sub-dimensions of Fan Psychological Commitment Scale did not have a significant predictive effect on Hatred Towards Opponent. Accordingly, hypotheses H1a, H1b, H1c and H1e were accepted, while hypotheses H1d and H1f were rejected.

Table 4. Linear Regression Analysis for the Prediction of Respect towards Opponents, the sub-dimension of Respect for Opposite Opinions and Self-Control Scale in Sports.

Predicted Variable	*Predicting Variables*	B	*Standard Error*	β	t	p
Respect towards Opponent	(Stationary)	3,516	,175		20,039	,000
	Personal Identity	-,054	,098	-,057	-,545	,586
	Affective Commitment	,085	,090	,091	,946	,345
	Resource Cost	-,052	,066	-,066	-,784	,433
	Psychological Cost	,027	,093	,032	,288	,774
	Social Obligation	-,263	,077	-,304	-3,405	,001*
	Regional Tribalism	,239	,071	,242	3,365	,001*
	Multiple R= .280 R^2=.078 Adj R^2 = .064 $F_{(6,393)}$ = 5.572, p=0.00 < .05					

p<0,05*

According to the findings of the study, Respect towards Opponents sub-dimension of Respect for Opposite Opinions and Self-Control Scale in Sports forms a meaningful model with the Fan Psychological Commitment Scale sub-dimensions. Personal Identity, Affective commitment, Resource Cost, Psychological Cost, Social Obligation, and Regional tribalism sub-dimensions of Fan Psychological Commitment Scale explain 7.8% of the total variance of Hatred Towards Opponent sub-dimension of Respect for Opposite Opinions and Self-Control Scale in Sports (R .280 R2=.078, F (6,393) = 5.572, p=0.000 <.05). As a result of the Regression Analysis, it was found that there was a positive relationship between Hatred towards the opponent and regional tribalism (β=.24, p<.001) and a negative relationship between Hatred towards the opponent and social obligation (β=-.30, p<.001). On the other hand, it was found that personal identity (β=-.06, p>.05), affective commitment (β=.09, p>.05), resource cost (β=-.07, p>.05), and psychological cost (β=. 03, p>.05) sub-dimensions of Fan Psychological Commitment Scale had no significant predictive effect on Respect Towards Opponent. Accordingly, hypotheses H1e and H1f were accepted, while hypotheses H1a, H1b, H1c and H1d were rejected.

DISCUSSION

As a result of the Multiple Regression Analysis conducted to reveal how the variables (sub-dimensions) of psychological commitment to the team, which were thought to have an effect on the hatred towards the opponent, predict the hatred towards opponent, the joint interactions of these variables showed a significant relationship with the hatred towards opponent. The sub-dimensions of psychological commitment to the team explain 39% of the hatred towards opponent. The effect levels of significant predictors on hatred towards opponent were determined as personal identity, resource cost, social obligation and affective commitment, respectively. While affective commitment has a negative effect on hatred, personal identity, resource cost and social obligation have positive effects.

Personal identity is the most determinative psychological commitment dimension on hatred towards opponent. Based on Tajfel and Turner's theory of social identity (58, 62, 63), personal identity is simply defined as the feeling of being one with a team or belonging to a team that defines one's self-identity. In the study, it can be said that fans who feel belonging to the team they are a fan of and who identify with their team adopt hatred towards opponent more. This result in the study is due to the fact that hatred towards an outside group is directly related to belonging to the group (5). In a study conducted on this subject with similar results, it was determined that identification with the team predicts negative feelings towards other fans (9). It would be more appropriate to address the hatred towards opponent resulting from identification with the group or the team in a way to include group behaviours since it is not only a personal feeling. Moreover, the concept of hatred, with its different levels, can be considered as a natural consequence of belonging to a group. Because it is argued that hatred towards the out-group and favouritism towards the in-group are two inseparable phenomena, in other words, the attitude towards the in-group and the attitude towards the out-group have a mutual negative effect on each other (5). It can even be argued that out-group hatred is more dominant than in-group favouritism. The reason for this is that people not only identify themselves with the group they belong to, and in the case of fandom, with the team and fan group, but also identify the fans of the opposing team with the opposing team (26). Fear, anger or hostility towards the out-group occurs when the perception arises that the opposing group poses a threat to the interests or existence of the current group (5). The

predominance of fear or anger depends on the severity of the hatred (76). Accordingly, although individuals differ in their willingness to benefit the group they are in or another group, when it comes to hatred, it is the out-group that the hatred is directed towards. This is especially true for fandom. The in-group emphasises the characteristics and achievements that are considered positive against the out-group. Accordingly, it is suggested that the fans of the opposing team are characterised as "bad fans" and are thought to be not as loyal as themselves (51). The achievements of the out-group are ignored by the group members if it is accepted that the in-group is more successful in other issues that are important for group identity (5). It is stated that the root of intense negative emotions such as hatred among fans is that strategic sports such as football are based on the old war culture (26). Therefore, it is not surprising to see that football fans not only praise the team they support, but also make negative attributions about the opposing team, thus developing a state of hatred. When fans have strong negative emotions such as hatred towards a team, the target of such hatred is not limited to the team, but often the fans of that team also become the object of hatred (51).

Another result of the study is the effect of high perceived resource cost on the hatred towards opponent. Resource cost refers to the investment in money, effort, or time emerged in the transition from one service provider to another (10, 52). Considering this in terms of fans, there may be more than one team in the same sports branch in big cities. Therefore, the fan has the option to change commitment between teams. The size of this investment is proportional to the time and energy spent for clearly expressing one's commitment to a team. This component of commitment has not been adequately discussed in fan behavior studies. A fan may maintain a close relationship with his/her team because s/he has invested money, effort and time in such a commitment. This relationship, like personal identity, triggers hatred towards opponent.

In the study, another fan psychological commitment dimension, which has a similar effect to the resource cost on the hatred towards opponent, is social obligation. Kahle, Kambara, and Rose (35), in their conceptual model of fan involvement, argued that obligation is one of the critical motivational factors for fan involvement. Social obligation is defined as the commitment based on the fan's conformity to social norms and pressure from significant others. Social structures are defined as “social expectations or norms that create a sense of obligation to remain active” (54), while Etzioni (19) states that they are based on “members' sensitivity to the pressures of primary groups”. Considering that this form of commitment is a sense of obligation fostered by social norms and pressures (35), its effect on hatred towards opponent can be evaluated as an expected situation for fans. Although this is not considered to be a very desirable situation, the pressure of other groups (managers, fan leaders, etc.) may have affected this situation.

One of the interesting results of the study is that although fans' affective commitment to their team is not very effective compared to other psychological commitment dimensions (personal identity, resource cost and social obligation) that are effective on hatred towards opponent, the increase in affective commitment to their team decreases hatred towards opponent. Fandom is not only limited to individual belonging to a particular team (personal identity), but also includes shared common spaces, connections with other fans, and common emotional and behavioural reactions (33). In this framework, it is observed that the concept of hatred towards the other team in fandom is not only related to personal identity, but also includes emotional state. The personal identity component and the affective commitment component are distinguished from each other by the different foundations from which they originate. While the personal identity component of psychological commitment is based on the fans' desire to develop and maintain their personal identity, the affective commitment that develops over time is based on loving a team, "a commitment or devotion to a particular team based on the spectator's interest in the team (67). In fact, in a different aspect, affective commitment is the commitment formed by respect for the goals and rules of the event or club, love and respect for managers, emotional closeness, sharing of organisational vision and mission. When the issue is considered in this respect, it is possible that the fans who feel that they act in accordance with the values and rules do not look favorably on an undesirable phenomenon in football, such as hatred. In fact, the emphasis in Brewer's (5) study that "group love and commitment is not a necessary precursor of out-group hatred" is considered important. Brewer (5) stated that the combination of feelings of love and hatred may have different dimensions for different fans. In the study conducted by Durgutluoğlu (14), which supports our findings, negative relationships were reported between affective commitment, which is the dimension of psychological commitment, and the "tendency towards violent thoughts and actions" and "corporate belonging" fanaticism levels. In addition, fans are emotionally committed to their teams. However, in practice, it is also possible to

be a fan and not be a spectator, or to be a spectator but not be a fan (17, 18). These situations may have affected the result of this study, which we find interesting.

When the literature was examined, no research findings were found on the relationship between psychological commitment to the team or its dimensions and hatred towards opponent. There are mostly studies on the effect of psychological commitment on fanaticism and aggression (8, 13, 14, 25, 65, 71) reputation (12), consumption behaviour (49, 64), identification (13). Considering that the hatred of the fans towards the opposing team or the opposing team's fans is generally associated with negative fan behaviors (fanaticism, aggression), it can be said that the related studies are partially similar to our findings.

As a result of the Multiple Regression Analysis conducted to reveal how the variables (sub-dimensions) of psychological commitment to the team, which were thought to have effects on respect towards opponent, predicted respect towards opponent, the joint interactions of these variables showed a significant relationship with respect towards opponent. The psychological commitment to the team sub-dimensions explain 8% of the respect towards opponent. Respect is not only one of the core values, but also the foundation of many values (46). Since there are many different variables affecting respect, which is based on morality and politics and emphasises a democratic and egalitarian understanding of life, it is an expected result that the power of psychological commitment to the team to explain respect towards the team is low among the fans. In the literature, there are very few studies that theoretically examine respect behaviour specific to fans. The fact that respect behaviour is included in the definition of sportsmanship and seen as its sub-dimension (16, 39, 66) and that respect is referred to for fair play behaviour in sports (20) strengthens the negative relationship of respect with undesirable behaviours in sports (violence, aggression, fanaticism, hatred).

The effect levels of significant predictors on respect towards opponent were determined as social obligation and regional tribalism, respectively. While social obligation has a negative effect on respect, regional tribalism has a positive effect. According to the findings of the study, the positive effect of social obligation, as in hatred towards opponent, similarly affected the respect towards opponent negatively. Although it is considered as an undesirable situation, social obligation, which is a type of commitment based on the fans' compliance with social norms and pressure from important people, has also prevented the fans from respecting the opponent with the influence of other people (manager, fan leaders, etc.). Although there is no similar study in the literature, Shields, Funk, and Bredemeier (55) found a negative relationship between moral distancing and sportsmanship orientation. Kavussanu et al. (37) and, Kavussanu, and Ring (38) found a negative relationship between moral distancing and prosocial behaviours and a positive relationship between moral distancing and antisocial behaviours. The research findings of Koç and Yeniçeri (41) and Koç and Seçer (40) also indicated that the level of respect positively affects sportsmanship behaviors. These results are partially similar to the findings of our study.

Another result of the study is that the high perception of regional tribalism has a positive effect on respect towards opponent. In their fan behavior study on factors affecting fan involvement, Laverie and Arnett (45) suggested that the concept of regional tribalism should be taken into account. Regional tribalism refers to “the extent to which an individual values or identifies with a particular environment” (48). From the fan's perspective, regional tribalism is defined as the commitment based on the perception of connection between the team and the place where the fan is affiliated to (e.g. a city, region, and university). In the findings of our study, it was determined that fans with this commitment have higher respect towards opponents. This may be due to the fans of the teams that make up our study group. This can be explained by the fact that these fans are Beşiktaş, Fenerbahce and Galatasaray fans from the teams of Istanbul province, and that the teams are relatively more established teams and that the fans are more respectful to their opponents. Furthermore, in their conceptual model of fan involvement, Kahle, Kambara, and Rose (35) suggested that regional tribalism is a critical motivational factor for fans to attend matches, and stated that fan cohesion with other fans is "the need to show public support for the home team through attendance". Kahle, Kambara and Rose (35) stated that this can explain the result of our findings to a certain extent.

As a result, relationships were determined between the psychological commitment of sports fans and their respect and hatred towards opponents. While it is determined that the high psychological commitment of sports fans increases the hatred towards opponents, it can be said that their psychological commitment is not very effective on respect. It is considered that the findings of the study will make important contributions

to both the relevant literature and more effective policies to be developed for the prevention of violence in football. In this context, accurately identifying the reasons affecting the hatred and respect of fans towards opponents will contribute to the development of solutions for the prevention of aggression in football. In addition, there are some limitations of the study. The fact that the study was conducted only on Beşiktaş, Fenerbahçe and Galatasaray fans negatively affects the generalisability of the study. The application of the study to other clubs other than the fans of the three big clubs may provide more information about the psychological commitment of the fans and their respect and hatred towards the opponent throughout Turkey. In addition, the research data were applied to the fans who shopped from the stores of the relevant clubs. The application of the study to the fans who constantly attend the matches of their teams or who are members of fan groups may contribute to obtaining more efficient results.

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Monitoring The Reactions of Athletes With History of Rectus Femoris Proximal Tear Healed With Different Methods to Training Load With Thermography

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Abstract

Although rectus femoris (RF) injuries are rare, it is an important muscle that should be considered because of its contribution to actions such as shooting and fast running in football. In the literature, there is no consensus on which conservative or surgical methods should be preferred in RF total rupture. Although MRI is the gold standard method in the detection of injury, there is a controversy in the literature for post-injury imaging and follow-up. In addition, there is a lack of diagnostic imaging methods in the literature on how training load affects athletes. In current study, the effect of training load on athletes is evaluated by thermography after treatment of the RF muscle with different methods. This study is worthy of being a case report in terms of providing evidence on how the training load affects the sports lives of athletes who return to sports after surgery or conservative treatment.
Keywords: Sports injury; Exercise; Rectus femoris; Rehabilitation; Sports medicine; Thermography

Farklı Tedavi Yöntemi İle İyileşmiş Rektus Femoris Proksimal Yırtığı Öyküsü Olan Futbolcuların Antrenman Yüküne Verdikleri Tepkilerin Infrared Görüntüleme İle Takibi

Özet

Rektus femoris yaralanmaları nadir görülen yaralanmalardan olmakla birlikte, futbol sporunda şut atma ve hızlı koşu gibi eylemlere katkısından dolayı üzerinde durulması gereken önemli bir kastır. Lietaratürde RF total rüptüründe konservatif veya cerrahi yöntemlerinden hangisinin tercih edilmesi gerektiğine dair bir fikir birliği bulunmamaktadır. Yaralanmanın tespitinde MR altın standart yöntemi olmasına rağmen yaralanma sonrası görüntüleme ile takip için de literatürde fikir birliği yoktur. Buna ilaveten literatürde antrenman yükünün sporcuları nasıl etkilediğine dair diagnostik görüntüleme yollarında da eksiklik bulunmaktadır. Yapmış olduğumuz bu çalışmada RF kasının farklı yollar ile tedavisi sonrası antrenman yüküne karşı sporcuların etkileniminin termografi ile değerlendirilebileceğini düşünmekteyiz. Cerrahi veya konservatif tedavi ile spora dönen sporcuların spor yaşamlarında antrenman yükünün nasıl etkilediğine dair kanıtlar sunması açısından vaka sunumu olmaya değer bir çalışma olduğunu düşünmekteyiz.

Anahtar Kelimeler: Spor yaralanması; Egzersiz yapmak; Rektus femoris; Rehabilitasyon; Spor ilacı; Termografi

INTRODUCTION

The rectus femoris (RF) muscle is one of the four parts of the quadriceps femoris, and the caput rectum starts from the anterior inferior of the spina iliaca, and the caput reflexum starts from the os ilium above the acetebulum. The two heads come together in front of the hip joint, this muscle, which is bipennate, ends in the patalle as a common tendon (29). The RF muscle is separated from the other parts of the quadriceps by containing more type II fibers than the other parts of the quadriceps muscle and folding two joints (12). RF muscle has an important place in football sports due to its role in the actions of running faster and shooting (16). In RF injury, which is common in football players, chronic injuries occur near the origin of the muscle, while acute injuries occur more often in the lower parts (13, 19). RF injuries are usually caused by eccentric loading of the hip flexors and knee extensors (3, 18). The knee joint can be torn in case of its sudden and forceful extension. The upper part of the muscle is pulled up and a gap is formed at the rupture site (28). Rupture of the RF muscle is a difficult type of injury to follow because it is rare and often overlooked. Conservative treatment takes about 6-12 weeks (9). Although the diagnosis of RF injuries can be made by both ultrasonography (5) and MRI, the gold standard method is MRI. Follow-up is important in terms of shortening the recovery period, preventing the formation of complications, and reducing the immobility period (25). However, there is no definite protocol for the treatment after RF injuries in the literature (29). In recent years, it has been stated that potential sports injuries can be determined in studies on sports injuries with thermography. By evaluating the asymmetry between the extremities of the athlete, thermography provides an inexpensive, non-invasive evaluation opportunity to those who are interested in athlete health (1, 11, 14). Thermography is also a method to determine and classify the grade of fatigue (7).

MATERIALS AND METHODS

In our research, we tracked professional Turkish Super League football players during their injury treatment process with the approval of the KTO Karatay University Medical Faculty Ethics Committee (date: 24.04.2020 and no: 2020/005). The concept of the study was clearly explained to the participants and their written concents were taken before IR imaging.

Case 1

The 22-year-old (172 cm, 72 kg) offensive player could not complete the match in the Turkish Super League due to the pain in the anterior thigh area. While the player was attempting to shoot with his right foot during the match, his left foot was caught in the grass and his left quadriceps muscle was overstretched. In the post-match examination of the player, there was a temperature difference on the right and left, and pain in the proximal left rectus femoris. He said that he felt a burning sensation when the actor flexed the active hip joint and regressed the hip joint. Grade III muscle strain interpretation was performed with loss of muscle-tendon continuity in the proximal left thigh. Grade III rectus femoris injury was reported in the MRI examination of the same date. Conservative treatment method was applied to the actor. The player participated in the training at the beginning of June 2010, which is 72 days after the rehabilitation practices, and returned to the field (Fig. 1).

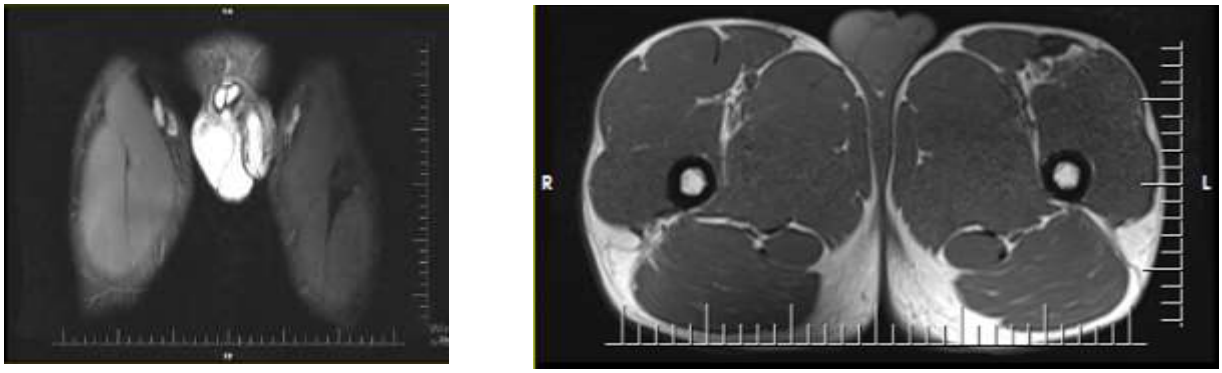


Figure 1: Case 1: RF grade III injury on the left side of the player, who returned to sports with conservative treatment, MR image after recovery

Case 2

A 31-year-old (189 cm 79 kg) attacking player, he was injured twice in the right rectus femoris region between March and April 2010. During the training on May 10, 2010, he could not complete the training with a sudden pain and burning sensation during the sprint. The investigations revealed a grade III injury on the proximal region of the right side RF muscle. The treatment of the athlete was carried out operationally. The athlete started training after 73 days (Fig. 4).

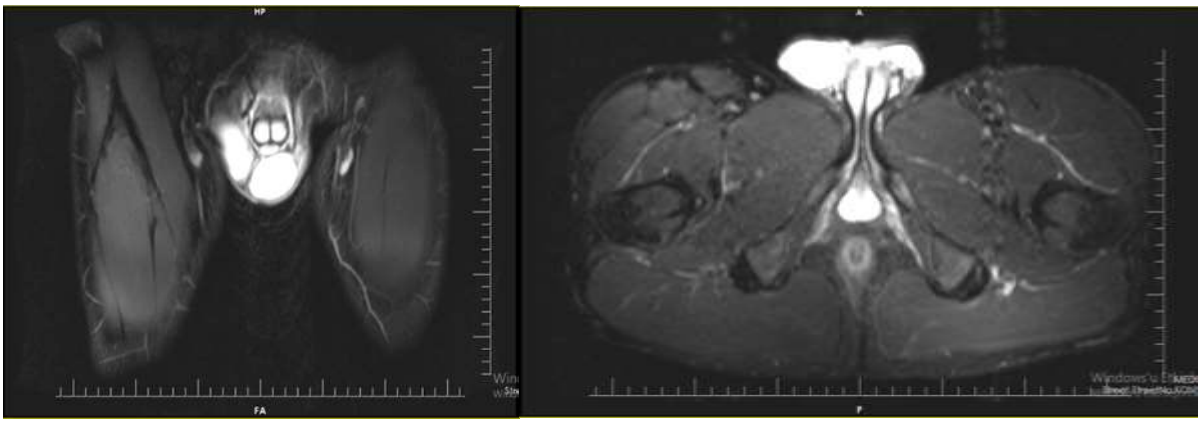
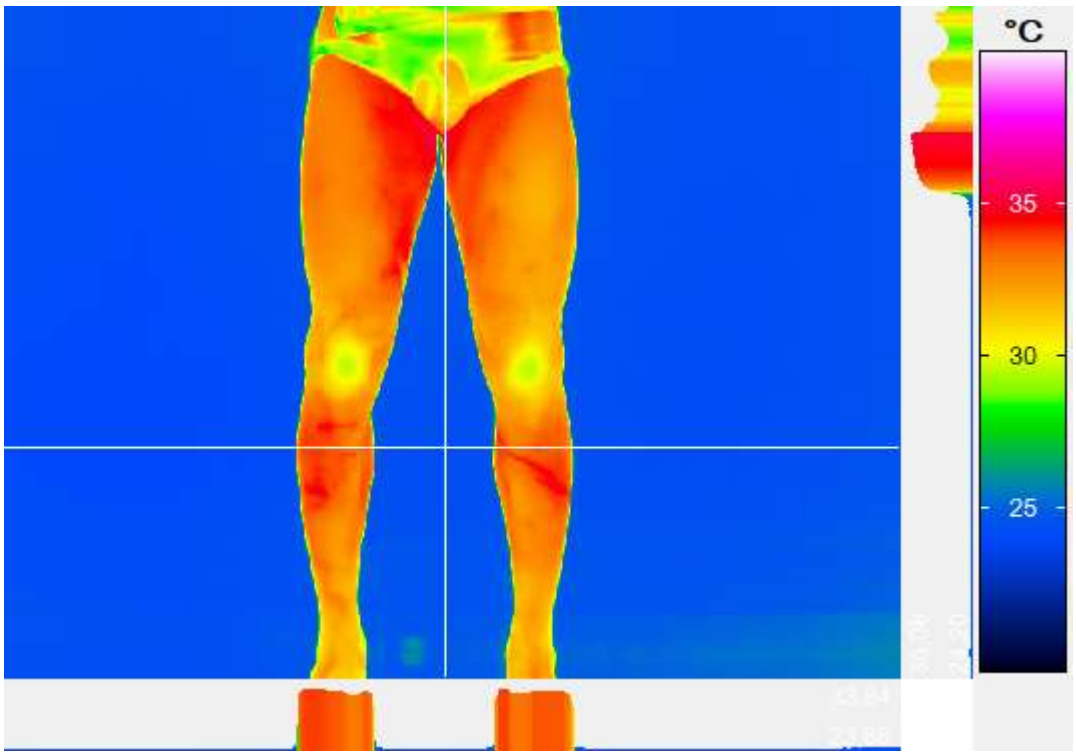


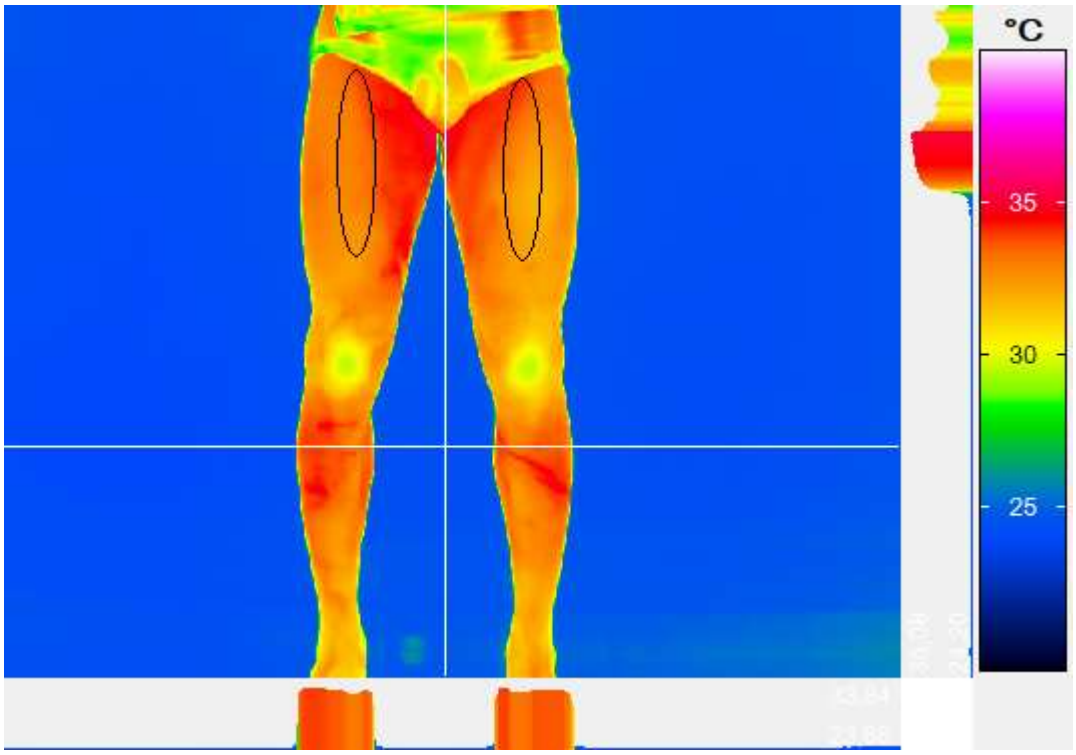
Figure 4: Case 2: Right side RF grade III injury that returned to sports with surgical treatment, MR image after recovery

RESULTS

Case 1

In the evaluation made before the training, it was seen that the average temperature difference between the right and left sides was 0.40 degrees, with the right side being higher, and the minimum temperature difference was 0.57 degrees. The maximum temperature difference was found to be 0.11 degrees higher in favor of the left side than in the right side (Fig. 2).

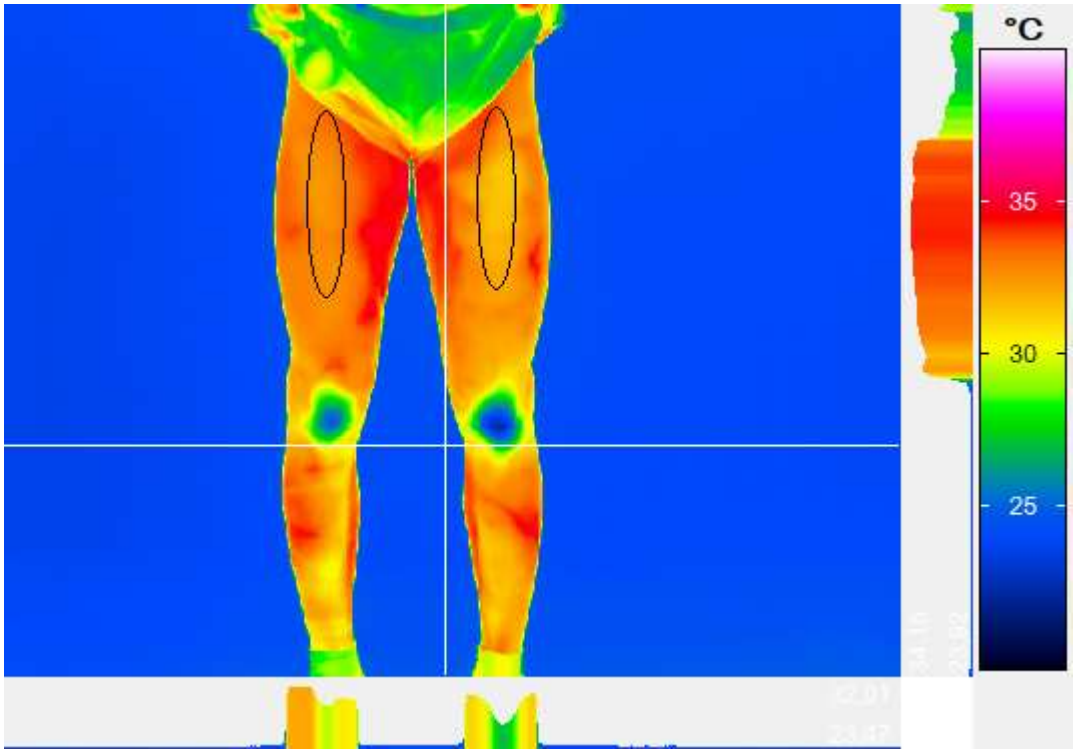




ID	Avg	Min	Max
E1	32,97	32,20	33,99
E2	32,57	31,67	34,10

Figure 2: Case 1 pre-training thermal image and temperature difference (E1: right side rectus region, E2: left side rectus region, Avg: average, min: minimum, max: maximum).

In the evaluation made after the training, it was seen that the average temperature difference between the right and left sides was 0.73 degrees, with the right side being higher, and the minimum temperature difference was 1.02 degrees. The maximum temperature difference was found to be 0.29 degrees higher in favor of the left side compared to the right side (Fig. 3).



ID	Avg	Min	Max
E1	32,66	32,25	33,59
E2	31,93	31,23	33,88

Figure 3: Case 1 post-training thermal image and temperature difference (E1: right side rectus region, E2: left side rectus region, Avg: average, min: minimum, max: maximum).

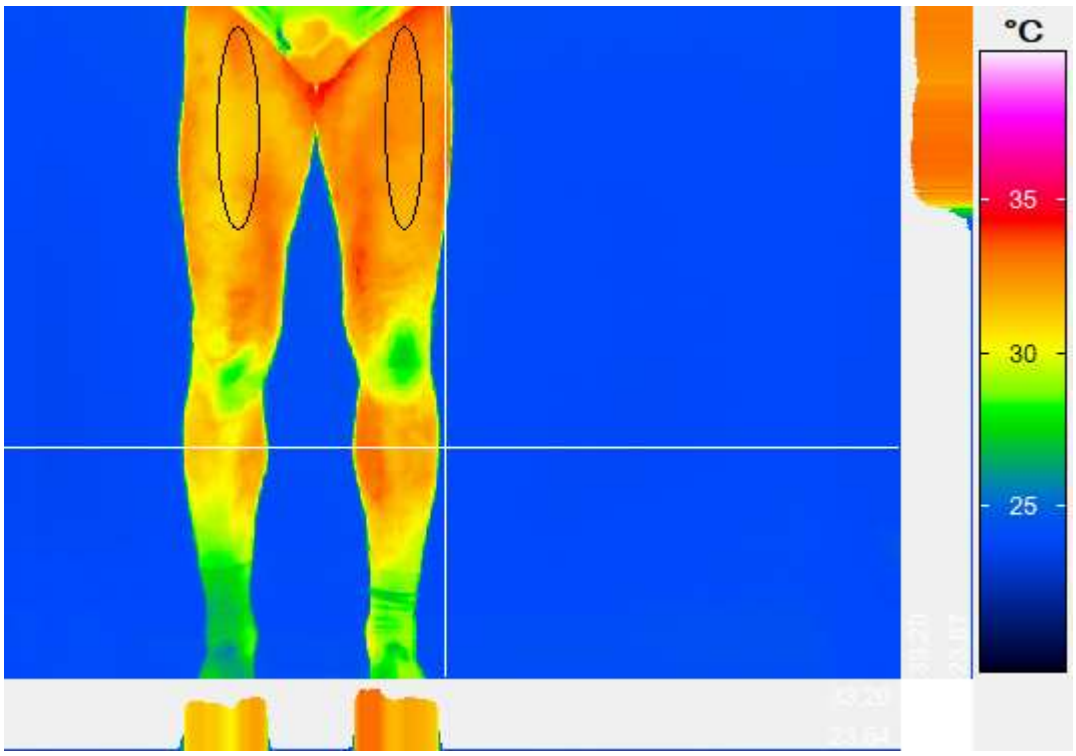
When we look at the values before and after the training, it was seen that the right and left side heat exchange differences were 0.33 degrees on average, a minimum of 0.45 degrees and a maximum of 0.18 degrees. This shows that before and after the training, the scissors between the right and left sides open in this difference size (Table 1).

Table 1: Case 1 temperature difference before and after training

Case 1	Mean Difference	Minimum Difference	Maximum Difference
Before the Training	0.40	0.57	- 0.11
After the Training	0.73	1.02	- 0.29
Change	**0.33**	**0.45**	**0.18**

Case 2

In the evaluation made before the training, it was determined that the average temperature difference between the right and left sides was 0.69 degrees, the minimum temperature difference was 0.70 degrees, and the maximum temperature difference was 0.30 degrees (Fig. 5).



ID	Avg	Min	Max
E1	31,62	30,74	33,15
E2	32,31	31,44	33,45

Figure 5: Case 2 pre-training thermal image and temperature difference (E1: right side rectus region, E2: left side rectus region, Avg: average, min: minimum, max: maximum).

In the evaluation made after the training, it was determined that the average temperature difference of the right and left sides was higher on the right side, 0.21 degrees, and the maximum temperature difference was 0.75 degrees. The minimum temperature difference was found to be 0.19 degrees higher on the left side (Fig. 6).

ID	Avg	Min	Max
E1	32,41	31,12	34,10
E2	32,20	31,31	33,35

Figure 6: Case 2 post-training thermal image and temperature difference (E1: right side rectus region, E2: left side rectus region, Avg: average, min: minimum, max: maximum).

When we look at the values before and after the training, it was seen that the right and left side heat exchange differences were 0.90 degrees on average, 0.51 degrees minimum and 1.05 degrees maximum. This shows that before and after the training, the scissors between the right and left sides open in this difference size (Table 2).

Table 2: Case 2 temperature difference before and after training

Case 2	Mean Difference	Minimum Difference	Maximum Difference
Before the Training	-0.69	-0.70	-0.30
After the Training	0.21	-0.19	0.75
Change	**0.90**	**0.51**	**1.05**

It was observed that the responses of case 1 and case 2 to the same training were different. It was observed that the thermal response of case 2, who recovered with surgical treatment, to the training load was higher.

DISCUSSION

While RF muscle injuries are common in sports, rupture of RF proximal tendons are rare injuries (8). Since RF proximal tendon injuries are rare, there is no definitive protocol on how to treat this injury (10, 23, 29). Treatment strategies for proximal injury of the RF muscle have been reported in the literature with good results with different techniques, both operatively and conservatively. In addition, it was stated that the type of disability and the patient's condition are decisive for the decision of conservative or surgical treatment (20). However, according to the literature research, there is no consensus on the treatment of RF proximal tendon rupture. While some studies suggest conservative treatment of sedentary people and operative treatment of athletes (29), some studies focus on the success of conservative treatment in sportive RF injuries (9, 15, 21) However, some studies emphasize that surgical treatment is a method that can be used in sports injuries (27). Although some researchers suggested that surgical management is a preferable alternative in the early period (17), Dalal et al. (2) showed that both conservative and operative treatment provided excellent results in proximal rectus femoris avulsions with similar rates of return to sports and incidence of complications.

Parallel to the lack of consensus on the treatment of the injury, there are currently no standardized recommendations regarding follow-up (20). For the discussion of the treatment method, first of all, correct diagnosis and evaluation are important (5). Along with clinical examination, imaging modalities play a key role in the diagnosis and evaluation of such injuries; clinical evaluation may be insufficient to distinguish contusions or to determine the extent of the lesion and the presence of muscle retraction (24). In ultrasound imaging, both static and dynamic images of the quadriceps muscle can be obtained; considering its low cost and practicality, it is an acceptable method as a first step in evaluation (5). However, MRI is more sensitive than ultrasound imaging in diagnosing these injuries and allows a multidimensional evaluation (4, 22, 25). MRI provides structural information of musculotendinous pathology at a resolution far beyond the capabilities of current ultrasound technology. This allows for more detailed grading of the injury (18). However, ultrasound examination can be considered as an alternative to serial imaging to follow up muscle and tendon injuries due to MRI costs and the inaccessibility of most physicians, however, it has been observed that ultrasound method can not detect changes in injury dimensions over time in quadriceps muscle injuries (6). Consequently, results of ultrasound imaging following muscle injury show that ultrasound resolution currently makes it relatively insensitive to predict or monitor clinical outcomes (23). As a result of all these, there is no consensus on how to follow up RF injuries in terms of rehabilitation follow-up. However, the effect of training load on the athlete with a history of injury cannot be determined without a follow-up protocol. Another result we obtained in these case reports was that 2 weeks later, the case giving more signals against operative and training had a rectus femoris grade II injury in the same region. In case 1, it was observed that the injury did not recur until the publication of the study. As a result, it is not possible to determine the training

load from imaging methods such as USG and MRI before injury occurs. We observed that pre-injury signals can be received thanks to IRT. The injury of Case 2 is the most important indicator of this. This study shows that training load is a tool that can be used to determine the risk of musculoskeletal injury. However, the most important aspect of the study is that it shows that IRT is a useful method in the follow-up of the recurrence of injuries in athletes with a history of injury.In this study, the response of the athletes, who have a history of RF proximal tendon injury and return to sports after treatment with different methods, the same training program was evaluated with infrared thermography. We determined that the thermal response of the athlete who recovered with operative treatment showed more change than the athlete who was treated conservatively. According to the results of our study, it can be said that the athlete who recovered conservatively adapts better to the stress caused by the training. Considering the effect of injury history on the risk of injury, it is suggested that the conservative treatment method is a better method. It is seen that infrared thermography method is an imaging method that can evaluate the training load more effective compared to other imaging methods. These two case reports we have presented in this study will contribute to future literature studies about RF proximal tears in terms of application of a follow-up protocol. We find this study worthy of a case report that can be used while comparing two elite football players who got conservative and operative treatments for their rectus femoris injuries and had the same training. On the other hand, these two cases who recovered in different ways were evaluated by using thermal cameras to see their reactions to the same training. Case 2 who possessed an injury risk had another rectus femoris injury in 2 weeks' time, and according to the data we had this fact is regarded as a significant data to be presented to the literature. In this study, we evaluated the training load with thermal cameras and so it is worth publishing so that it can be used as a case report to indicate injury risk indicator.

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Authors' contrıbutıons

All authors confirm that each of them have contributed equally to the manuscript during data collection, research, writing, editing and submitting. All authors read and approved the final manuscript.

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The authors declare that they have no conflicts of interest relevant to the content of this article.

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Examination of the Correlation Between Physical Education Teachers' Levels of Happiness and Psychological Well-being (Diyarbakır Province)

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Ethical Statement: It is declared that scientific and ethical principles have been followed while carrying out and writing this study and that all the sources used have been properly cited.

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Abstract

In this study, it is aimed to determine the relationship between these two variables by examining the happiness and psychological well-being levels of physical education teachers in terms of different variables. The sample group of this research consisted of a total of 252 physical education teachers, 124 female and 128 male, working in schools affiliated to the Ministry of National Education in Diyarbakir. Oxford Happiness Scale and Psychological Well-being Scale were used as data collection tools. According to the findings taken in the study, it was seen that the happiness and psychological well-being levels of physical education teachers were above the average. It was observed that the happiness and psychological well-being levels of physical education teachers did not differ according to gender, but differed according to age. In the comparison between physical education teachers' sports, exercise or physical activity status and happiness and psychological well-being, it was seen that there was a significant difference in favor of those who did sports, exercise or physical activity. While it was determined that there was a significant difference in favor of those participating in social activity in the psychological well-being levels of physical education teachers participating in social activities, it was seen that there was no difference between the happiness levels of physical education teachers and their participation in social activities. It was determined that there was a significant difference between the happiness and psychological well-being levels of physical education teachers and their self-identification in daily life in favor of the teachers who stated that they were peaceful and calm. As a result, it has been determined that there is a moderate and positive relevancy between teachers' happiness levels and psychological well-being levels.

Keywords: Happiness, Psychological Well-Being, Physical Education Teacher

INTRODUCTION

Many subjects that are significant in human life have been researched in psychology for many years. Psychological well-being has also been one of these issues. People can experience some hardships in their lives and that is important that they struggle against these hardships (28).

Even though it may seem so easy to explain the perception of happiness in the daily course of life, it is actually both very difficult to explain and exceedingly deep. Although words like excitement, joy, contentment and peace are generally perceived as defining happiness, they are not sufficient to fully explain happiness (22).

The person often experienced positive emotional states such as hope, joy, cheer, confidence; Having less experience of negative emotions such as sadness, hopelessness, fear, anxiety, hatred, and anger and being satisfied in life environments such as health, marriage or working environment are considered as outputs of happiness (12).

If a happy person in the team feels good, it affects both the team and himself. This increases efficiency. An athlete who has a higher happiness level will also rise his motivation level and achieve success even easier. A person's realization of happiness in the brain also reveals mental strength, and thus it becomes easier for the athlete to achieve success (28).

Scientists who go on their activities in the field of social sciences, which deal with individual and situational characteristics with different models, have tried to understand the well-being process. More than one expression or word that corresponds to the state of well-being in people are used. The perception of wellness, which is used to express people's health, includes expressions such as individual wellness, psychological well-being, positive or negative mood, life satisfaction, quality of life, which do not meet each other in meaning, but are related to each other. Because all of these statements are related to the conditions that affect the well-being of individuals (13).

Kıran (18) defined individuals with higher psychological well-being as those who struggle to ensure their own individual development and can continue their lives in line with their life goals. Ryff (23) explained wellness as the effort that a person makes to improve himself; therefore, while researching the concept of psychological well-being, he benefited from the studies of humanist existentialists and theorists working on the self. Therefore, the concept of psychological well-being; He expressed it in six dimensions: positive relations with other individuals, life goal, environmental dominance, self-acceptance, autonomy and personal development, and stated that it is expected that individuals with positive dimensions from these dimensions have higher levels of satisfaction with life and psychological wellness.

The psychological well-being of individuals is directly related to their psychological endurance. If individuals have a psychological endurance that can resist some sources of stress and reduce the effects of negative situations they encounter, their psychological well-being can increase in parallel with their endurance (20).

Taking part in sports, which is one of the techniques to overcome health problems caused by the tension and sedentary lifestyle created by the changing and developing social life, is gaining importance day by day. People may turn to sports for various reasons such as struggling with health problems, the need for socialization, etc. (4).

The problems caused by irregular and insufficient level of sports have led to the taking of necessary measures in most of the countries. In many countries, studies are carried out to increase the level of citizens doing sports and to protect public health (19). Since it is known that regular sports play an active role in preventing various ailments in every age group, countries develop policies accordingly. However, the sedentary lifestyle habits brought by technological innovation also affect the sports habits of individuals. In order to minimize the negative effects of technological developments on sports habits, countries or various institutions encourage individuals to engage in sports through different applications (2).

We can say that educators specializing in physical education and sports within educational institutions fulfill the most important duty to help sports become widespread in our country and to direct every student to sports. The fact that educators specializing in physical education and sports transfer their knowledge to

their pupils in a healthy way enables them to achieve professional success. In this respect, it is important for the teacher to be mentally healthy. It directly influences effective communication with students and academic advancement. Teachers with a positive attitude towards life are expected to do what is necessary for their students to gain course goals, and teachers with a positive opposing perspective are expected not to give up in the face of the difficulties they encounter in the lesson and to show the tendency to do their best in accordance with the needs of the age in order to help students to get the objectives of the lesson (14). Since the number of studies on the happiness and psychological well-being levels of educators specializing in physical education and sports is less, in this study, it was aimed to contribute to the literature by examining the correlation between the happiness and mental well-being levels of physical education and sports teachers.

MATERIAL AND METHOD

In this descriptive research, the correlational survey model was employed because it aims to explain the correlation between the mentalwell-being and happiness levels of physical education and sports teachers.

Population and Sample of the Research

Educators specializing in physical education and sports working in schools affiliated to MEB in Diyarbakır city constitute the population of the research. 252 educators who accepted to take part in the research voluntarily constitute the sample of the survey.

Data Collection Tools

In the information collection form of the research, "Personal Data Form" is used to measure the demographic characteristics of physical education teachers, "Oxford Happiness Scale" to measure their happiness levels, and "Psychological Well-being Scale" to measure their psychological wellness levels. The scales were administered to volunteer participants using the online questionnaire method.

Personal Data Form

It was employed by the researcher to measure the demographic qualities of educators specializing in physical education and sports through variables such as gender, age, sports/exercise/physical activity status, participation in social activities and self-identification status in daily life.

Oxford Happiness Scale

The happiness levels of individuals were gauged using the scale formulated by Hills and Argyle (16), which was subsequently adapted into Turkish by Doğan and Çötok (10). This single-dimensional scale comprises 7 items, with the 7th and 1st items functioning in a reversed manner. Respondents evaluate these items on a 5-point Likert-type scale, ranging from "Totally Agree" to "Totally Disagree." The scores taken from the scale indicate the degree of happiness, with higher scores showing greater happiness levels and lower scores indicating lesser happiness. The scale give satisfactory reliability, with a Cronbach's alpha coefficient of .74. In our study, the Cronbach's Alpha coefficient for the scale was found to be .71.

Psychological Well-being Scale

To assess psychological well-being, the Turkish version of the "Psychological Well-Being" scale was employed, as established by previous research (9, 27). This scale, encompassing 8 items, employs a 7-point Likert-type scale (ranging from 1 for "totally disagree" to 7 for "totally agree"). Higher scores on the scale are indicative of elevated levels of psychological well-being, whereas lower scores suggest a lower level of mental well-being. The Cronbach alpha internal consistency coefficient value was determined to be .80 for the Turkish form. The Cronbach Alpha internal consistency coefficient of the scale in our research was determined to be .89.

Statistical Analysis

The data acquired from the study were subjected to analyze in the SPSS.22 package program. Throughout the data analysis phase, various statistical methods were employed. Descriptive statistics were utilized to summarize the data, while the independent samples t-test was applied to make pairwise comparisons between groups. For the examination of differences among multiple groups, a one-way analysis of variance (ANOVA)

was conducted. To investigate the association between happiness and psychological well-being, the Pearson correlation test was employed. The significance level of .05 was considered in the interpretation of the results.

RESULTS

The statistical results showing the demographic information of the educators specializing in physical education and sports taking part in the research and the relationship between the applied scales and each other are given in the tables below.

Table 1: Results Regarding Demographic Information of Physical Education Teachers

Variables	Groups	n	%
Age	25 year and below	68	27,0
	26-30 years	100	39,7
	31-35 years	56	22,2
	36 year and +	28	11,1
	Total	252	100
Gender	Female	124	49,2
	Male	128	50,8
	Total	252	100
Regularly Attending Social Activities Except Exercise	Yes	156	61,9
	No	96	38,1
	Total	252	100
How Do You Describe Yourself In Daily Life?	Calm	100	39,7
	Peaceful	32	12,7
	Stressful	84	33,3
	Agressive	36	14,3
	Total	252	100

When the data on the ages of the teachers participating in the research are examined, 27% of them are 25 years old and below, 39.7% are in the 26-30 age range, 22.2% are in the 31-35 age range and 11.1% are 36 years old and above, 252 physical education teachers are seen. When the variable of gender of the educators specializing in physical education and sports in the study is examined, 49.2% of them are women and 50.2% of them are men. While 61.9% of the educators taking part in the survey regularly participate in social activities other than exercise, 38.1% do not participate regularly. 39.7% of the educators specializing in physical education and sports taking in the survey describe themselves as calm in daily life, 12.7% as peaceful, 33.3% as stressful and 14.3% as aggressive. In this case, it can be said that while some of the physical education teachers lead a comfortable life, an important part of them is stressful and aggressive.

Table 2: ANOVA Test Results of Physical Education Teachers' Happiness and Psychological Well-Being Levels by Age Variable

	Ages	n	$\overline{X}$	ss	f	p	scheffe
Happiness	25 year ve below (1)	68	20,71	4,97	7,39	0,00**	1-2 1-3 1-4
	26-30 years (2)	100	22,6	3,46			
	31-35 years (3)	56	23,29	3,75			
	36 year and + (4)	28	24,29	2,87			
Psychological Well-being	25 year and below (1)	68	35,82	11,04	11,74	0,00**	1-2 1-3 1-4
	26-30 year (2)	100	40,68	9,15			
	31-35 years (3)	56	43,79	5,41			
	36 year and + (4)	28	44,71	2,65			

** p<0,05 significance level*
*** p<0,01 significance level*

In the statistical analysis, a statistically significant difference was determined in the happiness and psychological well-being levels of educators specializing in physical education and sports according to the variable of age ($p<0.05$). As a result of the analyzes analyzed to understand between which age groups this significant difference is located, it was determined that it has been a statistically significant difference between

educators specializing in physical education and sports aged 25 and under and all other age groups, to the detriment of teachers aged 25 and under.

Table 3: T-Test Results of Educators' Specializing in Physical Education and Sports Happiness and Psychological Well-Being Levels by Gender Variable

Scale	Gender	n	$\bar{X}$	ss	t	df	p
Oxford Happiness Scale	**Female**	124	22,16	4,43	-1,02	250	0,31
	Male	128	22,69	3,71			
Scale of Psychological Wellness	**Female**	124	40,39	9,70	-0,21	250	0,84
	Male	128	40,63	8,54			

In the statistical analysis, no statistically significant difference was determined in the happiness and psychological well-being levels of educators specializing in physical education and sports in respect to variable of gender (p>0.05).

Table 4: T-Test Results of Educators' Specializing in Physical Education and Sports Happiness and Psychological Well-Being Levels According to the Variable "Regularly Attending Social Activities Except Exercise"

Scale	**Regularly Attending Social Activities Except Exercise**	**n**	$\bar{X}$	**ss**	**t**	**df**	**p**
Oxford Happiness	Yes	156	22,77	4,07	1,70	250	0,93
	No	96	21,88	4,06			
Scale of Psychological Wellness	Yes	156	41	8,67	1,09	250	0,04*
	No	96	39,71	9,78			

** p<0,05 significance level*

In the statistical analysis, no statistically significant difference was determined in the happiness levels of educators specializing in physical education and sports in terms of the variable "Regularly Attending Social Activities Except Exercise' (p>0.05). On the other hand, a statistically significant difference was determined in favor of those who regularly participate in social activities other than exercise in the psychological well-being levels of physical education teachers (p<0.05).

Table 5: ANOVA Test Results of Educators' Specializing in Physical Education Happiness and Psychological Well-Being Levels According to the Variable of "Identification of Self in Daily Life"

Scale	**How Do You Describe Yourself In Daily Life?**	**n**	$\bar{X}$	**ss**	**f**	**p**	**scheffe**
Oxford Happiness Scale	Calm (1)	100	24,4	3,58	23,87	0,00**	1-3 1-4 2-3
	Peaceful (2)	32	32,63	3,7			
	Stressful (3)	84	20,1	3,04			
	Agressive (4)	36	21,33	4,71			
Scale of Psychological Wellness	Calm (1)	100	45,6	6	24,92	0,00**	1-2 1-3 1-4
	Peaceful (2)	32	40,75	8,62			
	Stressful (3)	84	36,33	8,38			
	Agressive (4)	36	35,89	11,09			

** p<0,05 significance level*
*** p<0,01 significance level*

In the course of the statistical analysis, a statistically significant distinction was identified in the happiness and psychological well-being levels among educators specializing in physical education and sports, contingent upon the variable "how you describe yourself in daily life" ($p < 0.05$). Further research into the specific groups that contributed to this significant disparity revealed some significant findings. Firstly, a notable statistical difference was found in favor of those who identified as calm, when comparing physical education teachers who described themselves as calm to their counterparts who identified as stressed and aggressive on the happiness scale. Similarly, a statistically significant difference was identified in favor of those who identified as peaceful, when comparing physical education teachers who regard themselves as

peaceful to those who described themselves as stressed. Furthermore, a significant difference was noted between physical education teachers who got themselves as calm and all other groups, favoring the group that characterized themselves as calm ($p < 0.05$).

Table 6: Results of Correlation Analysis Between Happiness and Psychological Well-Being Levels of Physical Education Teachers

		Psychological Well-being
Happiness	r	0,70*
	p	0,00**

** p<0,05 relevancy level*
*** p<0,01 significance level*

According to the responses provided by the physical education instructors participating in the research to the scales, as a result of the statistical analyzes on the relationship between the Oxford Happiness Scale and the Well-Being Scale, a high level of positive correlation was observed according to the responses provided by the physical education instructors to the scales ($r = 0.70$).

DISCUSSION AND CONCLUSION

In the research, it is aimed to examine the mental/psychological well-being and happiness levels of physical education instructors working in different districts of Diyarbakır in terms of some variables and to reveal the relationships between these variables. It is important in terms of determining how the difficulties of educational processes affect teachers' happiness and psychological well-being. There are similar studies with different samples in the literature. However, no similar studies were found, especially within Diyarbakir province.

Observing that physical education instructors who are 36 years old and above are happier among the average of the happiness levels of physical education instructors in regard to the age variable. In a study on primary school teachers, it was determined that the effect of economic and non-economic factors on happiness did not differ significantly with the age variable (15). In the study of Eryılmaz and Ercan (12) on the subjective well-being of adolescents, it was determined that young adults were happier than adolescents. Again, in a research on middle school teachers, it has been concluded that as the ages of the teachers increased, their happiness levels also increased (11). These studies show parallelism with the results of our research. When the mean scores of psychological well-being of physical education instructors in regard to the variable of age were examined, it was observed that the mean scores of psychological well-being increased as the ages of the teachers increased. The perceived stress, psychological well-being and depression levels of the nurses have been analyzed and any statistically significant difference could not be observed between the psychological well-being levels of the nurses and the age variable (26). Again, contrary to our study, any statistically significant difference could not be observed between the psychological well-being levels and the age variable in Akyıldırım's study (3) with university students. However, in a study on teachers' happiness and psychological well-being levels, it was observed that the average of their psychological well-being levels increased as the ages of the teachers increased, but this increase was not found to be statistically significant (28). Our study also shows that as the age of physical education teachers increases, their average psychological well-being increases. In particular, the average of all age categories and psychological well-being levels of teachers aged 25 and under is statistically more significant in a negative way. It is thought that this result is due to the fact that the current living conditions of young teachers are getting more difficult and at the same time their workload is getting higher.

Having observed that any statistically significant disparity could not be determined in the average of physical education teachers' happiness levels when the gender variable was considered. However, male physical education teachers' the average level of happiness of is slightly higher than that of females. In a research employed by Şahin (25) with university students, no significant difference was observed in the mean happiness levels of students in terms of gender variable, which supports our research. Habibzadeh and Allahvirdiyani (15) found that there is a significant correlation between the gender of teachers and happiness as a result of their studies with primary school teachers. Contrary to these studies, in our study, any significant disparity was not observed between the levels of happiness of physical education instructors according to the

gender variable. When the mean scores of physical education instructors' psychological well-being levels in terms of gender variable were examined, it was not observed any significant difference. The mean of male physical education teachers is slightly higher than that of females. Contrary to our study, in the study of Streb et al. (24) in which they examined the relationship between post-traumatic stress disorders and the sense of resilience and consistency and psychological well-being levels of paramedics, they resulted that it has been a significant relationship with the gender variable. In a study on the psychological well-being levels of university students, it was not seen any statistically significant difference when the gender variable was considered (6). Again, as a result of a study on university students' psychological well-being levels, emotional intelligence and personality traits, any significant disparity was not seen between the mean psychological well-being levels of the participants in terms of gender (21). The results of these studies show parallelism with the results of our study.

Any significant disparity was observed between the happiness levels of physical education instructors according to their participation in a social activity except exercise. Huppert (17) states that being social is directly connected to psychological/mental well-being and happiness. In contrast to our research, Canbay (7) identified a positive correlation between students' social skills and their levels of happiness in his research centered on the link between social skill levels and happiness levels among high school students. Conversely, in the survey conducted by Ulukan et al. (28), which explored the happiness levels of students attending physical education and sports schools, any statistically significant distinction could not be found when comparing students' happiness levels with their levels of social activity.This result supports our study. When the average scores of physical education teachers' psychological well-being levels in regard to their attendance in social events are examined, it is seen that the psychological well-being levels of physical education teachers who participate in social events differ statistically positively compared to those who do not participate in social activities. At this point, it can be concluded that the psychological well-being levels of physical education teachers who participate in social events are higher than physical education teachers who do not participate in social activities. In their study, Aydın et al. (5) found that the psychological well-being levels of candidate teachers who took part in social events have been higher than those who have not. The result of the findings of this study is in parallel with the result of the research we have done.

It has been observed that physical education instructors who are regarded as calm among the average of physical education teachers' self-identification in daily life according to their happiness levels are happier than stressed and aggressive ones, and peaceful physical education teachers are happier than stressed teachers. Ulukan (28) analyzed that it has been a statistically significant distinction between the participants' self-identification in life and their level of happiness in their study on teachers. When the mean scores of physical education instructors for their daily self-identification and levels of psychological well-being have been analyzed, it has also been observed that the psychological/mental well-being levels of the physical education instructors who said they are calm, differed statistically in a positive way compared to those who were peaceful, stressed and aggressive. Ulukan (28), in his study examining the correlation between teachers' happiness and psychological resistance levels, observed that calm instructors were statistically more positively psychologically stronger than stressed teachers. This also supports our study.

A statistically significant ($r=0.70$) relationship was observed when examining the relationship between physical education teachers' average happiness levels and average psychological well-being levels. As a result, a positive correlation was observed between the happiness of physical education instructors and their psychological well-being. For these findings, as the happiness of physical education instructors increases, their psychological well-being levels also increase. Thus, from the results obtained, having said that the happiness levels of physical education instructors are a predictor of their psychological well-being levels. Açıkgöz (1), in his study with medical faculty students, observed a positive relation between students' happiness and psychological well-being levels. Again, Cantez (8) observed a similar result in their research in which they analyzed the correlation between happiness, psychological well-being and self-efficacy levels of university students.

As a result of the study, it was determined that there is a moderate and positive relationship between the happiness levels of physical education teachers and their psychological well-being levels. This study, which can be a reference for future studies, can provide more effective results by expanding the sample size.

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Examination of the Relationship Between the Reaction Time, Competition Result With the Competition Hour in the World Indoor Championships (2006-2022): 60 Meters

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Abstract

The relationship between the reaction time and the total running time of male (n=407) and female (n=345) athletes competing in the 60-meter wind sprint branch at the world indoor championships between 2006 and 2022 and the competition hour was examined in this study. Statistically significant and negative relationships were found between competition hour and athletes' reaction times, competition hour and athletes' competition result ratings in both genders (rho<0.040; p<0.05). When the subject is examined in terms of the stages of the competitions, no relationship was found for both genders in the final stage while the same relationships were preserved in the semi-final stage. At the qualification stage, a positive relationship was observed between the competition hour and the reaction time in both men (rho=0.25) and women (rho=0.22). In particular, it will be important that the competition time zones in the qualification stage are in similar circadian zones so as not to create a disadvantage among the athletes, and that the competition programs should be prepared by taking the performance-limiting and performance-supporting time zones into account.

Keywords: Athletics, Sprint, Circadian, Reaction Time

Özet

Dünya Salon Şampiyonasında (2006-2022): 60 Metrede Reaksiyon Süresi, Müsabaka Sonucu ve Müsabaka Saati Arasındaki İlişkinin İncelenmesi

Dünya salon şampiyonalarında 2006 ve 2022 yılları arasında 60 metre sürat koşu branşında yarışan erkek (n=407) ve kadın (n=345) sporcuların reaksiyon süresi ve toplam koşu süresinin yarışmanın yapıldığı saat ile ilişkileri bu

çalışmada incelenmiştir. Her iki cinsiyette de yarışma saatleri ile sporcuların reaksiyon süreleri, yarışma saatleri ve sporcuların yarışma sonuç dereceleri arasında istatistiksel olarak anlamlı ve negatif yönde ilişkiler bulunmuştur (rho<0.,040; p<0,05). Yarışmaların etapları yönüyle konu incelendiğinde ise her iki cinsiyette de yarı final etabında aynı ilişkiler korunmuşken, final etabında ise herhangi bir herhangi bir ilişki tespit edilememiştir. Seçme etabında ise yarışma saatiyle reaksiyon süresi arasında hem erkeklerde (rho=0,25) hem de kadınlarda (rho=0,22) pozitif bir ilişki görülmüştür. Özellikle seçme etabındaki yarışma saat dilimlerinin sporcular arasında dezavantaj oluşturmayacak şekilde benzer sirkadyen dilimlerde olması ve müsabaka programlarının performansı sınırlayıcı ve performansı destekleyici saat dilimlerinin göz önüne alınarak hazırlanması önemli olacaktır.

Anahtar Kelimeler: Atletizm, Sprint, Sirkadiyen, Reaksiyon Süresi

INTRODUCTION

Citius, altius, forties (faster, higher, stronger), the motto of the Olympic games, can be considered as a philosophy that wonders about the limits of human performance. When it comes to the limits of performance in sports, sports scientists have conducted numerous scientific studies to this day in order to be able to understand this multidimensional, multifactorial complex process and share the information they have obtained (1). It seems that scientific studies based on this curiosity will continue as long as humankind exists.

Although there is no single formula that determines performance in sports, it is necessary to study and understand the components in harmony. In the target sports branch, the limits of human performance are examined by including sub-disciplines such as exercise physiology, biomechanics, performance analysis, cognitive motor neuroscience, history, philosophy, exercise/sport psychology, and pedagogy (2). The performance of wind sprint branches also depends on many factors. It is categorized according to tags such as biomechanical, physiological, environmental, mechanical, equipment, and psychological (3). "Citius", that is, successful performance in the sprint branches chasing the title of the fastest, consists of the components of a fast reaction (reflex speed), acceleration (power), the highest achievable running speed (maximal speed), speed protection (maximal speed endurance) and the ability to minimize fatigue-related speed loss (submaximal speed endurance). In other words, acceleration, maximal velocity, and deceleration, which are the phases of sprint kinematics, are considered to be the determinants of speed (4).

In order for the athletes to reach their potential, sports staff aims to improve and develop all performance components. It has been demonstrated that athletic performance and the time zones of the day in which this performance is realized, in other words, circadian rhythm are related (5-14). In studies conducted in different groups, it was found that the power changes between 3% and 21.2% in different time zones of the day (6, 9, 14). The fact that the power change can be observed at this level makes the time when the performance takes place in the branches with a priority on speed performance even more important.

Within the scope of this study, the relationships between the total duration of sprint performance of elite athletes in the 60-meter wind sprint branch and the athlete's reaction time with the time of day at which the competitions were held were investigated.

METHODOLOGY

The research group of this study in the descriptive survey model consists of athletes (male=407, female=345) who competed in the qualification, semi-final and final stages of the World Indoor Championships held between 2006-2022. Athletes who made a false start or failed to achieve a competition result rating by violating different rules were excluded from the scope of the research. Information about the participants' age, competition hour, reaction time, and competition result variables were taken from the official competition results on the World Athletics official website (15).

Excel (Analysis Toolpak) and the SPSS 26.0 program have been used for statistical analysies and the p-value was accepted as < 0.05. Kurtosis, skewness values and Kolmogorov-Smirnov (KS) normality test were applied to test the suitability of the data for normal distribution. Kurtosis and skewness values have been accepted as ±1.5 (16).

Since the kurtosis and skewness values of the variables belonging to the athletes are other than ± 1.5 standard deviation values and the Kolmogorov smirnov (KS) value is $p<0.05$, it was determined that the data do not show a normal distribution. For this reason, Spearman correlation analysis has been used to determine the relationships between the competition hour and reaction time and the competition result. In evaluating correlation coefficients: the classification form of 0-0.40 is weak, 0.41-0.60 is moderate, 0.61-0.80 is significant (high), and 0.81-1.00 is almost perfect was accepted (17).

Ethical considerations

This study was conducted as an observational study with publicly available data. The study data have been taken from the publicly accessible World Athletics official website (15). The study data are not of ethical concern because they can be accessed online in an unprocessed format and the data are not collected through experiments, as stated by Morley and Thomas (18).

FINDINGS

The descriptive findings of the age, competition result, reaction time, and competition hour variables of the sprinters who competed in the World Indoor Championships between 2006 and 2022 are given in the tables below. The relationships between the competition result and reaction time and the competition hour were also calculated separately.

Table 1. Descriptive statistics of male and female athletes in the 60 m sprint

Gender		Age (*year*)	Result *(second)*	Reaction *(second)*	Competition Hour *(time)*
Male (*n=651)*	Mean	25.2	6.78	0.177	15:55
	SD	3.9	0.27	0.056	3:06
	Median	24.9	6.70	0.158	16:33
	25%	22.5	6.62	0.142	13:11
	75%	27.7	6.85	0.192	18:36
Female (*n=587)*	Mean	25.4	7.39	0.179	14:14
	SD	4.3	0.35	0.050	3:27
	Median	25.2	7.30	0.165	12:21
	25%	22.6	7.19	0.146	10:59
	75%	27.9	7.43	0.198	17:49

In this table, each race that the athletes ran in the qualification, semi-final, and final stages was evaluated as separate data and considered as the total number of races run for men and women. It was found that the average of the competitions run in the championships examined within the scope of the research was 6.78 seconds for men and 7.39 seconds for women. In terms of reaction time, the average reaction time of women was calculated as 0.179 seconds, while it was 0.177 seconds for men. The earliest competition hour for women was 10:15 and the latest competition time was 21:17 (average 14:14). For men, this condition is 10:13 and 21:42 hours (average 15:55).

Table 2. The relationship between the competition hours and reaction times and competition results of male and female athletes in the 60 m sprint

Gender		Male(*n=651)*		Female(*n=587*)	
		Reaction	Result	Reaction	Result
Competition	rho	-0.10*	-0.38**	-0.09*	-0.36**
Hour	*p*	*0.01*	*0.000*	*0.03*	*0.000*

Statistically significant ($p<0.05$) and weak relationships have been found between both genders, both between the competition hour and reaction time and between the competition hour and the competition result (rho<0.40). In other words, shorter reaction times and better competition results were achieved in competitions later in the day.

The analyses conducted to determine whether the findings obtained without separating the competition stages showed changes when they were examined by dividing them into qualification, semi-final, and final stages of the championships are given in the following tables.

Table 3. Descriptive statistics of the qualification, semi-final, and final stages of male athletes in the 60 m sprint

Male - 60 m		Age (*year*)	Result *(second)*	Reaction *(second)*	Competition Hour *(time)*
Qualification (*n=407)*	Mean	24.8	6.87	0.189	14:21
	SD	4.0	0.28	0.063	02:45
	Median	24.5	6.77	0.168	13:37
	25%	21.9	6.67	0.145	12:44
	75%	27.5	7.02	0.218	15:35
Semi-Final (*n=197*)	Mean	25.9	6.65	0.159	18:03
	SD	3.8	0.15	0.035	01:07
	Median	25.5	6.64	0.152	17:53
	25%	23.3	6.59	0.138	17:30
	75%	28.0	6.71	0.168	18:47
Final (*n=47*)	Mean	25.8	6.56	0.146	20:29
	SD	3.1	0.09	0.013	00:52
	Median	25.2	6.57	0.148	20:56
	25%	23.5	6.52	0.135	19:46
	75%	27.4	6.62	0.159	21:12

In Table 3, it is seen that the average reaction times and competition results of male athletes decreased progressively from the qualification to the final stage. In the same way, it is seen that the average competition hours increase from the qualification to the final.

Table 4. The relations between the competition hours, reaction times, and competition results of the qualification, semi-final, and final stages of male athletes in the 60 m sprint

Male - 60 m		Qualification (*n=407)*		Semi-Final (*n=197*)		Final (*n=47*)	
		Reaction	Result	Reaction	Result	Reaction	Result
Competition	rho	0.25*	0.10	-0.25*	-0.38*	-0.25	-0.23
Hour	*p*	*0.000*	*0.06*	*0.000*	*0.000*	*0.09*	*0.13*

In the qualification stage, a significant relationship in a positive direction has been found between competition hour and only reaction time in the male athletes. However, in the semi-final stage, a significant relationship in a negative direction and at a weak level (rho<0.40) has been found between competition hour and both reaction time and competition result in the male athletes ($p<0.05$). The qualification stage was held at 10:15 at the earliest and 19:15 at the latest. In the semifinals, these times are 16:20 and 20:39, and in the finals, they are 18:50 and 21:17. When examining the relationships with the competition hour, it is necessary to evaluate the subject in terms of the time intervals of the stages. It is understood that the reaction times of the competitions run at earlier hours are shorter in the qualification stage, which is seen to be run at an earlier time of the day compared to the semi-final and final stages. In the semi-finals, contrary to the qualification, the reaction times of the competitions run later in the day can be interpreted as shortened and the results of the competition improved.

Table 5. Descriptive statistics of the qualification, semi-final, and final stages of female athletes in the 60 m sprint

Female - 60 m		Age (*year*)	Result *(second)*	Reaction *(second)*	Competition Hour *(time)*
Qualification (*n=345)*	Mean	24.8	7.50	0.191	11:59
	SD	4.3	0.40	0.058	2:21
	Median	24.5	7.37	0.172	11:10
	25%	21.8	7.24	0.149	10:43
	75%	27.4	7.64	0.218	12:07
Semi-Final (*n=195*)	Mean	26.2	7.24	0.164	16:51
	SD	4.2	0.14	0.029	1:26
	Median	25.7	7.23	0.158	17:09
	25%	23.6	7.15	0.144	16:00
	75%	28.5	7.33	0.176	18:05
Final (*n=47*)	Mean	27.1	7.13	0.159	19:54
	SD	3.6	0.11	0.031	1:28
	Median	26.2	7.11	0.155	20:28
	25%	24.8	7.04	0.142	19:25
	75%	29.3	7.22	0.170	20:51

In Table 5, it is seen that the average reaction times and competition results of female athletes decreased progressively from the qualification to the final stage. In the same way, it is seen that the average competition hours increase from the qualification to the final.

Table 6. The relations between the competition hours, reaction times, and competition results of the qualification, semi-final, and final stages of female athletes in the 60 m sprint

Female - 60 m		Qualification (*n=345)*		Semi-Final (*n=195*)		Final (*n=47*)	
		Reaction	Result	Reaction	Result	Reaction	Result
Competition	rho	0.22*	0.08	-0.28*	-0.29*	-0.12	-0.19
Hour	*p*	*0.000*	*0.15*	*0.000*	*0.000*	*0.42*	*0.20*

In the qualification stage, a significant relationship in a positive direction has been found between competition hour and only reaction time in female athletes. However, in the semi-final stage, a significant relationship in a negative direction and at a weak level (rho<0.40) has been found between competition hour and both reaction time and competition result in the male athletes ($p<0.05$).

The qualification stage was held at 10:13 at the earliest and 19:45 at the latest. In the semifinals, these times are 16:16 and 19:04, and in the finals, they are 17:06 and 21:42. As in the case of men, it can be interpreted that the reaction times of the competitions run in the early hours are shorter at the qualification stage, while in the semifinals, unlike the qualification, the competitions run later in the day have shorter reaction times.

The charts of the athletes' reaction times and competition results in terms of the time of day are given in Chart 1 and Chart 2 according to gender.

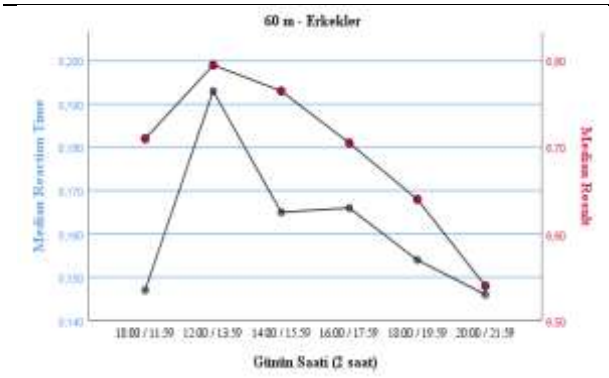

Chart 1. The Chart of the median values of the reaction time and competition results of men according to the time of day with an interval of two hours

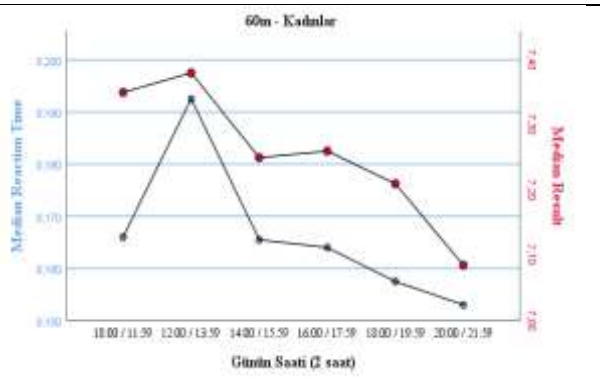

Chart 2. The Chart of the median values of the reaction time and competition results of women according to the time of day with an interval of two hours

It is understood from the charts that the performance of the athletes decreased in terms of reaction time and the competition result in the competitions held between 12:00 and 14:00 in both genders.

DISCUSSION and CONCLUSION

In the current study, the relationship between the reaction time and the total running time of male (n=407) and female (n=345) athletes competing in the 60-meter sprint event at the World Indoor Championships held between 2006 and 2022 and the competition hour were examined. Statistically significant ($p<0.05$) and weak relationships have been found between both genders, both between the competition hour and reaction time and between the competition hour and the competition result (rho<0.40). In other words, shorter reaction times and better competition results were achieved in competitions later in the day.

It is known that the components of sports performance change in a sinusoidal way according to the time of day. It has been found in studies conducted that physical fitness tests and long-term submaximal exercise performance show the busiest times in the morning, and the performance capacity test results based on heart rate are at the peak level in the morning. Post-lunch decreases in performance variables such as muscle strength were found to be significant (7). Hill and Smith (1991) obtained higher peak power outputs in their study on anaerobic power and capacity in the evening compared to other times of the day (12).

When the competitions conducted within the scope of the research were examined by dividing the time of day, it has been found that the performance of athletes decreased in terms of reaction time and competition result in competitions held between 12:00 and 14:00 in both genders. The best reaction times have been put between 10:00-12:00 and 20:00-22:00 in men, and in women between 18:00-22:00. In a study examining the changes in sprint performance according to the time of day, it was reported that the performance in the evening hours was higher than in the morning hours, while this situation could not be maintained in repeated sprints (19).

As a result, it has been observed that there are changes in the reaction times and competition performances of athletes in the sprint branch depending on the time of day. In major competitions organized in sports branches such as athletics, reasons such as the high number of athletes and the diversity of branches make it difficult to prepare competition programs. Nevertheless, it is recommended that the competition time zones should be in similar circadian zones so as not to create a disadvantage among athletes, and performance-limiting and performance-supporting time zones should be considered when preparing competition programs.

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Examination of Yoga on Heart Rate Variability and Mindfulness Levels

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Abstract

Today, yoga is a beneficial system that is at the forefront in terms of both physical and psychological health. It can be said that yoga is extremely suitable in terms of ensuring the harmony of mind and body. The aim of the study is to examine the effect of yoga practices on heart rate variability and mindfulness levels. A total of 52 women who did and did not do yoga (Mean age= 30.25±5.58) voluntarily participated in the study. Heart rate variability was measured using the emWave Pro Plus (Quantum Intech, Inc. Boulder Creek, CA, USA, designed by the Institute of HeartMath). Using the emWave Pro device, the resting heart rate variability measurements were taken for 5 minutes in the sitting position. For this study, SDNN, RMSSD, MeanHR, LF/HF, and coherence parameters were evaluated. The Mindful Attention Awareness Scale (MAAS) was used to determine the mindfulness levels of the participants. According to the findings, a statistically significant difference was found in favor of the yoga group in the levels of SDNN (p>.005), meanHR (p>.020), and awareness (p>.041)". There is no significant difference in RMSSD (P =.050), LF/HF (P <.232), and Coherence (P <.718) parameters. As a result, yoga practices increase HRV. Also, it can be said that it is an application that helps women to improve their mindfulness levels.

Keywords: Yoga, Heart rate variability, Mindfulness

Yoganın Kalp Atım Hızı Değişkenliği ve Bilinçli Farkındalık Düzeyine Etkisinin İncelenmesi

Özet

Günümüzde yoga hem fiziksel hem de psikolojik sağlık açısından ön planda olan faydalı bir sistemdir. Zihin ve beden uyumunun sağlanması açısından yoganın son derece uygun olduğu söylenebilir. Mevcut çalışmanın amacı yoganın kalp atım hızı değişkenliği ve bilinçli farkındalık düzeyine etkisini incelemektir. Çalışmaya yoga yapan ve yapmayan yaş ortalaması 30.25±5.58 olan toplam 52 kadın gönüllü olarak katılmıştır. Kalp atım hızı değişkenliği ölçümü, emWave Pro Plus (Quantum Intech, Inc. Boulder Creek, CA, USA, designed by the Institute of HeartMath) kullanılarak gerçekleştirilmiştir. emWave Pro+ cihazı kullanılarak oturur pozisyonda 5 dk boyunca dinlenik kalp atım hızı değişkenliği ölçümleri alınmıştır. Bu çalışma için SDNN, RMSSD, MeanHR, LF/HF, Coherence parametreleri değerlendirmeye alınmıştır. Katılımcıların bilinçli farkındalık düzeylerini belirleyebilmek için Mindful Attention Awareness Scale (MAAS) kullanılmıştır. Bulgulara göre, SDNN (p>.005), meanHR (p>.020), ve

farkındalık (p>.041), düzeylerinde yoga yapan grubun lehine istatistiksel olarak anlamlı farklılık bulunmuştur. RMSSD (p=.050), LF/HF (p<.232), ve Coherence (p<.718), parametrelerinde ise anlamlı farklılık gözlenmemektedir. Sonuç olarak yoga uygulamaları KAHD ni artırır. Aynı zamanda kadınların bilinçli farkındalık düzeylerinin de iyileşmesine yardımcı bir uygulama olduğu söylenebilir.

Anahtar kelimeler: Yoga, Kalp atım hızı değişkenliği, Bilinçli farkındalık

INTRODUCTION

Today, yoga is a system that is at the forefront in terms of both physical and psychological health. It can be said that yoga is extremely suitable in terms of ensuring the harmony of mind and body.

Yoga is a completely globalized phenomenon. In India and abroad, adults, children, and young people do yoga in different environments (gyms, schools, homes, work, yoga studios, and temples). Gyms, yoga studios, and schools offer yoga classes in almost every country. We continue to see the manifestations and use of yoga that started more than a century ago in the modern world (48). Yoga is about adapting to the universe itself. It uses a unique geometry to reach the highest level of perception and adaptation (6). Hatha Yoga is the most common form of yoga practices (23). Hatha Yoga is a preparation process for the body to maintain higher energy levels. This preparation begins with the body, breath, mind, and inner self (6). In addition, Hatha Yoga aims to gain control of breath (53).

Yoga-based practices are used as a support in the treatment of many problems such as muscular system diseases (7), chronic low back pain (3, 19), blood pressure (14, 41), multiple sclerosis (MS) (36), obesity (50), schizophrenia (26), cancer (59 , 2), attention deficit-hyperactivity (21). Considering the last 45 years, mental disorders, cardiovascular diseases, and respiratory system disorders are among the diseases supported by yoga practices (25). In addition to physical disorders, yoga has been done frequently to overcome psychological problems such as depression, especially anxiety (14). Huang et al. (24)'s study results show that Hatha Yoga's regular, long-term practices benefits health.

Heart rate variability (HRV) is a tool for estimating autonomous cardiac modulation (32). HRV is an expression of the change of time distance between increasing and decreasing QRS complexes at different time measurements (8). It is believed that temporal fluctuations in heart rate reflect changes in respiratory synchronization exhibitions and autonomous cardiac regulation (9). These changes can be measured by electrocardiography (ECG). ECG is the science and technology to interpret the potential electrical changes that accompany the efficacy of the heart (42). The changes in heart rate can be evaluated by time field (SDNN, SDANN, RMSSD, NN50, SDSD, HRVTI, TINN) and frequency (LF/HF, HF, LF, VLF, ULF) methods (31).

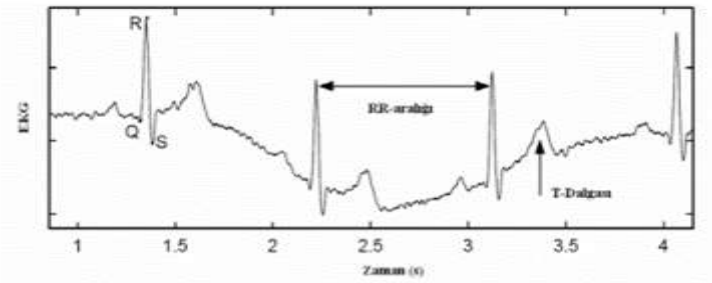

Figure 1. Demonstration of R-R on an ECG record (8)

HRV is used to determine health as an indicator of autonomous regulation (56). Heart rate variability changes depending on stress (physical or mental), exercise, respiratory, age, gender, and metabolism. A problematic experience we encounter during the day can reduce our HRV level. Whereas yoga and meditation practices play an important role in increasing HRV levels (22). Therefore, HRV is a suitable assessment method to evaluate changes in body practices that facilitate autonomous balance (56). In other words, HRV provides a strong way to observe the interaction between parasympathetic and sympathetic nervous systems (44). In the literature, there are studies examining how yoga practices affect heart rate variability in healthy and/or patient individuals (13, 15, 18, 29, 34, 35, 37, 43, 45, 46, 51, 52, 54, 56, 57, 58, 60). In addition, yoga studies show

that asana (posture) practices positively affect muscle strengthening, joint mobilization, respiratory arrangement, cardiovascular and endocrine system balance (19).

Mindfulness is a form of attention and awareness first defined in ancient Eastern meditation traditions and is widely discussed in contemporary Western culture. Mindfulness is defined as individuals' focusing on what is present in an accepting and non-judgmental way (5). In order to increase the level of mindfulness of individuals, practice such as mindfulness meditation (4, 55), Mindfulness-Based Cognitive Therapy and Mindfulness-Based Stress Reduction (MBSR) (55) are used. Mindfulness-Based Stress Reduction (MBSR) program is a program aimed at maintaining the integrity of body, mind, and soul. It generally includes an 8-week program, including daily life activities (such as eating, drinking, walking, and cooking), yoga, and meditation practices. The program requires the behaviors of interest, openness, and acceptance at the current time (27). In order to determine the mindfulness levels of individuals, evaluations can be made through surveys based on self-report. The most commonly used scale as a mindfulness measure in the litis the Mindful Attention Awareness Scale (MAAS). The mindfulness of individuals can also be measured by evaluating the extent to which the person can be aware of his daily activities. MAA S contains substances like "When something happens, I have difficulty focusing on what happened at that moment" or "I run to daily work without realizing what I am doing.". These statements mean that the mind is on autopilot and that internal and external experiences occur without deliberate consideration (12).

Experimental research shows the relationships between heart rate variability (HRV) and the regulation of emotions and behaviours. Similarly, the fact that a person's experience at the present moment is an accepting and non-judgmental focus on one's current experience is a key feature of mindfulness that promotes emotional and behavioral regulation. Furthermore, the ability to regulate one's attention is associated with higher HRV, the correlation between physical and psychological health. Therefore, mindfulness exercises have potential benefits (11).

Studies examining the relationship between yoga and HRV in general focus on factors such as depressive symptoms, mood, and anxiety disorders (1, 15, 16). There are also studies examining the relationship between Mindfulness-Based Yoga and HRV (40, 38). In this study, we wanted to examine the effect of long-term hatha yoga training (at least 6 months) on HRV and mindfulness. In general, being in a state of mindfulness promotes a calm mood (emotional regulation). Differentiation of emotional states also affects heart rate variability. Therefore, this situation can be regulated through yoga practices. Thus, the data obtained from individuals who have been practicing yoga for a long time will contribute to the literature . In this context, the aim of the study is to examine the effect of yoga practices on heart rate variability and mindfulness levels. We hypothesize that women who do yoga have higher heart rate variability parameters and levels of mindfulness than those who do not.

METHOD

Participants

A total of 52 women (30.25 ± 5.58 years) voluntarily participated in the study. Convenience sampling method was used in the study. Convenience sampling is a method in which data is collected from an easily accessible group of people. The individuals in the sample are selected not because they are most representative of the entire population, but because they are most easily accessible to the researcher (47).

In general, the criteria for being included in the yoga group is to practice hatha yoga for at least six (6) months . In addition, for two groups, Individuals who meet the criteria of being between 20-40 years of age, not suffering from systematic discomfort, and not using drugs were included in the study. The participants were divided into two groups as yoga and non-yoga group.

Table 1. Descriptive Statistics

	Groups	N	$\bar{X}$	Sd
Age	Yoga Group	27	30.74	4.80
	Non-Yoga Group	25	29.72	6.38

In Table 1, it is seen that the average age of the yoga group participating in the research is 30.74 ±4.80, while the non-yoga group is 29.72 ±6.38.

Data Collection Tools

Personal Information Form, the Mindful Attention Awareness Scale-(MAAS), and Heart rate variability (HRV) measurements were used as data collection tools.

Personal Information Form

The researchers prepared a personal information form to determine the participants' age, yoga practice, types of yoga, years of yoga, medication use, and systematic disorders.

Heart rate variability (HRV) Measurement

HRV was performed using the emWave Pro+ device of Heartmath. The Blood Volume measurement sensor was placed on the participant's earlobe for measurement. The breathing cycle for each participant was arranged to be 5.5-6 per minute. This breathing rate is at the average resonance frequency of the cardiovascular system for adults (30). For this study, SDNN, RMSSD, MeanHR, LF/HF, and Coherence parameters were evaluated.

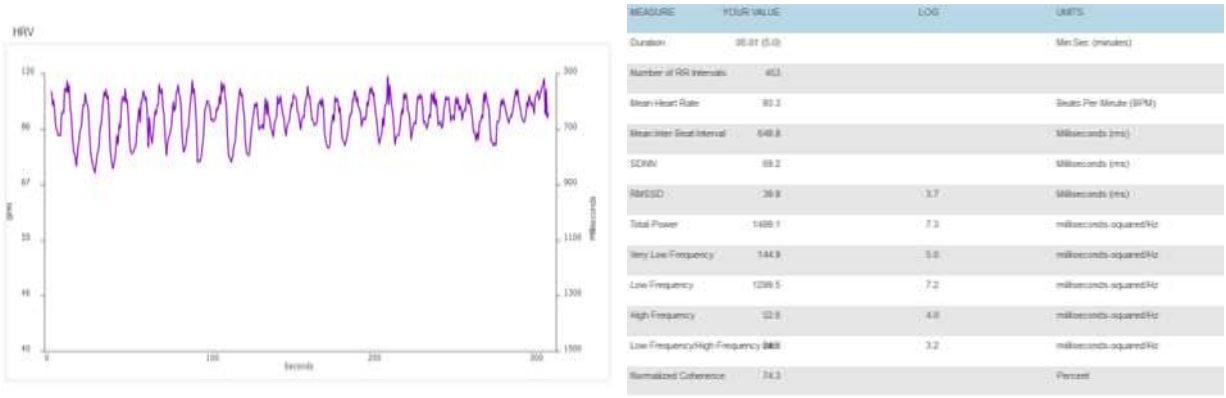

Figure 2. Example figure showing the QRS complex and heart rate variability parameters on the HRV device (emWave Pro+)

Mindful Attention Awareness Scale-(MAAS)

The MAAS developed by Brown and Ryan (10) was adapted into Turkish by Catak (12) in the adult population. The MAAS is designed to measure present-oriented attention and awareness. MAAS consists of 15 items. The six-point Likert-type inventory is scored as 1 (almost always) and 6 (almost no). High scores express high mindfulness. Catak (12) found that MAAS was a valid and reliable tool for evaluating the mindfulness of the Turkish population. Cronbach's Alpha coefficient of the scale is 0.85. In this study, Cronbach's Alpha coefficient was found to be 0.88.

Research Publishing Ethics

Ethics Committee Approval of the study was taken from the Ethics Committee of Burdur Mehmet Akif Ersoy University before starting the research (Decision No: GO 2022/922).

Collection of Data

Before the day of data collection, the participants were asked to avoid strenuous activity and not to consume alcohol and caffeine-containing beverages until at least 2 hours before the application and have a slight meal. Before the measurement, the participants rest in a sitting position for 5 minutes. After the rest, participants in the study first filled out the personal information form and MAAS. Then, using the emWave Pro+ device, the resting heart rate variability measurements were taken for 5 minutes in the sitting position.

Statistical Analysis

An appropriate statistics program was used in the analysis of the data. Z scores were examined to determine the extreme values of the data. Values above -2.50 +2.5 were excluded from the Z scores data. Then, for the values of EM score p> 0.05, loss data assignment was made according to the average of the series. Normality test was performed using Skewness and Kurtosis analysis. According to George and Mallery (20), skewness and kurtosis values should be between ±2.00. An Independent Sample T-test was used to determine the difference between the groups.

Table 2. Score distribution of measurement parameters

	N	$\bar{X}$	Sd	Skewness	Kurtosis	Min.	Max.
SDNN	52	87.07	24.76	.476	-.088	37.70	144.40
RMSSD	52	58.39	30.03	.775	.172	4.70	128.70
LF/HF	52	5.63	4.14	.576	-.576	.00	15.90
MeanHR	52	82.93	11.65	-.086	-.667	57.70	107.60
Coherence	52	67.13	13.29	-.386	-.523	34.70	89.20
Mindfulness	52	64.90	10.60	-.052	-.205	38.00	86.00

SDNNstandard deviation of normal to normal R-R intervals; RMSSDsquare root of the mean squared differences of successive R-R intervals; LF/HFthe ratio of LF to HF; MeanHR mean heart rate ;Coherence psychophysiological coherence

In Table 2. Since the average scores obtained from the parameters did not deviate from the normal distribution, parametric tests were applied in the current study.

RESULT

Table 3. Mindfulness levels and HRV parameter values of the yoga group and non-yoga group

		N	$\bar{X}$	Sd	t	p
SDNN	Yoga Group	27	96.11	23.86	2.929	**.005***
	Non-Yoga Group	25	77.32	22.27		
RMSSD	Yoga Group	27	66.19	30.54	2.005	.050
	Non-Yoga Group	25	49.96	27.62		
LF/HF	Yoga Group	27	6.30	4.29	1.211	.232
	Non-Yoga Group	25	4.91	3.92		
MeanHR	Yoga Group	27	79.34	11.44	-2.412	**.020***
	Non-Yoga Group	25	86.80	10.80		
Coherence	Yoga Group	27	67.78	13.52	.364	.718
	Non-Yoga Group	25	66.43	13.29		
Mindfulness	Yoga Group	27	67.77	10.77	2.097	**.041***
	Non-Yoga Group	25	61.80	9.69		

***p<0.05**

In table 3, a statistically significant difference was observed in favor of the yoga group in SDNN (p>.005), MeanHR (p>.020), and mindfulness (p>.041). There is no significant difference in RMSSD (P = .050), LF/HF (P < .232), and Coherence (P <.718).

DISCUSSION

Yoga is a science that facilitates homeostasis and aims to improve the individual's quality of life. Therefore, yoga practices are recommended to regulate the autonomic nervous system and to influence cardiovascular function (58). According to the current study findings, the SDNN values of the yoga group are higher than the non-yoga group. SDNN is the standard deviation of NN intervals. The parameter that gives the general HRV estimation in the evaluation of HRV is SDNN (31).

When the literature is examined, it is possible to come across studies showing the positive effect of yoga practices on the autonomous system. Papp et al. (39)'s study contains 12 healthy men and women participating in a yoga program once a week (60 minutes/ eight-week). According to the study's results, eight weeks of Hatha Yoga has significantly improved heart rate change. This result shows increased vagal tone and reduced sympathetic activity. Tyagi and Cohen (56)'s review studies suggest that yoga may affect cardiac autonomous

regulation with increased HRV and vagal dominance during yoga practices. It was found that yoga group has increased vagal tones at rest than non-yoga group. According to Vinay et al. (58), the autonomous balance leans towards parasympathetic dominance after a month of yoga practice. Chu et al. (15) study results show that yoga program is effective in increasing parasympathetic tone. They recommend regular yoga practice for women to improve their HRV. Tyagi et al. (57) examined the effects of yoga on HRV, emotion-flow state, and mental stress in individuals with metabolic syndromes. Study results show that yoga practitioners have greater homeostatic capacity, autonomous, metabolic, and physiological flexibility. When the studies evaluating the SDNN parameter in the literature are examined, many studies support the current study findings. Therefore, it can be said that doing yoga increases the SDNN parameter, which is the determinant of HRV.

According to the current study findings, the mean heart rate values of yoga group are lower than non-yoga group. Krishina et al. (28)'s studies examining the effect of heart rate, blood pressure, and cardiac autonomous function on heart failure show a significant decrease in heart rate compared to individuals in the control group of the yoga group. The results of the study by Devasena and Narhere (17) show that there is a significant decrease in heart rate in subjects who practice yoga. Therefore, it can be said that regular yoga practices support the work of the heart.

It is known that yoga practice, especially relaxation techniques and slow pranayama, provides sympathovagal balance and improves HRV (37). However, according to the current study's findings, no statistically significant difference was observed in the LF/HF ratio, which is an indicator of sympathovagal balance. There is disagreement in the literature regarding the LF component. Some studies show LF as a quantitative marker for sympathetic modulations, while others show LF as a parameter reflecting both sympathetic and vagal activity. As a result, the LF/HF ratio is considered by some researchers to reflect sympathovagal balance or to reflect sympathetic modulations (31).

The current study determined the mindfulness levels of women through self-report. The present study findings show that the mindfulness levels of yoga group, and SDNN, the predictor of HRV, are higher than non-yoga group. In the literature, it is possible to come across studies in which mindfulness and HRV are evaluated together. Sun et al. (49) used the Mindful Attention Awareness Scale (MAAS) to determine the level of mindfulness in their studies. The findings of the study show that as mindfulness increases, the ability of the autonomic nervous system to function to protect homeostasis improves Mankus et al. (33). The study of mindfulness and heart rate variability in individuals with high and low anxiety symptoms suggests that mindfulness can increase the parasympathetic effects on the heart rate for high-anxiety individuals.

Studies on mindfulness and HRV in the literature are often experimental. The content of the studies is aimed at examining the effect of mindfulness practices on HRV (55). Yoga and/or meditation practices are included in mindfulness-raising methods, such as the Mindfulness-Based Stress Reduction (MBSR) program and mindfulness meditation. Therefore, yoga and meditation are among the practices to improve mindfulness.

CONCLUSION

As a result, yoga practices increase HRV. It is also a practice that helps to enhance women's mindfulness levels. The limitation of this study is to include only female individuals in the research and only the evaluation of resting HRV parameters. Considering these limitations in future studies, including male individuals in the study may contribute to the literature.

Conflicts of Interest

The authors declare no conflicts of interest

Statement of Researchers' Contribution Rates

Both authors contributed equally at all stages of the research.

Contribution and Acknowledgment

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Examination of the Correlation Between the Happiness and Psychological Well-Being Levels of the Exercisers(Diyarbakır Province)

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Abstract

In this study, it is aimed to determine the relationship between these two variables by examining the happiness and psychological well-being levels of exercisers in terms of different variables. The sample group of the research consists of 232 individuals, 159 women and 73 men, who exercise in the sports centers in Diyarbakir. Oxford Happiness Scale and Psychological Well-Being Scale were used as data collection tools. Parametric tests were applied due to the normal distribution of the data. ANOVA tests were used to determine the way of the difference. In addition, Pearson Correlation analysis was used to determine the relationship between happiness and psychological well-being of exercisers. The significance level was determined as .05. According to the findings obtained in the study, it was determined that the happiness and psychological well-being levels of the exercisers were above the medium level. It has been observed that the happiness and psychological well-being levels of the exercisers do not differ according to the age and gender variable. While a significant difference was observed in favor of those participating in social activities in the psychological well-being levels of individuals participating in social activities, no significant difference was observed in terms of happiness levels. Among the self-defining situations of individuals who exercise in daily life, it was observed that those who were peaceful were happier than those who were stressed, while those who were calm and peaceful had higher levels of psychological well-being than those who were stressed. As a result, it has been observed that there is a moderate, positive relationship between the happiness levels of the individuals who exercise and their psychological well-being levels.

Keywords: Happiness, Psychological Well-Being, Exercise

INTRODUCTION

Psychology has sought answers to many positive or negative concepts in human life (18). Happiness and psychological well-being are among these concepts. People may encounter negative events throughout their lives. The reactions and behaviors shown in the face of these negative situations are important in terms of social sciences and psychology (32).

Happiness is a concept that is effective in all areas of people, appears as the concept of subjective well-being in the literature, and attracts great attention by researchers. Happiness can be explained as a feeling of the positive dimension of the individual's emotions in contrast to the negative dimension and the general satisfaction of the individual with his/her life (8). Many studies have shown that being happy causes positive results and is a protective factor against psychological problems (20, 22).

The relationship between the concept of happiness and exercise has been revealed by many studies (23, 28). In cases where individuals are restless and not happy, it is necessary to examine the consequences of negative effects on the human body caused by psychological stress. The healing properties of exercise against the destruction caused by these negativities should be observed by examining the treatment process changes and biological effects. The basic function of cells in the organism are nutrient and oxygen transport. While exercise provides more oxygen to the organism, it also ensures that nutrients and oxygen reach almost every part of the body more intensely and comfortably. As a result, the vitality levels of cells and physical endurance increase. With the programmed exercise, the level of happiness increases and it is protected from the negative effects of stress (2).

Scientists have tried to understand the physical and psychological well-being and processes of individuals, taking into account different situational and personal variability. People can express their well-being using many different words and terms. Many concepts, which are not the same but are related, are used to express the healthy state of people. The concept of well-being includes concepts such as personal well-being, psychological well-being, positive or negative affect, and quality of life. All of the concepts used are related to the conditions that affect the health status of individuals in every aspect (13).

Psychological well-being refers to being able to respond effectively to negative events and manage the process effectively and successfully (21). Kıran (17) defined individuals who are psychologically better as individuals with higher level of psychological well-being, struggling with all obstacles in front of their personal development, and living in line with their goals and objectives.

Ryff (27) considered well-being as an effort to improve one's self, and for this reason, while investigating the concepts of psychological well-being or psychological well-being, he benefited from humanist existentialists and theorists working on the self. Therefore, the concept of psychological well-being; He expressed it in six dimensions: positive relations with other individuals, life goal, environmental dominance, self-acceptance, autonomy and personal development, and stated that it is expected that individuals with positive dimensions from these dimensions have high levels of satisfaction with life and psychological well-being.

Various health problems arise due to the stagnant lifestyle that emerges as a result of the constant change in social life. One of the effective methods to deal with these problems is exercise. People; In order not to experience health problems and to live an active social life, they can turn to exercise and sports. The problems caused by irregular and insufficient level of sports have led to the taking of necessary measures in most of the countries. In many countries, studies are carried out to increase the level of citizens doing sports and to protect public health (24).

Achievement motivation of exercise was positive with perceived efficacy, self-efficacy, orientation towards exercise; on the other hand, it is seen to be negatively related to depression (19). Exercising at a certain level provides benefits for the individual in coping with negative situations such as depression, stress, sadness, and grief, as well as protecting mental and psychological health (29). The psychological well-being of individuals is directly proportional to their psychological endurance. If individuals have a psychological resilience that can resist various sources of stress and reduce the effects of negative situations they encounter, their psychological well-being may increase in parallel with their resilience (25). Since the number of studies

on the happiness and psychological well-being levels of exercisers is low, the objective of this study is to enhance the existing body of knowledge by researching the correlation between the levels of happiness and psychological well-being among exercisers.

METHOD

In the descriptive survey, the correlational survey model have been put to use as it aims to explain the correlation between the psychological well-being and happiness levels of exercisers.

Population and Sample of the Research

Individuals over the age of 18 who regularly attend sports centers in Diyarbakır city constitute the universe of the research. A total of 232 subjects, 159 female and 73 male, who accepted to take part in the research voluntarily constitute the sample of the research.

Data Collection Tools

In the data collection form of the research, "Personal Data Form" was applied to measure the demographic characteristics of individuals who exercise regularly, "Oxford Happiness Scale" to measure their happiness levels, and "Psychological Well-Being Scale" to gauge their psychological well-being levels. The scales were administered to volunteer participants using the online questionnaire method.

Personal Data Form

It was prepared by the analyst to measure the demographic qualities of exercisers through variables such as gender, age, sports/exercise/physical activity status, participation in social activities and self-identification status in daily life.

Oxford Happiness Scale

The measurement tool crafted by Hills and Argyle(15) to measure the happiness levels of individuals was adapted into Turkish by Doğan and Çötok (10). This scale, which has a single dimension, consists of 7 items. The 7th and 1st items in the scale work in reverse. The measurement tool is a 5-point Likert-type scale, which is answered as "Totally Agree" - "Totally Disagree". According to the answers given, the higher score to be taken from the scale indicates the higher level of happiness, while the lower score indicates the lower level of happiness. The Cronbach's alpha coefficient of the measurement tool was found to be .74. The Cronbach Alpha coefficient of our research was found to be .73.

Psychological Well-Being Scale

The Turkish adaptation of the "Psychological Well-Being" measurement tool was employed to gauge the extent of psychological well-being (9, 31). Comprising 8 items, the scale employs a 7-point Likert scale (1=totally disagree, 7=totally agree). Higher scores on the scale state higher psychological well-being levels, while lower scores remark lower psychological well-being levels. The Turkish version exhibited a Cronbach's alpha internal consistency coefficient of .80. In our study, the Cronbach's Alpha internal consistency coefficient was determined to be .88.

Analysis of Data

The data acquired from the study were subjected to examine in the SPSS.22 package program. Throughout the data analysis phase, various statistical methods were employed. Descriptive statistics were utilized to summarize the data, while the independent samples t-test was applied to make pairwise comparisons between groups. For the examination of differences among multiple groups, a one-way analysis of variance (ANOVA) was conducted. To investigate the association between happiness and psychological well-being, the Pearson correlation test was employed. The significance level of .05 was considered in the interpretation of the results.

RESULTS

The demographic data of the individuals participating in the research and the statistical results showing the relationship between the applied scales separately and with each other are given in tables below.

Table 1: Results Regarding Demographic Variables of Individuals Exercising

Variables	Groups	n	%
Age	18-20 years	59	25,4
	21-25 years	114	49,2
	26 year and +	59	25,4
	Total	232	100
Gender	Women	159	68,5
	Men	73	31,5
	Total	232	100
Regularly Attending Social Activities Except Exercise	Yes	115	49,6
	No	117	50,4
	Total	232	100
How Do You Describe Yourself In Daily Life?	Calm	73	31,5
	Peaceful	26	11,2
	Stressful	97	41,8
	Aggressive	36	15,5
	Total	232	100

A total of 232 exercisers, 25.4% of whom are 18-20 years old, 49.2% are aged 21-25, and 25.4% are aged 26 and older, participated in the study. While female individuals constitute 68.5% of the exercisers taking in the survey, 31.5% are male individuals. While 49.6% of the individuals taking part in the survey regularly participate in social activities other than exercise, 50.4% do not participate regularly. 31.5% of the individuals taking part in the research describe themselves as calm in daily life, 11.2% as peaceful, 41.8% as stressful and 15.5% as aggressive.

Table 2: ANOVA Test Results of Happiness and Psychological Well-Being Levels of Exercisers by Age Variable

Scale	Age	n	$\bar{X}$	ss	f	p
Oxford Happiness Scale	18-20 years (1)	59	22,81	4,94	1,27	0,28
	21-25 years (2)	114	22,12	4,72		
	26 years and + (3)	59	23,32	4,93		
Scale of Psychological Well-being	18-20 years (1)	59	39,8	8,10	2,19	0,11
	21-25 years (2)	114	39,46	9,83		
	26 years and + (3)	59	42,44	8,68		

In the statistical analysis, no statistically significant disparity was analyzed in the happiness and psychological well-being levels of the exercisers when the age variable was considered ($p>0.05$).

Table 3: T-Test Results of Happiness and Psychological Well-Being Levels of Exercisers by Gender Variable

Scale	Gender	n	$\bar{X}$	ss	t	df	p
Oxford Happiness Scale	Women	159	22,47	4,87	-0,64	230	0,90
	Men	73	22,9	4,78			
Scale of Psychological Well-being	Women	159	40,23	8,88	-0,20	230	0,38
	Men	73	40,48	9,86			

In the statistical analyzes performed, any statistically significant disparity was observed in the happiness and psychological well-being levels of the exercisers in regard to variable of gender($p>0.05$).

Table 4: T-Test Results of Exercisers' Levels of Happiness and Psychological Well-Being According to the Variable of "Regularly Attending Social Activities Except Exercise"

Scale	Regularly Attending Social Activities Except Exercise	n	$\bar{X}$	ss	t	df	p
Oxford Happiness Scale	Yes	115	23,75	4,27	3,67	230	0,32
	No	117	21,48	5,10			
Scale of Psychological Well-being	Yes	115	42,95	7,97	4,53	230	0,02*
	No	117	37,71	9,56			

** p<0,05 significance level*

In the statistical analysis, any statistically significant disparity was not observed in the happiness levels of exercisers, when the variable "Regularly Attending Social Activities Except Exercise" was examined (p>0.05). However, a statistically significant distinction has been analyzed on behalf of those who regularly participate in social activities other than exercise in the psychological well-being levels of the individuals participating in the exercise (p<0.05).

Table 5: ANOVA Test Results of Happiness and Psychological Well-Being Levels of Exercisers According to the Variable of "How Do You Describe Yourself In Daily Life?"

Scale	How Do You Describe Yourself In Daily Life?	n	$\bar{X}$	ss	f	p	scheffe
Oxford Happiness Scale	Calm (1)	73	23,26	3,44	5,87	0,01**	2-3
	Peaceful (2)	26	25,46	3,43			
	Stressful (3)	97	21,39	4,83			
	Agressive (4)	36	22,47	6,82			
Scale of Psychological Well-being	Calm (1)	73	42,49	8,41	5,40	0,01**	1-3 2-3
	Peaceful (2)	26	44,31	6,98			
	Stressful (3)	97	38,24	9,41			
	Agressive (4)	36	38,56	9,77			

** p<0,05 significance level*
*** p<0,01 significance level*

In the statistical analysis, a statistically significant disparity was observed in the level of happiness and psychological/mental well-being of exercisers, when the variable of how do you describe yourself in daily life is considered. In conclusion of the Post-Hoc analyzes carried out to understand which groups this disparity is between, a positive difference was observed between the exercisers, who see themselves as peaceful in the happiness scale, and those who exercise, who see themselves as stressful (p<0.05). In conclusion of the Post-Hoc analysis employed to see between which groups the significant disparity emerged in the psychological well-being scale, a significant difference was observed between the exercisers, who saw themselves as calm, and those who saw themselves as stressed, in favor of those who were calm (p<0.05). In addition, it has been found a significant difference between the exercisers who see themselves as peaceful and those who are stressed, in favor of those who are peaceful (p<0.05).

Table 6: Results of Pearson Correlation Analysis Between Happiness and Psychological Well-Being Levels of Exercisers

		Psychological Well-being
Happiness	r	0,65*
	p	0,00**

*** p<0,05 relevancy level*

When the answers given to the scales by the exercisers participated in the research were examined, in conclusion of the statistical analyzes employed to see what kind of relationship there was between the Oxford Happiness Scale and the Psychological Well-Being Scale according to various variables, it has been determined a statistically positive and moderate relationship according to the answers given by the exercisers to the scales observed (r = 0.65).

DISCUSSION AND CONCLUSION

In this research, it is purposed to analyze the happiness and psychological well-being levels of exercisers in Diyarbakır in terms of some variables and to reveal the relationships between these variables. In addition to the physical effects of exercise, it is important to reveal the psychological effects on the individual. When the literature is examined, there are similar studies with different sample groups. However, no similar research was found, especially within the framework of Diyarbakir province.

When the happiness levels of the exercisers were considered in terms of the age variable, it has not been observed any statistically significant distinction. In a study on primary school teachers, it was determined that the effect of economic and non-economic factors on happiness did not differ significantly with the age variable (14). This supports our work. Contrary to our study, Eryılmaz and Ercan (12) found that young adults were happier than adolescents in their study on subjective well-being of adolescents. When the psychological well-being levels of the exercisers were considered in terms of the age variable, no significant difference was observed. Tekkurşun Demir et al., (30) did not observe any difference in the mental well-being levels of the sportsman with regard to variable of age in their study on the decision-making styles and mental well-being levels of individual and team sportsman. This is in line with the findings of our study. In his study, Bilir (4) observed that mental well-being, basic psychological needs, autonomy and competence needs differed statistically by age groups.

When the happiness levels of the exercisers in the study were examined with regard to the variable of gender, any significant difference was not observed. In support of our study, Elmas et al. (11) could not observe a statistically significant disparity with regard to gender variable in their study in which they examined the relationship between physical activity levels and psychological well-being of university students. Habibzadeh and Allahvirdiyani (14) found that there is a significant correlation between the gender of teachers and happiness as a result of their studies with primary school teachers. When the mean scores of the psychological well-being levels of the exercisers were analyzed for the gender variable, no significant difference was observed. In a study on the psychological well-being of university students, it has been observed that there was not any statistically significant disparity according to the variable of gender (5). Again, as a result of a study on university students' psychological well-being, emotional intelligence and personality traits, no significant difference was observed between the psychological well-being levels of the participants in terms of gender (26). The results of these studies show parallelism with the results of our study.

No significant disparity was observed between the happiness levels of the exercisers according to their participation in a social activity other than exercise. Huppert (16) states that being social is directly connected to psychological/mental well-being and happiness. Contrary to our research, Canbay (6) found a positive relationship between students' social skills and happiness levels in his study on the correlation between social skill levels and happiness levels of high school pupils. In the study of Ulukan et al. (32) in which they examined the happiness levels of pupils studying physical education and sports school, they found that there was not any statistically significant disparity when the students' happiness levels were compared with their social activity levels. This result supports our study. When the average scores of the psychological well-being levels of the exercisers are examined according to their participation in social activity, it is seen that the psychological well-being levels of the individuals participating in social events differ statistically in a positive way compared to the individuals who do not participate. At this point, it can be concluded that the psychological well-being levels of participants in social activities and exercise are higher than those who do not take part in social events. Aydin et al. (3) found that the psychological resilience levels of candidate teachers who participated in social activities were higher than those who did not. The result of the findings of this study is in parallel with the result of the research we have done.

It has been observed that the exercisers are more happy than the individuals who are stressed, among the average of the happiness levels of self-identification in daily life. Ulukan (32) examined the relationship between teachers' happiness and resilience levels and observed that calm teachers were statistically more positively psychologically stronger than stressed teachers. This also supports our study.

A statistically significant (r=65) relationship was observed in the examination of the relationship between the average happiness levels of the exercisers and the average psychological well-being levels. As a result, a

positive correlation was observed between the happiness of exercisers and their psychological well-being. According to these results, as the happiness levels of the exercisers increase, their psychological well-being levels also increase. Thus, from the results obtained, it can be said that the happiness level of exercisers is a predictor of their psychological well-being. Again, Cantez (7) observed a positive correlation between happiness and psychological well-being in their study in which they examined the relationship between happiness, resilience and self-efficacy levels of university students. Açıkgöz (1) observed a similar result in his study with medical school students.

As a result of the study, it was determined that there is a moderate, positive relationship between the happiness levels of the individuals who exercise and their psychological well-being levels. This study, which can be a reference for future studies, can provide more effective results by expanding the sample size.

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Boredom and Addiction: An Exploratory View at University Students' Digital Game Playing Processes in Leisure Time

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Ethical Statement: It is declared that scientific and ethical principles have been followed while carrying out and writing this study and that all the sources used have been properly cited.

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Abstract

The aim of this study is to examine the relationship between the lack of digital game playing dimensions and the perception of seeking and boredom in leisure time. 201 volunteer students from Selçuk University Faculty of Sport Sciences participated in the study (N_{female}: 99, N_{male}:102). In the study, Digital game addiction scale and Leisure time boredom perception scale were used as data collection tools. Since the data conformed to the Normal distribution parameters, t tst for pairwise comparisons and One way ANOVA test for three or more category comparisons were tested. The relationship between scales and dimensions was examined with the Pearson correlation test. As a result of the study, while there was no significant difference according to gender and age ($p<0.05$), it was concluded that as the daily leisure time and playing time increased, the averages of addiction and boredom and dissatisfaction increased($p<0.05$). A moderately positive relationship was found between deprivation and seeking of addiction dimensions, and boredom and dissatisfaction($r>0.30$). In the light of these results, it can be deduced that a factor that increases the level and addiction of playing games in university students can be determined as the perception of boredom in leisure time.

Keywords: Recreation, Boredom, Addiction, University students

Sıkıntı ve Bağımlılık: Üniversite Öğrencilerinin Serbest Zamanda Dijital Oyun Oynama Süreçlerine Keşifsel Bir Bakış

Özet

Bu çalışmanın amacı dijital oyun oynama boyutlarından yoksunluk ve arayış ile serbest zamanda sıkılma algısı arasındaki ilişkinin incelenmesidir. Çaışmaya Selçuk Üniversitesi Spor Bilimleri Fakültesi öğrencilerinden gönüllü 201 öğrenci katılmıştır ($N_{kadın}$: 99, N_{erkek}:102). Çalışmada Veri toplama aracı olarak Dijital oyun bağımlılığı ölçeği ve Serbest zaman sıkılma algısı ölçeği kullanılmıştır. Veriler Normal dağılım parametrelerine uyduğundan ikili karşılaştırmalar için t tsti, üc ve üzeri kategori karşılaştırmalarında One way ANOVA testi ile sınanmıştır. Ölçekler ve boyutlar arasındaki ilişki pearson correlation test ile incelenmiştir. Çalışmanın sonucunda cinsiyet ve yaşa göre anlamlı farklılık bulunmazken ($p<0.05$) günlük boş zaman ve oyun oynama süresi arttıkça bağımlılık ve, sıkılma ve tatminsizlik ortalamalarının arttığı sonucuna ulaşılmıştır ($p<0.05$). Bağımlılık boyutlarından yoksunluk ve arayış ile sıkılma ve tatminsizlik arasında orta düzeyde pozitif yönlü ilişki tespit edilmiştir ($r>0.30$). Bu sonuçlar ışığında üniversite öğrencilerinde oyun oynama düzey ve bağımlılığını arttıran bir faktörün serbest zamanda sıkılma algısı olarak belirlenebileceği çıkarımı yapılabilir.

Anahtar kelimeler: Rekreasyon, Sıkılma, Bağımlılık, Üniversite öğrencileri

INTRODUCTION

Digital technology, which is constantly evolving and developing, has reached quite popular use. With the increase in people's perception of leisure and boredom, this technological dimension, which has become widespread especially recently, is seen frequently in all age groups around the world (32).

The perception of leisure time as boredom is associated with negative mood. This is due to the fact that current leisure experiences are not frequent, inclusive, exciting, diverse or new enough (13). Leisure behavior should be psychologically rewarding, especially when individuals perceive that they have the right amount of time for leisure activities. Therefore, leisure boredom is a possible consequence of conflicting perceptions of having too much time with too little to do (30). As a result, the perception of leisure boredom in daily life has become a social habit for individuals to meet their needs and requirements through digital tools (32).

The digital age adventure has been critical in our lives since its emergence in the 20th century. Constantly developing and changing technological devices such as computers, tablets and smartphones have become indispensable for our lives (4). The use of technological devices appearing in every aspect of life have affected and changed children's communication, games, understanding of entertainment and learning skills. Although the use of technological devices is seen in all age groups, it plays a more active role in the younger generation (8; 26). This has affected individuals' usage of Internet and mobile devices and the duration of playing digital games.

The emergence of multi-user games, on the other hand, has led especially children to turn to virtual friendships rather than real friendships. It is claimed that this social aspect provided by online games increases the addiction of many people to online games (10). Due to such concerns, parents resort to methods such as banning and restricting digital games. However, today, removing digital games from children's lives causes them to fall behind these developing technologies and restricts them from acquiring the digital skills necessary for their future lives. Therefore, instead of preventing their interaction with digital devices, children should be taught the conscious and effective use of them (2). Individuals who learn to use digital devices consciously will be able to use their leisure time efficiently and their perception of boredom will be at the lowest level.

The concepts of leisure time and the perception of boredom, which have attracted the attention of scientists and been the subject of research from past years to the present, appear in all areas of life. In today's world, the busy pace of work, the epidemic process we are in and many difficulties once again emphasize the importance of efficient use of time (28). Rapidly developing technology has brought along many innovations such as computers, the internet and digital games that have become inseparable parts of our lives.

Although digital games were created to make use of individuals' leisure time and minimize their perception of boredom, they are considered as activities for many areas such as education, entertainment and competition. Playing digital games can be perceived as a way out to get away from the tiring pace of life, as well as a communication tool that can realize social intimacy among peers. It is accepted that it is normal to play digital games in moderation as a part of a healthy lifestyle, and that games even have positive contributions to people such as emotional discharge, relaxation and eliminating the perception of boredom (24).

Digital interaction when stressed is thought to be one of the best ways to reduce stress and improve psychological health. Social networks such as Facebook, Instagram and Twitter and digital games allow individuals to introduce themselves, establish and maintain relationships with others (25). For many people, a high preference or desire for being alone is associated with positive well-being. When alone, people use digital games to self-regulate their emotions, discover their private self, and experience a sense of achievement. In addition, the unique features of digital games are that they are non-face-to-face, interactive and anonymous. For this reason, digital games are among of the platforms preferred by people who want to be alone to interact on social media (20).

People who cannot manage their leisure time appropriately tend to experience the perception of leisure boredom. Individuals who want to instrumentally satisfy the optimal stimulation needs of their current leisure experience prefer digital games (21). Thus, over time, a huge sector has been formed on the axis of digital games and continues to increase the popularity of digital games in the world with phenomena such as e-sports.

In the process, digital games are developed in a way to become more refined for the motivation of individuals to play digital games, increasing their addictive effects (17). Accordingly, it is assumed that digital game addiction within the scope of the study has increased faster than normal due to both the recent technological developments and the effects of pandemics and natural disasters on us. In addition, the relationship between the perception of boredom in leisure time, which is considered to be the biggest cause of digital game addiction, has been examined and it is thought that the results will contribute to the field of sports sciences. In this context, the questions aimed to be answered by this research are as follows;

• Do leisure time boredom and digital game addiction differ according to gender, age, and daily leisure time and daily game play time (hours)?

• What are the daily leisure time tendencies of university students? Does it differ by gender?

• Is there a relationship between "deprivation and seeking", one of the sub-dimensions of digital game addiction, and the perception of leisure time boredom among university students?

METHOD

Research Model

In the study, the relational survey model, which aims to determine the presence or degree of variation between two or more variables, was used from among the general survey models conducted on the whole population or a group of samples to be taken from it in order to make a general judgment about the population in a population consisting of many elements (16). In this study, which was conducted to determine the perception of boredom and digital game addiction levels of university students in leisure time, the instant screening approach and relational survey model, which are included in the general screening model, were used. In this study, which has a cross-sectional characteristic, it is aimed to develop predictions for the future by obtaining the characteristics specific to the time it was scanned with the single survey model. The relational survey model is used to predict the levels of mutual influence between the data obtained by the survey. Instant survey approaches aim to describe the existing situation as it is within the specified time period (15).

This study was approved by Selcuk University, Faculty of Sport Sciences, Non-Interventional Clinical Research Ethics Committee with the decision numbered E.40990478-050.99-473923 dated 23.02.2023.

Population and Sample

The population of the study consists of higher education students studying at universities within the borders of Turkey and playing digital games. The data were collected by e-survey method. The sample group consists of a total of 201 voluntary participants, 99 female and 102 male students studying at Selçuk University Faculty of Sport Sciences in the 2022-2023 academic year, selected by convenience sampling method.

Data Collection Tools

Leisure Time Boredom Perception Scale: Leisure Time Boredom Perception Scale was developed by Iso-Ahola and Weissinger (13) to measure the personal differences of people's perception of boredom in their leisure time. The Turkish version of the scale was adapted for adults by Kara et al. (14) with a validity and reliability study. The scale consists of 10 items and 2 sub-dimensions (boredom and dissatisfaction). In the 5-point Likert-type scale, the statements are answered as (1) Strongly Disagree - (5) Strongly Agree. In this study, Cronbach Alpha values for the sub-dimensions of the scale were found as boredom .82 and dissatisfaction .841.

Digital Game Addiction Scale: A 5-point Likert-type self-report method (1= Strongly Disagree, 5= Strongly Agree) was used to evaluate the statements in the scale, which was adapted by Hazar and Hazar (11). In this study, the "deprivation and seeking" sub-dimension, which was validated in Hazar and Hazar's (11) study, was evaluated. The Cronbach's alpha coefficient of the sub-dimension, which is thought to be associated to boredom and dissatisfaction, was calculated as .850 in this study.

Analysis of the data

SPSS 25.0 statistical package program was used to evaluate the data and to find calculated values. The data were summarized by giving percentages, mean and standard deviations. After checking that the data were normally distributed (±1.95) (George and Mallery, 2010) , independent group t test was used for pairwise cluster comparisons, and One-Way Analysis of Variance (ANOVA-Scheffe) was used for more than two cluster comparisons. Pearson correlation test was used to reveal the relationship between two dependent variables. Effect sizes were calculated as cohen's d for pairwise comparisons, and partial n2 for comparisons with three or more categories. Calculations were made with the GPower 3.1 program. The significance level was taken as 0.05 in the study.

RESULTS

Table 1. Participant characteristics and comparison according to variables

	Scale and its dimensions		Leisure boredom		DGA
			dissatisfaction	boredom	deprivation and seeking
Variable		**N (%)**	**X±SS**	**X±SS**	**X±SS**
Gender	Female	99 (43.3)	17,67±4,65	11,84±4,26	19,49±10,48
	Male	102 (50.7)	16,50±4,21	12,85±4,85	18,21±9,15
t			1.878	-1.556	0.920
Age	20 years and under	96 (47.8)	17,29±4,05	12,42±4,32	19,05±9,41
	21 years and under	105 (52.2)	16,88±4,81	12,29±4,84	18,65±10,24
t/ES			0.285	0.643	0.204
Daily leisure time	1-3 hours	19 (9.5)	16,10±5,31	10,52±4,55	16,52±9,41
	4-6 hours	41 (20.4)	16,39±5,24	10,56±4,32	14,12±9,72
	7-10 hours	32 (15.9)	16,50±4,56	13,71±4,64	19,53±8,69
	11 hours and above	109 (54.2)	17,67±3,89	12,95±4,44	20,82±9,69
F/ES			1.473	**4.922**/0.07**	**5.364**/0.07**
Daily game playing	1-3 hours	102 (50.7)	16,52±4,83	11,97±4,59	17,21±9,86
	4-6 hours	40 (19.9)	17,42±4,32	13,20±5,12	17,25±8,62
	7-10 hours	10 (5)	14,50±5,77	10,10±4,33	14,10±9,23
	11 hours and above	49 (24.4)	18,46±2,85	12,93±4,04	24,51±8,73
F/ES			**3.412*/0.04**	1.778	**8.307**/0.11**

*p<0.05,**p<0.01; ES: partial n^2 for ANOVA test

When Table.1 is examined, no significant difference was found in either scale according to gender and age. It was found that the averages of boredom (F=4.922;p<0.01) and deprivation and seeking (F=5.364;p<0.01) increased with increasing leisure time compared to daily leisure time. Also there was a significant difference in favor of dissatisfaction (F=3.412;p<0.05) and deprivation and seeking (F=8.307;p<0.01) daily game playing time over 10 hours.

Table 2. Daily Leisure Time Tendencies of Participants

Going to cafe etc.	X±SS	Female	Male	t/ES
	2,34±1,25	2,47±1,33	2,22±1,15	1.414
Being at Home with the Family	**3,40±1,42**	**3,67±1,37**	**3,14±1,43**	**2.667**/0.37**
Watching Television	2,01±1,16	2,03±1,10	1,99±1,22	0.244
Surfing the Internet	**3,41±1,18**	**3,58±1,08**	**3,25±1,26**	**1.987*/0.28**
Spending Time on Social Media	**3,18±1,25**	**3,41±1,18**	**2,97±1,29**	**2.531*/0.35**
Watching a Movie	3,08±1,27	3,39±1,23	2,78±1,24	**3.480**/0.49**
Reading a Book	**3,42±1,27**	**3,78±1,17**	**3,06±1,28**	**4.145**/0.58**
Playing Games on PC or phone	3,39±1,15	3,25±1,14	3,53±1,14	1.732
Doing Activities with Friends	3,22±1,27	3,38±1,27	3,06±1,26	1,762
Participating in sports organizations / Playing sports	3,08±1,50	3,11±1,51	3,05±1,50	0.246

*p<0.5,**p<0.01; ES: Cohen's d for t test

When the daily leisure time tendencies of our participants were analyzed by gender, "Being at Home with the Family", "Surfing the Internet", "Spending Time on Social Media", "Reading a Book" showed significance in favor of women. It was observed that the trends in participation in other activities were close to each other.

Table 3. The relationship between Digital Game Addiction - deprivation and seeking dimension and - the sub-dimensions of perception of leisure boredom

		Boredom	Dissatisfaction
Deprivation and Seeking	r	,416**	,386**
	p	,000	,000

**p<0.01

When the relationship between dependent variables was examined, a moderate and positive relationship was found between Deprivation and Seeking and both Boredom and dissatisfaction.

DISCUSSION

The development of the Internet and related digital devices has brought digital games, which have become a leisure time tool, to the forefront. In particular, the intense interest of the new generation has caused digital gaming tools (PC, console, mobile) to become increasingly popular and thus their usage rates have increased (23). In our sample consisting of university students, the tendency to play digital games and immobilization in leisure time is increasing. In fact, national data show that 85% of individuals aged 15 and over did not go to movies, 92% did not attend cultural activities and 94% did not attend sports events in the last 12 months (7). In the light of the data, it can be inferred that mobilization is gradually decreasing and therefore individuals tend to use different leisure time tools. The data also revealed that 82.7% of individuals used the internet regularly in the first 3 months of 2022. In addition, international data reveal that approximately 5 billion people have been using smartphones since July 2022 (6). This intensity of use has revealed the phenomenon of "nomophobia", which is defined as a new disease, and it has been predicted that the feeling of deprivation and anxiety increases the use of these tools. The aim of this study is to evaluate "deprivation and seeking", which are the dimensions of digital game addiction, and "dissatisfaction" and boredom", which describe the perception of leisure boredom, according to the characteristics of the participants and to reveal the relationship between them. It is valuable to determine the answers given to these phenomena and the relationships developed by the students of the faculty of sport sciences who have leisure time awareness. Because the tendencies shown by this generation, who has received training on the effective use of leisure time and has this awareness, will give the opportunity to predict the tendencies of those who have limited or no awareness of this idea. It is aimed to investigate and interpret the relationship between these phenomena, which are hypothesized to feed each other positively, in the context of digital gaming, which is seen as a dimension of technology addiction, which is a new era addiction, from a leisure time perspective.

When the findings obtained as a result of our study were evaluated, it was seen that reading books, surfing the internet, being at home with family and playing games on PC or phone were the most preferred leisure time utilization tools, respectively. Internet access rate in our country is 94.1%. Of this rate, 69% stated that they use it more than once a day (7). This can be associated with many factors. Web-based comforts such as accessibility and ease of use are some of them. However, the most current factor that causes intensive use is undoubtedly the emergence of conditions related to the global pandemic between 2020-2022, which creates the necessity to spend time at home. The Covid-19 pandemic process has increased the use of the internet and technological devices all over the world. Although this is seen as a "savior" during the pandemic, it has changed habits in the long term. It has made inequalities in education and business life relatively tolerable. However, the places for entertainment and physical activity, which are limited due to compulsory isolation and quarantine situations, have increased the search for in-home socialization or activities (5). Therefore, the use of applications such as the internet, social media, digital games or mobile games has increased as the most accessible resources. The first motivation of individuals who turn to such digital actions is undoubtedly boredom and leisure time. However, the tendency to use digital devices and applications, which continues to increase after the pandemic, reveals the deprivation of a technologycal device, digital addiction. Digital gaming represents a part of this addiction. Continuously developing game applications, the enrichment of the content and the increase in visualization tools have increased the attractiveness of the digital game sector (3). Individuals constantly demand this development and more. The search for new games, the tendency to play

games continuously and the transformation of the game into a digital socialization tool (27) cause it to maintain its popularity, especially among young people.

While the results of the study did not show statistical differences according to gender and age variables, significant differences were found according to daily leisure time and daily game playing time variables. Gender is considered as an important variable in digital gaming and boredom perception. When the literature is examined, while the tendency to play digital games is higher in men, the level of boredom perception is higher in women. However, our sample, which includes students from the Faculty of Sport Sciences, did not present any gender-related differences. The reason can be interpreted as being a homogeneous group and having similar interests and awareness levels. Depending on age, a significance in favor of young people in both boredom perception levels and in the deprivation and seeking dimension of digital game addiction is supported by the literature. Since our study includes a small age group with an average age of 18-22 years in the university period, it can be said that they have the same period and developmental characteristics, which explains the insignificance of age-related results. As expected in the evaluation of the variables, significant results were obtained according to the daily leisure time and daily game playing time. In the boredom sub-dimension and deprivation and seeking sub-dimensions according to daily free time, significance was determined according to the students who have less leisure time as the daily leisure time increased. In other words, the level of boredom and the perception of deprivation and seeking increase in parallel. The deprivation and seeking subscale was evaluated in the digital game addiction literature as the search to overcome/achieve a predefined goal/obstacle and to worry about the lack of this feeling (9). The perception of boredom is undoubtedly one of the factors that increases the tendency to escape from this anxiety. An individual can overcome the perception of boredom with a "goal/objective to be achieved" and can realize this with leisure time activities. When we consider digital games as leisure time utilization tools, digital games have the goals of leveling up, and being superior against the computer or against a real opponent online (18; 31). Therefore, it can be said that as the duration of leisure time increases, the level of boredom will increase and the tendency towards escape theory-based digital gaming will increase. The results obtained according to the daily game playing time make it difficult to affirm playing digital games in leisure time. The dissatisfaction that increases as the daily game playing time increases and the search for more seeking and deprivation experienced in the digital gaming express the situation that triggers negative internet-digital use (11). Increasing dissatisfaction and deprivation as the person plays games will increase antisocial behavior and immobilization in the long run (22). This may lead to many psychological, social and physical problems (12; 29).

According to the correlation analysis, which includes results parallel to the evaluation according to demographic variables, boredom and dissatisfaction are moderately positively correlated with deprivation and seeking, which are subscales of digital game addiction. The age scale of digital gaming is quite wide. These games, which are the activities done by individuals of all ages for different purposes, have become an entertainment tool with an increasing demand (1; 10.). Although digital game addiction, which refers to "excessive gaming " or "problematic gaming", is present at all ages, it is at a higher level in Generation Z due to the period when they were born and grew up (19). The deprivation and seeking, which is the subject of our study, is not a state that describes addiction, but also reveals the state of eliminating boredom in terms of leisure time utilization, being satisfied, having a purpose and striving for it, and not being able to stay away from the flow. Digital games can be considered as an optimally preferable activity in terms of quality leisure time. However, the flow-induced disappearance of self-control or intervention systems can lead to loss of perception and addiction. We may be exposed to digital games, which are preferred everywhere and by everyone and are easily accessible, with the perception of boredom, and we may become addicted with the need for constant satisfaction. The relationship revealed in this study is that they feed each other. The fact that the sample was selected from the faculty of sports sciences and that these results were obtained in individuals who also use physical activity in their recreational preferences revealed the necessity of some preventive mechanisms.

CONCLUSION

This study aimed to evaluate the deprivation and seeking subscale of digital game addiction factors and the boredom and dissatisfaction subscales of the leisure time boredom perception scale according to the

participant characteristics and to reveal the relationship between them. While the study did not reach any results according to gender and age, it was concluded that boredom and game addiction increased as leisure time increased, and dissatisfaction and addiction increased as game playing time increased. It was concluded that the relationship between them was moderately positive.

This study has some limitations. The study was planned to be applied to various departments throughout the university. However, the earthquake affecting 10 provinces on February 6, 2023 and the transition to the distance education process caused the sample of this study to change. In order to realize the qualified data collection process, data were collected in digital environment in the groups that the researchers could reach personally. In addition, the disaster on February 6 caused the distance education process to take place freely for the student, similar to the situation in the pandemic. Therefore, as the leisure time periods increased, this situation also affected the result of the study. In addition, the fact that the impact was not limited to 10 provinces but created a psychological trauma in the whole country is thought to have caused an increase in game playing time as it affected the escape tendencies of individuals.

Considering all these limitations, it is recommended to conduct the study again while continuing formal education. Inclusion of university students studying in various fields in a broader framework will increase the scope and value of the study. In addition, increasing digital gaming tendency and its reflections on behavior and emotions can be examined with continuity studies. Students should be informed about the consequences of the increase in leisure time and game playing time through faculty and university administrators.

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Investigation of Teachers' Self Efficieny of Educational Game Teaching: Case of Alanya

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Abstract

In this study, it was aimed (i) to compare teachers' educational game teaching self-efficacy in terms of gender, age, marital status, educational status, seniority, different branches and (ii) to examine educational game teaching self-efficacy levels. General survey method was used in the research. The sample group of the study consisted of 50 physical education and sports, 50 preschool and 50 classroom teachers, total 150 teachers working in Alanya district. In data collection, the 'Educational Play Self-Efficacy Scale' and the demographic information form were applied online via Google® forms to the individuals who voluntarily participated in the study. The data obtained from the study were using IBM SPSS 25.0 statistical package programme. Since the data showed normal distribution as a result of the kurtosis and skewness test, Independents Sample T test was used for binary variables and One Way Anova test was used for three or more variables. As a result of the findings, it was determined that there was a significant difference in the participants' educational game playing competences in terms of age, seniority and branch variables. However, no significant difference was found in terms of gender and educational status variables. In addition, while physical education and sports teachers' self-efficacy in teaching educational games is better than other branch teachers, pre-school teachers' efficacy levels in the application dimension are lower than other branches. As a result, it was determined that teachers' self-efficacy in educational game teaching was at a high level, but there were differences in age, professional seniority, branch and application competence in game teaching. By providing in-service training to improve the implementation dimension, pre-school teachers' self-efficacy level in educational game teaching can be increased to a high level.

Keywords: Educational game, Teacher, Physical education and sport teacher, Self-efficacy.

Özet

Öğretmenlerin Eğitsel Oyun Oynatma Öz Yeterliliklerinin İncelenmesi: Alanya Örneği

Bu çalışmanın amacı (i) öğretmenlerin eğitsel oyun oynatma öz-yeterliliklerinin cinsiyet, medeni durum, eğitim durumu, yaş, kıdem, farklı öğretmenlik branşları açısından karşılaştırılması ve (ii) eğitsel oyun oynama öz-yeterlilik düzeylerinin incelenmesidir. Araştırmada genel tarama yöntemi kullanılmıştır. Araştırmanın örneklem

grubunu Alanya ilçesinde görev yapan 50 beden eğitimi ve spor, 50 okul öncesi ve 50 sınıf öğretmeni olmak üzere toplam 150 öğretmen oluşturmaktadır. Verilerin toplanmasında 'Eğitsel Oyun Öz-Yeterlik Ölçeği' ve demografik bilgi formu, çalışmaya gönüllü olarak katılan bireylere Google® formları aracılığıyla çevrimiçi olarak uygulanmıştır. Çalışmadan elde edilen veriler IBM SPSS 25.0 istatistik paket programı kullanılarak analiz edilmiştir. Veriler basıklık ve çarpıklık testi sonucunda normal dağılım gösterdiğinden ikili değişkenler için bağımsız örneklem T testi, üç ve daha fazla değişken için tek yönlü varyans analiz testi kullanılmıştır. Bulgular sonucunda katılımcıların eğitsel oyun oynatma yeterliliklerinde yaş, mesleki kıdem ve öğretmenlik yaptığı branş değişkenleri açısından anlamlı bir farklılık olduğu tespit edilmiştir ($p<0,05$). Ancak cinsiyet ve eğitim durumu değişkeni açısından anlamlı bir farklılık bulunmamıştır ($p>0,05$). Ayrıca beden eğitimi ve spor öğretmenlerin eğitsel oyun oynatma öz-yeterliliklerinin puan ortalaması diğer branş öğretmenlerine göre daha iyi olduğu görülürken, okul öncesi öğretmenlerin uygulama boyutundaki yeterlilik düzeylerine ilişkin puan ortalaması ise diğer branşlara göre daha düşüktür. Sonuç olarak öğretmenlerin eğitsel oyun oynatma öz-yeterliliklerinin yüksek düzeyde olduğu ancak yaş, mesleki kıdem, branş ve oyun oynatamadaki uygulama yeterliliğinde farklılıklar olduğu belirlenmiştir. Uygulama boyutunun iyileştirilmesine yönelik hizmet içi eğitim verilerek okul öncesi öğretmenlerin eğitsel oyun oynatma öz-yeterlilik seviyesi yüksek düzeye çıkarılabilir.

Anahtar Kelimeler: Eğitsel oyun, Öğretmen, Beden eğitimi ve spor öğretmeni, Öz-yeterlilik.

INTRODUCTION

Although it is not known when and where the game was first played in the historical process, it is stated in written sources that children's games played with stones and vaccine bones are generally known as the oldest games. Historians have discovered in their research that these games were carved on ancient reliefs. In ancient Egypt, various game figures were found on wall paintings. Traces of children's games were also found in some tombs belonging to ancient civilizations living in Anatolia. In some of his works, Kashgarli Mahmut mentions the game of tepük, which is similar to today's football played in Central Asia. Children's games are also found in Dede Korkut stories (9). Although it is known that some of these games are played for entertainment and some are played for the purpose of preparing for life, it is generally known that all games have an important contribution in preparing children for life. Although the game has an important place in preparing for life and having a good time for living beings in all areas of life, it is clearly stated in many studies that educational games adapted to the field of education of children are one of the most important components of the educational process (10).

Education is an important factor in preparing people for life, which is present at every stage of life and is tried to be given to living beings in different ways. In order to provide effective education, a number of different methods and auxiliary supports should be used. In this context, the place of games in education has been evident since the beginning of human history. It is seen in the literature that not only humans but also all living creatures benefit from games in preparing for life, utilizing their free time, and staying healthy. As Huizinga (16). revealed in his Homo Ludens, the first people developed self-defense tactics through games, and in the following periods, people resorted to games in every field (4).

When the game is examined conceptually, there is no single definition of the game. The reason is that it is too comprehensive to be expressed with a single definition. According to Dönmez (13), play is explained as a part of real life, and one of the most effective learning processes for children, which is the basis of physical, cognitive, emotional and social development, which is a part of real life and which is the basis of physical, cognitive, emotional and social development, which is carried out with or without rules, with or without rules, in which the child voluntarily takes part under all circumstances. Play can sometimes be a whole with strict rules that make it difficult for children to adapt to the game. However, even though children have difficulty in complying with these rules, they do not prefer to attempt to disrupt this whole by bending the rules (18).

Games are activities that provide social harmony, affect the level of intelligence, attention, and skill, affect the level of intelligence, attention, and skill, have no material benefit, give pleasure with physical and mental abilities, in a classified place and time, have their own rules, are made through voluntary participation, and can also be done with groups, provide social harmony, and affect the level of intelligence, attention, and skill

(15). Through play, children come together not only with their own age group but also with different age groups and begin to ensure their social adaptation (21).

Although the games used in the educational environment are similar to other types of games, they are called educational games. Educational games are a process and experience that allows children to reinforce the information they learn in the classroom, allows them to have fun and relax while using their cognitive abilities, adds activity to the classroom environment, attracts the attention of all students to the lesson, concretizes the student's learning experience, provides intrinsic motivation, and draws the student in (22).

It is undoubtedly a fact that educational games are one of the most important teaching techniques that allow the student to participate directly in the educational activity and appeal to all developmental areas in the student-oriented education system we are in. Teachers can make students learn more easily by creating an active learning environment while playing educational games and teaching students to dream. In this respect, teachers' educational game self-efficacy level may have an effect on student achievements.

There are important issues to be considered in the process of preparing and implementing educational games. As long as these issues are taken into consideration, the best efficiency will be obtained from educational games. If it is necessary to mention these issues that need to be paid attention in general, the achievements, deciding at which stage of the lesson the game will be used, taking into account the characteristics of the group to be played, the duration of the educational game, the necessary materials, the appropriate physical conditions, the rules should be clearly and clearly stated in advance and flexibility in the rules should be made in case of need. In addition, how evaluation and reward will be done should be determined in advance (1, 20).

In this study, it was aimed to examine teachers' self-efficacy in educational games. For this purpose, (i) the comparison of teachers' self-efficacy of educational game teaching in terms of gender, marital status, educational status, age, seniority, different branches and (ii) self-efficacy levels of educational game teaching were examined.

METHOD

Research Design

The research was conducted in the survey model from the descriptive method. The general survey model is explained as a research method that aims to define an existing situation as it exists (17). A random sampling technique was used to determine the sample of the study.

Participants

The population of the study consisted of teachers working in Alanya district in the 2022-2023 academic year. The sample group consists of a total of 150 teachers, including 50 physical education and sports, 50 preschool (kindergarten) and 50 primary school classroom teachers working in the same district. Participants were informed about the content of the research before the study and voluntarily participated in the study.

Table 1. Demographic information of the participants

Variable	Group	N	%
Gender	Woman	93	62
	Man	57	38
	Total	150	100
Age (year)	21-30	49	32,7
	31-40	56	37,3
	41-50	39	26
	51 and over	6	4
	Total	150	100
Marital status	Married	95	63,3
	Single	55	36,7
	Total	150	100
Education Status	Bachelor	126	84
	Master	24	16
	Total	150	100
Seniority (year)	Between 2-6	27	18
	Between 7-11	47	31,3
	Between 12-16	56	37,3
	17 and over	20	13,3
	Total	150	100
Branch	Physical education and sport	50	33,3
	Pre-school	50	33,3
	Classroom teacher	50	33,3
	Total	150	100

Table 1 shows that 62% of the participants were female, 37.3% were between the ages of 31-50, 63.3% were married, 84% were bachelor's graduates, and 37.3% had 12-16 years of seniority.

Ethics

Ethical approval of the study was obtained from Alanya Alaaddin Keykubat University Social and Human Ethics Committee (with decision number 2023/02 and date 20.02.2022).

Data Collection Instrument

The data used consist of 2 parts: demographic information and scale questions. Demographic information includes questions about gender, age, marital status, branch, and seniority. Teachers' Self-Efficacy Scale for Educational Game Play developed by Altınkök and Yılmaz (6) was used in the study. The scale (Planning: Items 1, 2, 3, 4. Implementation: 5, 6, 7, 8. Evaluation: 9, 10, 11. items) consists of three sub-dimensions and 11 questions and is a 5-point Likert-type scale. The reliability coefficient of the scale was found to be 0.88 (6). In scale validity and reliability studies, it is stated that the sample size should be 5-10 times the number of scale items (24, 19). For this reason, since the scale consists of 11 items, the scale was applied to at least 50 teachers for each branch. The score ranges table given by Altınkök and Yılmaz (6) was used in the evaluation of game playing levels (Score ranges between 1-1-1,8 score; Very weak. Between 1,9-2,6 score; Weak. Between 2,7-3,4 score; Medium. Between 3,5-4,2 score; High. Between 4,3-5 score; Very High.).

Analysis of Data

Descriptive statistical information including frequency distribution, percentage, arithmetic mean, and standard deviation of the data of the participants were made with Spss 24 program. Skewness and kurtosis tests were applied to the data obtained from the research for the normality test. Skewness and kurtosis values between +1.5 and -1.5 were interpreted as normal distribution (25). Since the skewness and kurtosis values were between +1.5 and -1.5 as a result of the test, Independent Samples T test was performed for pairwise comparisons, One Way Anova test for multiple comparisons, and Tukey and LSD tests were performed to determine which groups the differences were between. The statistical significance level was accepted as $p<0.05$.

RESULTS

Table 2. Comparison of participants' educational game teaching self-efficacy according to gender

	Genger	N	Mean±SD	t	df	p
Planning	Woman	93	4,301±0,456	0,452	148	0,652
	Man	57	4,258±0,689			
Application	Woman	93	4,115±0,639	-0,315	148	0,753
	Man	57	4,149±0,621			
Assessment	Woman	93	4,369±0,446	-1,602	148	0,111
	Man	57	4,491±0,463			

In Table 2, no significant difference was found in the sub-dimensions of the game teaching self-efficacy scale in terms of gender variable (p>0.005).

Table 3. Comparison of participants' educational game teaching self-efficacy according to marital status

	Marital status	N	Mean±SD	t	df	p
Planning	Married	95	4,231±0,562	-1,557	148	0,122
	Single	55	4,377±0,533			
Application	Married	95	4,073±0,599	-1,400	148	0,164
	Single	55	4,222±0,676			
Assessment	Married	95	4,340±0,458	-2,716	148	**0,007**
	Single	55	4,545±0,422			

In Table 3, when the sub-dimensions of the game teaching self-efficacy scale were examined according to the marital status of the participants, no significant difference was found in the planning and implementation dimensions (p>0.005). However, a significant difference was found in the evaluation sub-dimension (p<0.005). At this level of significance, it was determined that singles were at a better level.

Table 4. Comparison of participants' educational game teaching self-efficacy according to their educational status

	Educational Status	N	Mean±SD	t	df	p
Planning	Bachelor	126	4,252±0,575	-1,680	148	0,095
	Master	24	4,4583±0,394			
Application	Bachelor	126	4,127±0,625	-0,06	148	0,952
	Master	24	4,135±0,667			
Assessment	Bachelor	126	4,444±0,436	1,794	148	0,075
	Master	24	4,263±0,529			

In Table 4, no significant difference was found in the sub-dimensions of the game teaching self-efficacy scale of the participants in terms of educational status (p>0.005).

Table 5. Comparison of participants' educational game teaching self-efficacy according to age

	Age	Mean±SD	F	p	Tukey, LSD
Planning	21-30 years (1)	4,316±0,581	0,808	0,491	
	31-40 years (2)	4,196±0,611			
	41-50 years (3)	4,359±0,439			
	51 and over years (4)	4,375±0,440			
Application	21-30 years (1)	4,362±0,530	5,470	**0,001**	1-2 1-3
	31-40 years (2)	4,102±0,626			
	41-50 years (3)	3,846±0,680			
	51 and over years (4)	4,291±0,332			
Assessment	21-30 years (1)	4,523±0,435	1,532	0,209	1-2
	31-40 years (2)	4,339±0,419			
	41-50 years (3)	4,384±0,521			
	51 and over years (4)	4,444±0,403			

In Table 5, when the sub-dimensions of the participants' self-efficacy scale for teaching games according to age were analyzed, no significant difference was found in the planning and evaluation dimensions (p>0.005). However, a significant difference was found in the implementation sub-dimension (p<0.005). This

significance was found to be the highest in the 21-30 age group and the lowest in the 41-50 age group at the mean level.

Table 6. Comparison of participants' educational game playing self-efficacy according to years of seniority

	Seniority	Mean±SD	F	p	Tukey, LSD
Planning	Between 2-6 years (1)	4,388±0,581	2,785	**0,043**	1-2
	Between 7-11 years (2)	4,095±0,700			
	Between 12-16 years (3)	4,375±0,393			
	17 years and over (4)	4,337±0,431			
Application	Between 2-6 years (1)	4,398±0,564	2,540	0,059	
	Between 7-11 years (2)	4,133±0,607			
	Between 12-16 years (3)	4,062±0,627			
	17 years and over (4)	3,937±0,701			
Assessment	Between 2-6 years (1)	4,567±0,390	1,267	0,288	
	Between 7-11 years (2)	4,390±0,473			
	Between 12-16 years (3)	4,369±0,448			
	17 years and over (4)	4,400±0,502			

In Table 6, no significant difference was found in the implementation and evaluation sub-dimensions of the participants according to the game teaching self-efficacy scale ($p>0.005$). However, a slight difference was found in the planning sub-dimension ($p<0.005$).

Table 7. Comparison of participants' self-efficacy in educational game teaching according to their branches

	Branches	Mean±SD	F	p	Tukey, LSD
Planning	Physical education and sport (1)	4,395±0,443	3,188	**0,044**	1-3 3-2
	Pre-school (2)	4,330±0,344			
	Classroom teacher (3)	4,130±0,763			
Application	Physical education and sport (1)	4,375±0,452	9,799	**0,000**	1-2 3-1
	Pre-school (2)	3,850±0,719			
	Classroom teacher (3)	4,160±0,586			
Assessment	Physical education and sport (1)	4,446±0,483	5,705	**0,004**	1-2 3-2
	Pre-school (2)	4,253±0,423			
	Classroom teacher (3)	4,546±0,413			

In Table 7, significant differences were found in the planning, implementation, and evaluation sub-dimensions of the participants in the game teaching self-efficacy scale ($p<0.005$). In the planning sub-dimension of this significance, it is seen that physical education and sports teachers' self-efficacy in educational game teaching is better in the planning sub-dimension compared to other branches. It is seen that physical education teachers are better than other branches in the application sub-dimension of educational game teaching. In the evaluation sub-dimension, it is seen that classroom teachers are better than other branches.

DISCUSSION

In this study, it was aimed to examine teachers' self-efficacy in educational games. For this purpose, (i) the comparison of teachers' self-efficacy of educational game teaching in terms of gender, marital status, educational status, age, seniority, different branches and (ii) self-efficacy levels of educational game teaching were examined. In this direction, in our study, when the participants were examined in terms of gender, no significant difference was found in the sub-dimensions of educational game teaching, which reveals that both male and female participants are good at educational game teaching self-efficacy and the importance they attach to educational games. In the study, there was no significant difference between the play skill levels of

physical education teachers according to their gender (2). In a study conducted by Yılmaz et al. (27), it was determined that the participants' self-efficacy in playing games did not differ significantly according to the gender variable. It was seen that there was no difference in the planning and implementation dimension of physical education and sports teacher candidates' educational game playing self-efficacy according to gender variable, but there was a difference in the evaluation sub-dimension according to gender variable (12). In Aslan's (7) study on the self-efficacy of preschool teachers regarding game teaching, while there was a significant difference in the planning and evaluation sub-dimension according to gender variable, there was no significant difference in the implementation sub-dimension. In another study examining the self-efficacy levels of special education teachers regarding game teaching, a significant difference was found in the sub-dimension of implementing game activities (4). It was stated that the play teaching self-efficacy levels of teachers working in preschool special education institutions differed according to the gender status of the teachers (11).

In our study, when the marital status of the participants was analyzed in terms of marital status, no significant difference was found in the sub-dimensions of educational game teaching and it was revealed that both married and single participants were good at educational game teaching self-efficacy. In this respect, it can be said that marital status has no effect on educational game playing self-efficacy. Yılmaz et al. (26) stated in their study that the teaching self-efficacy levels of physical education teachers differed in terms of marital status. However, in another study, it was determined that there was no significant difference. In addition, it was determined that the self-efficacy beliefs of married and single teachers were high (8).

In our study, no significant difference was found in the sub-dimensions of educational game teaching when analyzed in terms of the educational status of the participants. In this respect, it can be stated that educational status has no effect on educational play self-efficacy. There is no statistically significant difference in the self-efficacy of teachers working in preschool special education institutions regarding play teaching according to the educational status variable (7, 3). However, it was observed that special education teachers' self-efficacy related to play teaching differed according to their educational status (4).

In our study, when the participants were analyzed in terms of age, a significant difference was found in the application sub-dimension of educational game teaching competencies. It can be said that this difference may be due to the fact that the frequency of playing educational games in the lessons of the participants in the middle age group is less than the participants in the other category and this may have affected their application skills. When we examined the studies, for example, in one study, when the sub-dimensions of the participants' game playing self-efficacy scale were examined, no significant difference was found in the implementation and evaluation dimensions. However, a significant difference was found in the planning sub-dimension. This significance was found to be higher in the 18-30 age group than in the 31 and over age group (27). It was found that the play teaching self-efficacy levels of teachers working in preschool special education institutions showed a significant difference according to age (11). In another study, it was observed that preschool teachers' self-efficacy for play teaching did not differ according to age variable (7). Similarly, in another study, it was observed that there was no significant difference in the educational play skill sub-dimension of teachers according to age variable (23).

In our study, when analyzed in terms of seniority years of the participants, there was a slight difference in the planning sub-dimension between the educational game playing skills, but no significant difference was found in the implementation and evaluation sub-dimensions. The excitement and experience of those who have just stepped into the teaching profession may have led to a difference in the planning dimension because they were more meticulous in preparing for the lesson. In another study from the literature, a significant difference was found between 11-20 years of service and 21-30 years of service in the dimensions of preparation phase, game phase, and introduction to the game and game playing skill level according to the years of service of physical education teachers (2). In the study examining the self-efficacy levels of special education teachers regarding play teaching, a significant difference was found in terms of gender in the sub-dimension of implementing play activities (4). However, in another study, no difference was found according to seniority (27). It was concluded that the play teaching self-efficacy levels of teachers working in preschool special education institutions showed a significant difference according to the professional seniority of the teachers (11). In another study on the self-efficacy of preschool teachers regarding play teaching, a significant

difference was observed in favor of teachers with 6-10 years of seniority according to the variable of professional seniority (7). It was stated that there was a significant difference in teachers' ability to play educational games according to the length of service variable (23).

In our research, when the participants were analyzed in terms of the branch, a difference was found between their educational game teaching skills. The fact that the physical education and sports course includes the acquisition of basic motor skills in terms of its content, branch-specific activities, and activities with games for this purpose may have influenced physical education and sports teachers to have a better level of educational game playing skills than other branch teachers. In the study conducted by Akçınar (2), it was determined that physical education teachers' skill level in playing educational games was at a very good level. In a study conducted on the self-efficacy of physical education and sports teachers and classroom teachers to play educational games, no significant difference was found in the implementation and evaluation sub-dimensions of the participants. However, a significant difference was found in the planning sub-dimension. It was determined that the mean self-efficacy score of classroom teachers was higher than that of physical education teachers (27). In another study, teachers' self-efficacy levels regarding planning, implementation, evaluation, and game teaching did not differ according to branch (7).

In addition to this, when the educational game teaching competence levels of the branches were examined according to the score ranges in Altınkök and Yılmaz (6), it was seen that the educational game playing competence levels of the participants working in physical education and sports and preschool teaching branches were at a very high level in terms of planning-implementation-evaluation, while the participants of the classroom teaching branch were at a high level in the planning and implementation sub-dimension. In a study conducted, physical education teachers' skills in the preparation phase and game play phase were found to be very good, while their skills in the evaluation phase were found to be poor (2). In another study, when the self-efficacy levels of physical education and sports teacher candidates in educational game playing were examined, it was determined that the teacher candidates had very high self-efficacy in the planning and evaluation dimension and high self-efficacy in the implementation dimension (12). While teachers working in preschool special education institutions see themselves as competent in terms of planning, evaluation, and professional in game teaching, they are not very competent in terms of implementation (7).

CONCLUSION

It was determined that there was a significant difference in the educational game teaching skills of the participants in terms of age, seniority, and branch characteristics. There was no statistically significant difference in terms of gender and educational status. It was seen that the self-efficacy levels of physical education and sports teachers in teaching educational games were higher than the teachers in other branches. However, it was determined that the efficacy levels of pre-school teachers in the application dimension were lower than the teachers in other branches. In addition, it was determined that teachers' self-efficacy for teaching educational games was at a high level. Pre-school teachers' self-efficacy levels for playing educational games can be increased to a high level by providing in-service trainings to improve the application dimension. A new study can be conducted by adding more samples and branches in the comparison of teachers' self-efficacy to teach educational games.

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The Effect of Athlete Mindfulness on the Development of Athlete Psychological Skills

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Abstract

The aim of this study was to investigate the effect of athlete mindfulness, which is expressed as the ability of athletes to establish a cause-effect relationship without losing the perception of reality in the moments and situations related to sports, on the development of their psychological skills, which is emphasized by sports psychologists to positively affect athlete performance by 85%.

This study was designed according to the relational screening and causal comparison methods in order to examine the interaction between the variables. The study group comprised of 362 athletes who can be reached by non-random sampling methods and determined according to the criterion sampling method. As a data collection tool "Athlete Psychological Skills Assessment Scale" developed by Smith et al., (1995) and adapted to Turkish culture by Erhan et al. (2015) was used. Also, "Athlete Mindfulness Scale" developed by Thienot et al. (2014) and adapted to Turkish culture by Tingaz (2020) was used. In the analysis of the data obtained, the demographic variables of the participants were analyzed by correlation and t-test in independent samples, and structural equation model was used in determining the effect of mindfulness levels of athletes on the development of their psychological skills.

As a result, it has been concluded that the mindfulness of the athletes is a significant predictor of the development of the psychological skills of the athletes and explains it at the level of .30.

Keywords: Awareness, Mental Skills, Athlete Psychology

Özet

Sporcu Bilinçli Farkındalığının Sporcu Psikolojik Becerilerinin Gelişimine Etkisi

Sporcuların, spora dair yaşanılan anlar ve durumların içerisinde gerçeklik algısını yitirmeden neden sonuç ilişkisi kurabilmesi olarak ifade edilen sporcu bilinçli farkındalığının, spor psikologları tarafından sporcu performansını %85 oranında olumlu olarak etkilediği vurgulanan psikolojik becerilerinin gelişimine etkisini araştırmayı amaçlayan bu çalışma, değişkenler arasındaki etkileşimin incelenmesi adına ilişkisel tarama ve nedensel karşılaştırma yöntemlerine göre dizayn edilmiştir.

Çalışma grubu seçkisiz olmayan örnekleme yöntemlerinden ulaşılabilir ve ölçüt örnekleme yöntemine göre belirlenmiş 362 sporcudan oluşmaktadır. Çalışmada veri toplama aracı olarak Smith ve ark., (1995) tarafından geliştirişmiş ve Erhan ve ark. (2015) tarafından Türk kültürüne uyarlanmış olan "Sporcu Psikolojik Becerilerini Değerlendirme Ölçeği" ve Thienot ve ark. (2014) tarafından geliştirilmiş ve Tingaz (2020) tarafından Türk kültürüne uyarlamış olan "Sporcu Bilinçli Farkındalık Ölçeği" kullanılmıştır. Elde edilen verilerin analizinde katılımcıların demografik değişkenleri korelasyon ve bağımsız örneklemlerde t-testi ile Sporcuların bilinçli farkındalık düzeylerinin, sporcuların psikolojik becerilerinin gelişimi üzerine etkisi yapısal eşitlik modeli ile analiz edilmiştir.

Sonuç olarak sporcuların bilinçli farkındalığının sporcuların psikolojik becerilerinin gelişimi üzerinde anlamlı bir yordayıcı olduğu ve .30 düzeyinde açıkladığı sonucuna ulaşılmıştır.

Anahtar Kelimeler: Farkındalık, Zihinsel Beceriler, Sporcu Psikolojisi

INTRODUCTION

Nowadays, in addition to training science, sports psychology which is defined by Rejeski and Barwley (58) as providing scientific, educational, and professional support in order to ensure development, progress and permanence in people's behaviors towards sports, is also used to support the development of athletes in the field of sports and to increase their sports performance (30). Sport psychology, which is defined as the application of the psychological principle to sports and physical activities at all levels of skill development, reflects the outputs of psychology in its focus and methods (14). In this context, it is possible to say that the effect of sports psychology on physical performance is important. Karageorghis and Terry (48) state that athletes focus on training 90% physically and 10% mentally, but 90% of the competitions are mental because there are very few situations where elite athletes are physically separated from each other. This inference supports the importance of sports psychology. In addition, studies conducted by sports psychologists have concluded that psychological skills positively affect athlete performance by 85%, and the importance of sports psychology and therefore psychological skills is emphasized (15). While the high-performance level desired by the athletes can be weakened by some psychological barriers apart from physical injuries, it can also be strongly supported by psycho-physiological aids (11). Sports success and sports performance depend on the capacity of individuals to be physically and psychologically ready, and therefore individuals should have good discipline and be able to cope with potential problems (10). This will be possible by integrating learned behaviors with psychological skills such as stress management, concentration, motivation, focus, decision making, problem solving, mental toughness, goal setting, and self-confidence (53). In short, the development of psychological skills will positively support the performance of athletes (74). At this point, it is also important whether the behaviors of the athletes, which include some psychological skills, are done consciously or not. Because it is stated in the relevant literature that conscious behaviors will be more effective than unconscious behaviors (73). In this context, it is possible to say that the mindfulness levels of the athletes will also have an effect on the development of psychological skills that can bring athletes to high performance. This idea is supported by Schwanhausser's (62) statement that there are studies that increase sportive performance because mindfulness provides people with mindfulness protocols such as determination and acceptance (75). Mindfulness, which is the actor of this dual relationship, creates a new research area for sports psychology because it focuses on increasing athlete performance (11).

If the concept of mindfulness is briefly mentioned, although this concept has a history of 2500 years (47), it has recently attracted the attention of the literature as a subject of scientific research (76, 7). Mindfulness, originally known as mindfulness, finds meaning in the Pali language as the integrated form of the words remembering, awareness and attention (66).

The concept of mindfulness, which is known as conscious awareness in Turkish (57), is generally integrated with the meaning of remembering. However, remembering here is not remembering the events experienced, but remembering the real thing in the present moment, in other words, it is conveyed as the state of being able to turn the reality of that moment into sensations and experiences, and to be able to grasp the lived events with their correct, clear and real meanings (59).

There are many definitions for mindfulness in the literature. When these definitions are examined, mindfulness is expressed as allowing people to stay in the moment and accept the situation without questioning or judging (2003), contacting past experiences and the lived moment through stimuli (45, 13), compassionate acceptance of the moment by establishing a cause-effect relationship (54) accepting or rejecting the situation by being consciously aware of it, even if it is automatic (79). According to studies, mindfulness is an innate feature of people, but this skill can be developed with practical exercises. (35). For this situation, Kabat-Zinn (44) emphasized the development of some skills to reveal conscious awareness. These are Non-Judgment: it is the comprehension of the mechanical reactions given by observing the feelings, thoughts and behaviors of the individual as an outside eye (2). This situation enables the moment to be noticed in a transparent and objective way (44). Patience is to fully accept the present moment and store it in the mind to notice and use when needed (44). During this time, it allows the mind to come from a state of constant thinking to a state of listening and observing. The Novice (Beginner) Mind: It is defined as a state of discovery in which the world is watched with excitement and the sensations are given priority (55). This makes it easier to catch new opportunities and possibilities (44). Confidence refers to revealing one's own self and increasing sensitivity towards that self (44). Not to be greedy: Conscious awareness asks people to concentrate on their body by focusing on their own existence without a purpose by isolating them from the intense goals of the outside world (44). Acceptance: The state of acceptance is expressed as the state of accepting and surrendering to that reality by being willing to see oneself with his whole self and holistic realization (44). Allowing (Letting It Flow): Emphasizes the importance of trying to perceive and follow the existing world as it is, without molding one's mind into a shape, desire or emotional state (44, 45).

To activate all these skills, to capture the state of conscious awareness and to ensure permanence in this situation, thoughts and attitudes should be shaped by exercising and practicing intensely and consistently, just like developing a muscle (3, 2). In short, a state of awareness that people have may exist at some moments, but exercises should be done to maintain and improve this state (28).

The importance of mindfulness for individuals has been emphasized in the relevant literature as a skill that can be used in all areas such as work, family, school, and social life. This skill is also important in the field of sports, where some people practice as a hobby and some as a job. In fact, exercises, approaches, and practices have been created that sports actors can benefit from in order to gain conscious awareness skills. With the aim of activating the conscious awareness of sports actors, the ability to cope with the difficulties that will be discussed within the scope of this study, the state of being open to learning, the ability to concentrate, the confidence and achievement motivation, and it is expected that psychological skills, which are to get rid of worries, the ability to be mentally ready with goal setting, the ability to perform well under pressure and stress, will be developed (31). As stated in the introduction part of the study, psychological skills are important for athletes. It is known that conscious awareness is also important for the development of psychological skills. In this context, it would be correct to mention the relationship between the development of psychological skills and mindfulness.

Athlete Psychological Skills and Mindfulness

In recent years, Awareness-Based Interventions, which emphasize acceptance rather than the traditional cognitive-behavioral approach to change or suppress cognitive and emotional experiences, have been adopted in the field of sports in order to eliminate the negative psychological factors that athletes are exposed to with healthier methods (60, 63).

Mindfulness interventions aim to transform psychological states by using the strategy of harming the relationship with the person, using techniques such as awareness and acceptance (41, 79). This will provide the athletes with the opportunity to reduce the negative effects on them by accepting them instead of seeing the difficulties as factors to be resisted.

There are some studies in the relevant literature on these interventions. When the related studies are examined, Conscious Awareness increases the sportive performance of the athletes (27, 50), reduces the symptoms of competition anxiety and athlete's nutrition disorder (Chen et al., 2019), Norouzi et al. (56). In another study by Kabat-Zinn (43) in order to activate the level of mindfulness, it was determined that the programs aimed at reducing the stress level by controlling the awareness based on awareness contributed to

a decrease in anxiety, stress and depression levels and psychological well-being in athletes. has been done. In a study conducted by Brown and Ryan (12) it is claimed that mindfulness causes positive outcomes such as an increase in life-long satisfaction and positive emotions, and a decrease in situations such as stress. Similarly, in studies conducted in line with mindfulness-based interventions, it is stated that mindfulness-based interventions increase emotions in a positive way (32) and decrease anxiety and stress levels (4, 20). In this context, it is understood that mindfulness is one of the methods used to increase the performance of athletes by minimizing the psychological events that negatively affect the performance of athletes through mindfulness-based practices and interventions.

Researching the relationship between these two concepts is important both in terms of practice and theory. In terms of practice, it is the planning of the technical staff responsible for the performance of the athletes, considering the contribution of mindfulness practices in the development programs they organize for the development of the psychological skills of the athletes that will provide a competitive advantage against their opponents. Theoretically, the concept of mindfulness has not been integrated into sports yet because it is a current concept, so few studies have been done. Therefore, it is thought that this research is important in terms of contributing to the literature on the connection of psychological skills and mindfulness concepts with sports. In this context, this study aims to investigate the effect of mindfulness of athletes on the development of psychological skills that will make athletes superior to other competitors.

METHOD

This study, which aims to investigate the effect of mindfulness levels of athletes on the development of athletes' psychological skills, was designed according to the relational screening model, which is one of the quantitative research methods and tests whether more than one variable has a relationship in itself and if there is a relationship, it aims to determine its level (49) also it was designed according to causal comparison model (17) that focus on determining the reasons for the emergence of a situation or phenomenon in question, the factors affecting the causes, and the consequences of these effects.

Study group

Within the scope of the research, the study group was determined according to the accessible sampling and criterion sampling technique, which are random sampling methods (22). The criterion of the said study group is that the participants are individuals who do sports. Demographic information about the participants is given in the table below.

Table 1. Demographic information of the participants

Variable	Type	Frequency	Percent
Gender	Female	118	%46,6
	Male	135	%53,4
Age			
Sports Type	Team	105	%41,5
	Individual	148	%58,5
Sports Year			

Data Collection Process

In the study, both web-based and face-to-face data were obtained during the data collection process. In web-based data collection, the researchers created a questionnaire via Google forms, which informed the athletes in detail about the research and included measurement tools, and the survey link was shared with the participants. The link in question was sent to the athletes via WhatsApp and e-mail. Face-to-face research data were obtained through hand-delivered questionnaires to volunteer athletes. In this context, the participants answered the scale form on the internet and face-to-face, and the answers were transferred to the electronic environment and recorded.

Data collection tool

The data collection tool used in this study consists of three parts. In the first part, there is a personal information form with demographic information such as age, gender, year of doing sports and type of sport. In the second part, the "Athlete Psychological Skills Assessment Scale" (SPBDÖ), which evaluates the

psychological skills of the athletes, was used. In the third part, the "Athlete Mindfulness Scale" was used to determine the mindfulness levels of the participating athletes. Information on the validity and reliability analyzes of the measurement tools in the study are given below.

Athlete Psychological Skills Assessment Scale" (APSAS)

The "Athlete Psychological Skills Assessment Scale" (APSAS) consists of 7 factors and 28 items. It was developed by Smith et al., (67) and adapted to Turkish culture by Erhan et al. (31). The first factor was named as "the ability to cope with difficulties" and consisted of items 5, 17, 21, 24. The second factor was named as "Coachability" and consisted of items 3*, 10*, 15, and 27. The third factor was named "Concentration" and consisted of items 4, 11, 16, and 25. The 4th factor was named as "Confidence and success motivation" and consists of items 2, 9, 14, 26. The 5th factor was named as "goal setting and mental preparation" and consists of items 1, 8, 13, and 20. The 6th factor was named as "Performing well under pressure" and consisted of items 6, 18, 22, 28. The 7th factor was named as "Freedom From Worry" and consisted of 7*, 12*, 19*, 23.* items. The scale, designed as a 4-point Likert type, is scored between 0 and 3 ((0) almost never, (1) sometimes, (2) often, and (3) almost always). Since items 3, 7, 10, 12, 19 and 23 of the scale are negative, they are scored inversely. The results of the confirmatory factor analysis conducted in line with the data of this study to test the scale for conformity with the structural equation model are given below.

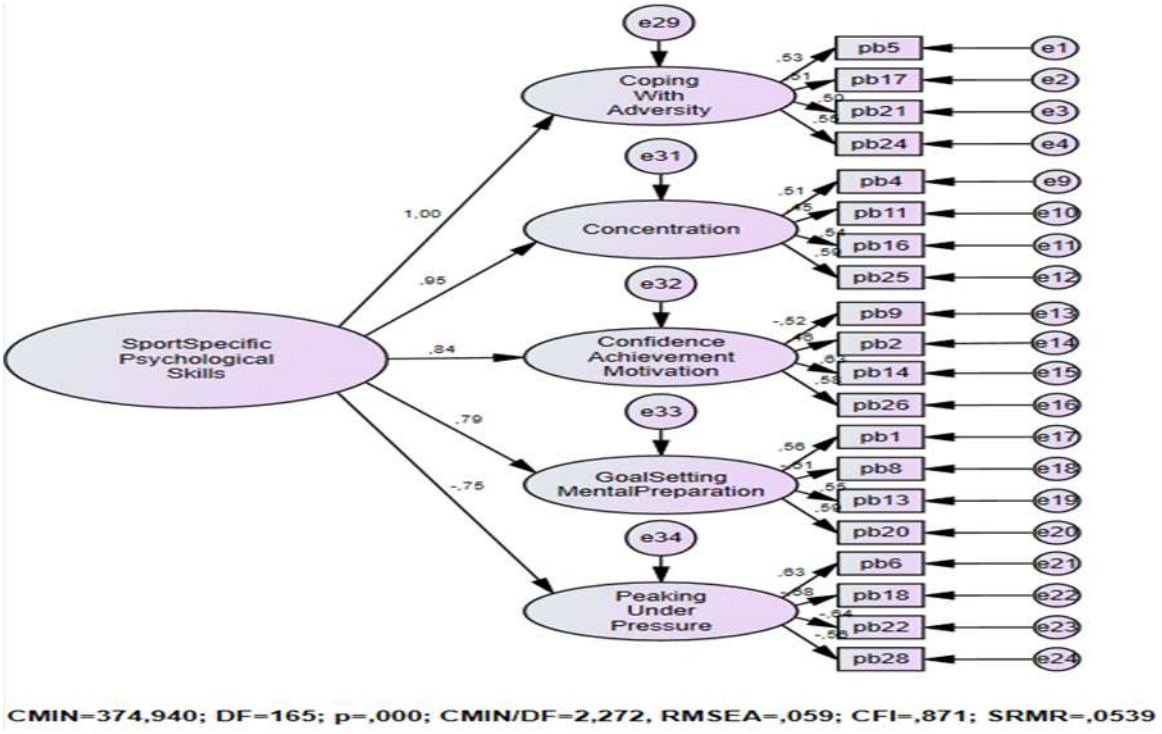

Figure 1. Confirmatory factor analysis model for the Athlete Psychological Skills Assessment Scale

When the figure is examined, the confirmatory factor analysis process of the Athlete Psychological Skills Assessment Scale, which was confirmed with seven factors in the original and five factors in the scope of this study, is as follows: The structure was tested with seven factors in the first analysis. As a result of the first analysis, it was determined that the regression coefficients of the factors of being open to learning and getting rid of anxiety were not significant, and the factor loadings of the items were not in the range of the criterion values, so they were not suitable for the model. In line with these findings, two factors were excluded from the analysis and the analysis was repeated (39), the model and values in the figure emerged. When the fit index values of the model in the figure were examined, it was determined that $\chi 2/df$ (<3), CFI (>.80), SRMR (<.80) and RMSEA (<.80) values were within acceptable fit value ranges (42, 25, 24). When the other parameters of the measurement tool are examined; It was determined that the factor loads of the items were between .45 and .68, the R2 (Square of the Multiple Correlation) values were between 0.207 and 0.468, and the t values given for the significance of the path between the item and the dimension were between 6.340 and 9.543. When

the said values are examined; It has been determined that the factor loads are above the threshold value range specified in the literature, and the t values are above 1.96 (38). Item-total correlation explains the relationship between the scores obtained from the existing items in the measurement tool and the total score. In this context, it was determined that the corrected item total correlation values examined varied between 0.335 and 0.522. The fact that these values are moderate and positive indicates that the items in the measurement tool exemplify similar behaviors and the scale is at a high level in terms of internal consistency (16). It is also stated in the literature that the item-total correlations of 0.30 and above will be sufficient for the items in the measurement tool and that the items with these values are good items (16). Finally, the Cronbach alpha internal consistency coefficient (α) value was calculated as 0.719 ($\alpha \geq .70$). It is possible to state that the fact that all these values are in the criterion value range is proof of the adequacy of the scores obtained from this scale (33, 39).

Athlete Mindfulness Scale

Athlete Mindfulness Scale developed by Thienot et al. (71) and adapted to Turkish culture by Tingaz (72) consists of 3 factors and 15 items. The first factor was named "Awareness". This factor consists of 1, 2, 3, 4, and 5 items. The second factor consists of 6, 7, 8, 9, and 10 items called "No Judgment", which should be scored reversely. The third factor was named "Refocusing" and consisted of Items 11, 12, 13, 14, and 15. The Athlete Mindfulness Scale is scored between 1 and 6 ((1) Almost Never, (2) Extremely Rarely, (3) Rarely, (4) Sometimes, (5) Often, and (6) Almost Always). It is a Likert type scale. The results of the confirmatory factor analysis conducted in line with the data of this study to test the scale for conformity with the structural equation model are given below.

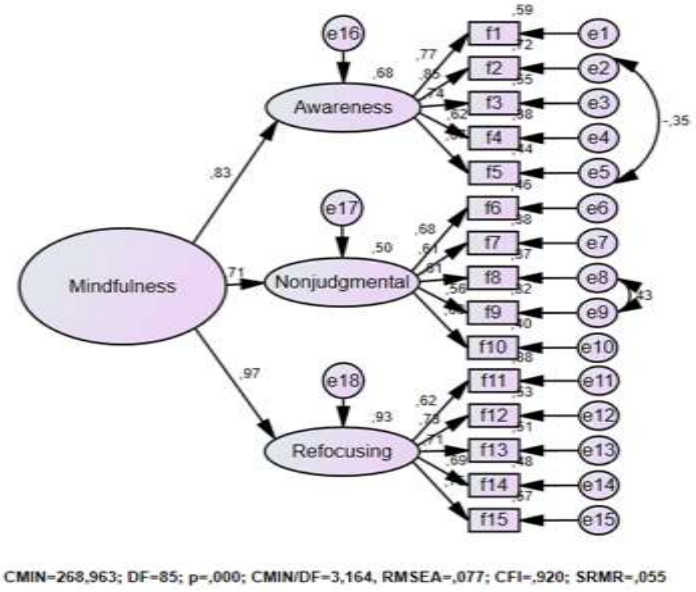

Figure 2. Confirmatory factor analysis model for the Athlete Mindfulness Scale

When the figure is examined, the CFI (>.90) and SRMR (<.80) values of the fit index values of the three-factor Mindfulness Scale (BFI) have good agreement, $\chi 2/df$ ($3< \chi 2/df<5$) and RMSEA (<. 80) value was found to be within acceptable fit value ranges (24, 42). Two modifications of the model were made during the analysis process before these values were reached. In the first analysis, on the grounds that the fit index value of the RMSEA (=.089) was not within the criterion value range (24, 39), a modification was made between the 8th and 9th items, which would make the most contribution to the modification suggestions. The analysis was repeated and it was determined that the RMSEA (=.084) value was not in the criterion value range (39), and the second and final modification was made between the 2nd and 5th items, and the fit index values in the figure were reached.

When the other parameters of the measurement tool are examined; It was determined that the factor loads of the items were between .56 and .85, the R2 (Square of the Multiple Correlation) values were between 0.317 and 0.723, and the t values given for the significance of the path between the item and the dimension were between 8.598 and 16.109. When the said values are examined; It has been determined that factor loads are above .50, which is the threshold value specified in the literature, and t values are above 1.96 (38). Item-total

correlation explains the relationship between the scores obtained from the existing items in the measurement tool and the total score. In this context, the corrected item-total correlation values examined varied between 0.473 and 0.649. The fact that these values are moderate and positive indicates that the items in the measurement tool exemplify similar behaviors and the scale is at a high level in terms of internal consistency (16). It is also stated in the literature that the item-total correlations of 0.30 and above will be sufficient for the items in the measurement tool and that the items with these values are good items (16). Finally, the Cronbach alpha internal consistency coefficient (α) value is 0.893 ($\alpha \geq .70$). It is possible to state that the fact that all these values are in the criterion value range is proof of the adequacy of the scores obtained from this scale (33, 39).

Analysis of data

The data obtained from the participants were first analyzed with z-score, missing values, outliers and descriptive statistics. In the analysis of the z scores, the scores of the athletes were converted into z scores, and it was determined that there were 25 data with scores other than +2.58 and -2.58, which are the threshold values in the literature. The extreme values in question were removed from the data set and re-examined and it was determined that there was no data with outliers (38). In the second stage, the normality distributions of the data were examined and their suitability for the analyzes (Structural equation model, confirmatory factor analysis, parametric or non-parametric) was tested (24). Z (kurtosis and skewness) values obtained by dividing the values of kurtosis and skewness by their own standard errors were taken into account in meeting the normality criterion of the data (69). In this study, the threshold value of ±2.58 expressed by Field (33) was taken as basis. It has been determined that the skewness values of the Z (kurtosis and skewness) values of the data vary between -2.23 and +0.90, and the kurtosis values vary between -2.28 and +1.55. In this context, it meets the normality assumption of the data. Parametric tests were applied in the analysis of the data that met the normality distribution, and t-test and correlation analysis were used in independent samples for the analysis of independent variables. Structural equation modeling was used to determine the predictive level of mindfulness in the evaluation of athlete's psychological skills. Before factor analysis and Structural equation modeling, multicollinearity was checked to test the suitability of the data for factor analysis. In the analysis results, the relationship between the independent variables was not higher than 0.90, the Variance Inflation Factor (VIF) values were lower than the threshold value of 10, the Condition Index (CI) values were lower than the threshold value of 30, and the tolerance values were lower than the threshold value of 10. (24) and it was determined that there was no multicollinearity problem. After these analyzes, Factor Analysis phase was passed. The factor structure of the measurement intervals was analyzed by Confirmatory Factor Analysis (CFA). Constructs confirmed after DFA were analyzed by SEM. $\chi 2$ and $\chi 2/df$ (Chisquare/degree of freedom), CFI (Comparative fit index), SRMR (Standardized root mean square error) and RMSEA (Approximate root mean square error) for sample groups larger than 250 in the evaluation of the model resulting from CFA and SEM) fit index values were taken into account (Gürbüz, 2019; Hu and Bentler, 1999). In addition, within the scope of SEM, path coefficients and r2 values were examined to examine the predictive level of athlete mindfulness of athlete's psychological skills.

RESULTS

The findings regarding the analysis of the data within the scope of the study are given below.

Tables related to the results of independent groups t-test and correlation analysis within the scope of the analysis results of the participants' demographic variables regarding athlete mindfulness and athlete psychological skills are given below.

Table 2. Examination of athlete mindfulness and athlete psychological skills in terms of gender variable

Variable	Gender	n	Mean	SS	SD	t	P
Athlete Mindfulness	Female	83	4.42	0.85	360	-0.468	0.64
	Male	279	4.46	0.78			
A Psychological Skills	Female	83	3.05	0.28	360	-1.741	0.08
	Male	279	3.11	0.24			

When the table was examined, no significant difference was determined regarding the gender variable in the mindfulness scores of the athletes ($t(360)= -0.468$; $p>0.05$). No significant difference was found regarding the gender variable in the development scores of the athletes' psychological skills ($t(360)= -1.741$; $p>0.05$). In line

with these results, it is possible to say that the athletes' being male or female has no effect on the development of mindfulness and psychological skills.

Table 3. Investigation of athlete mindfulness and athlete psychological skills in terms of age variable

	Age
Athlete mindfulness	0.038
Athlete Psychological Skills	0.029
(p>0.05)	

According to table no relationship was determined between the athletes' mindfulness (r (362)=0.038, p>0.05) and the development of psychological skills (r (362)=0.038, p>0.05) in terms of age variable. These result means that the mindfulness and psychological skills of the athletes do not increase or decrease according to the age change.

Table 4. Investigation of athlete mindfulness and athlete psychological skills in terms of sport type variable

Variable	Gender	n	Mean	SS	SD	t	P
Athlete Mindfulness	Individual	165	4.46	0.80	360	-0.06	0.95
	Team	197	4.45	0.79			
A.Psychological Skills	Individual	198	3.10	0.26	360	-0.77	0.54
	Team	165	3.08	0.25			

When the table is examined, no significant difference was determined regarding the type of sport variable in the mindfulness scores of the athletes (t(360)= -0.06; p>0.05). No significant difference was found regarding the type of sport variable in the development scores of the athletes' psychological skills (t(360)= -0.77; p>0.05). In line with these results, it is possible to say that there is no effect on the development of mindfulness and psychological skills of the athletes, whether the type of sport is a team or individual sport.

Table 5. Investigation of athlete mindfulness and athlete psychological skills in terms of the variable of years of doing sports.

	Sports Year
Athlete Mindfulness	0.156**
Athlete Psychological Skills	0.187**
(p<0.05**)	

When the table is examined, a statistically significant relationship was determined between the athletes' mindfulness (r (362)=0.156, p>0.01) and the development of their psychological skills (r (362)=0.187, p>0.01) in terms of year of doing sports. In line with these results, it is possible to state that as the years of doing sports increase, the development of mindfulness and psychological skills of the athletes also increases.

The models and findings related to the structural equation model analysis regarding the effect of athlete mindfulness on athlete psychological skills are given below.

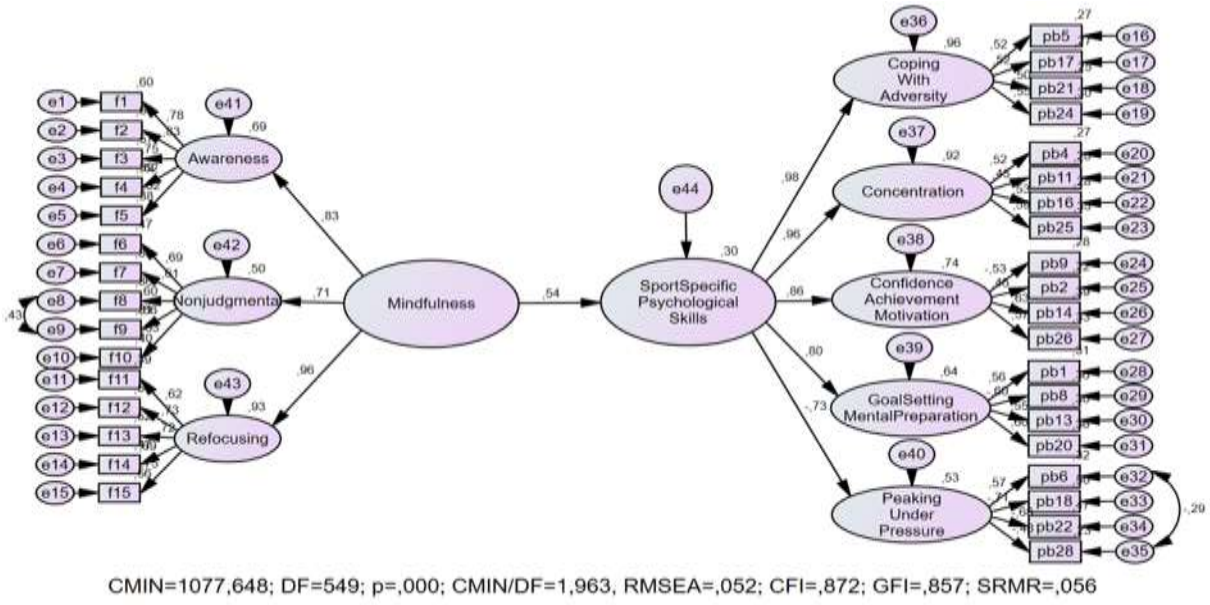

Figure 3. Athlete Conscious Awareness and Athlete Psychological Skills Structural Equation Model

Table 6. Findings Related to the Research Model

Impact			β	Standard Error	t	p	R^2	Result
Athlete Mindfulness	→	P. Skills	0.543	0.061	6.149	0.000	0.30	Acceptance

A structural equation model was created to determine the effect of athlete mindfulness on athlete psychological skills. When the fit index values of the model in the figure were examined, it was determined that χ2/df, CFI, SRMR and RMSEA values were in good fit value ranges (42, 25, 24). In addition, it is seen that athlete mindfulness has a statistically significant and positive effect on athlete psychological skills (β: ,54; p<0.05). It was concluded that a one-unit increase in athlete conscious awareness caused an increase of .54 on athlete psychological skills, and athlete mindfulness had a predictive effect on athlete psychological skills at the level of 30%.

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

There was no difference in terms of gender in the development of athlete mindfulness and psychological skills. In other words, the fact that the athlete is male or female does not affect the development of mindfulness and psychological skills. When the relevant literature on mindfulness was searched, Baer, Samuel, and Lykins (6) found that mindfulness did not differ according to the gender variable. Similarly, in the study conducted by Tingaz (73), it was determined that there was no statistically significant difference in gender among the athletes studying at the faculty of sports sciences. According to the results of the research conducted by Acar (1) on psychological counselor candidates, the gender variable did not differ in mindfulness. In addition to these results, as a result of the mindfulness research conducted by Vural and Okan (75) on shooting athletes, it was found that the mindfulness and non-judgment sub-dimensions of mindfulness did not differ significantly according to the gender variable, but in the refocus dimension, male athletes had higher scores than female athletes. This situation suggests that mindfulness and psychological skills develop as a result of environmental factors that they are exposed to rather than their gender and conducting research on more equal and more gendered people will shed light on the result obtained. Contrary to all these results, as a result of Kesler's (51) study on elite wrestlers, it was revealed that men have higher mindfulness scores compared to women. When the interaction between psychological skills and gender is examined within the scope of the literature, according to the results of a study conducted by Yıldız and Erhan (78) on athletes engaged in winter sports, no difference was found in the psychological skills of athletes according to gender. This result supports

our research, but contrary to this result, in a study conducted by Şahinler (68) on athletes, it was determined that female athletes had higher scores than male athletes regarding their psychological skills.

No significant relationship was determined in terms of age variable between the athlete's mindfulness and the development of psychological skills. In other words, it was concluded that there is no relationship between mindfulness level and the development of psychological skills of the athlete in terms of the increase or decrease in age. In the relevant literature there are studies which supports the research result. Kolayiş and Çelik (52) in their studies on the licensed athletes, no statistically significant difference was determined between mindfulness and age variable. In addition to this result, Azak's (5) study on individuals in different professions similarly did not find a significant relationship between mindfulness and age. When the literature is examined for the relationship between psychological skills and age, no significant difference has been observed in the sub-dimensions of age and the psychological skills of athletes, such as being open to learning and performing well under pressure and stress. A significant difference was found in the dimensions of coping with difficulties, concentration, confidence and success motivations, setting goals and being mentally ready, and getting rid of worries. In addition, as a result of the research conducted by Sevinç (64), it was revealed that there is a significant difference between age and psychological skills. Although it is known that there are different results from this study in the literature, in the light of the information we have obtained as a result of the research, it is thought that the age of the athletes does not contribute to the development of mindfulness or psychological skills because these skills develop with experience rather than age.

No difference was deternmined in terms of the type of sport performed in the development of athlete conscious awareness and psychological skills. In other words, the fact that the athlete is doing one of the team or individual sports does not affect the development of mindfulness and psychological skills. In addition to the results of the study, in the literature review conducted within the scope of athlete mindfulness, according to the results of the study conducted by Tingaz (73) and Can and Kaçay (18) for athlete students, no significant difference was found between the branches performed in the team or individual field and athlete mindfulness. This result supports the research as it reflects the same result as this study. When the literature is examined in terms of the type of sports performed with psychological skills, contrary to the results of the study, it has been revealed as a result of the studies that there are significant differences between individual and team sports in previous studies (68, 78). In order for the results to have a wider scope, it is recommended to conduct extensive research on athletes with different demographic characteristics.

A significant relationship was determined between the athlete's mindfulness and the development of psychological skills in terms of year of doing sports. In other words, as the athlete's years of doing sports increase, the level of mindfulness and the development of psychological skills increase. It is thought that this situation is because of the automaticity in the learned behaviors performed continuously during training or during the competition. As the sports year increase, experience of the athlete will also increase which includes the movements. So it is normal to have a relationship with the sports year at this point. In the relevant literature significant differences were determined between sports age and psychological skills (68, 21, 37). Contrary to these results, there are also studies in which there are no significant differences between psychological skills and the year of doing sports (23, 77). In the study of Vural and Okan (75), it has been proven that sports age has a relationship with the refocus sub-dimension of mindfulness and on the total score of mindfulness. However, when some studies are examined, it has been determined that there is no statistical relationship between the year of sports and mindfulness (51, 73).

Finally, one of the most important results is that the mindfulness of the athlete has a positive effect on the development of the athlete's psychological skills. It has been concluded that athlete mindfulness has a 30% effect on the development of athlete psychological skills. It is also consistent with the results of other studies that mindfulness and mindfulness-based interventions provide people with well-being in mood and general psychology (34). In this context, when the literature is examined, increasing awareness improves the ability to overcome difficulties by providing coordination between people's feelings and thoughts and by reducing the emotions with irregular functions. (65). In addition, mindfulness contributes significantly to the concentration of clues that make it easier for athletes to set performance goals and reach those goals (70). Looking at the results of Schwanhausser's (62) research, mindfulness enables athletes to achieve sportive success by adapting them to the sports environment and increasing their mental readiness level. In addition, studies by Brown and

Ryan (12) revealed that as a result of mindfulness-based interventions made to increase mindfulness, positive emotions are increased (32) and the level of situations such as anxiety and stress is reduced. Naturally, this situation suggests that it is closely related to the ability to get rid of worries. Similarly, Jon Kabat-Zinn et al. (46) had the rowers preparing for the Olympics independently perform mindfulness training two to seven weeks before the Olympics. Some of the medal-winning U.S. Olympic team rowers have reported that mindfulness meditation has shown benefit in optimizing performance during race time. On top of that, some researchers emphasized that the Awareness-Acceptance and Engagement approach (MAC) and Awareness Sports Development Program (MSPE) will help increase athlete performance, as well as increase mindfulness for awareness, acceptance, concentration, sense of control and bodily sensations, and reduce stress and anxiety (8, 9, 26, 36, 40, 61).

As a result, mindfulness can help the athletes to be highly motivated during the competition, to keep stress in balance, to cope with difficulties and to use their skills well on all factors (29), to perform well under pressure, and in the development of psychological skills that will naturally provide a competitive advantage against their competitors. It is possible to state that it is an effective parameter that contributes 30%. It has been determined that the athletes' being fully aware of the situation by staying in the moment during competition, training and other times is effective in the development of psychological competencies that form the infrastructure of the behaviors that should be exhibited in problem situations or situations where psychological skills are needed. This situation suggests that sports actors responsible for athlete performance should also consider the development of mindfulness levels in the development of athletes. In the results of this study, it would be correct to evaluate the existence of certain limitations and the results of the study taking into account the existing limitations. It is recommended to contribute to the literature and to provide a new perspective to practitioners by conducting different studies at points where the scope of the said study is not sufficient. This study was carried out with a working group consisting of amateur and professional athletes from different sports branches. Therefore, it should be accepted that the results cannot be generalized to athletes in all sports branches. In this context, the results may vary in studies to be conducted on athletes with different demographics and wider masses based on a different or a single branch. In addition, the measurement tool used in this study to evaluate the psychological development of athletes originally consisted of seven factors. Within the scope of this study, it worked as five factors. These dimensions are freedom from anxiety and openness to learning. It is thought that the reason why the dimensions are not working in this study is due to the fact that the participants have been doing sports for an average of seven years. The fact that this period is long causes the anxiety of the athletes to decrease over time and to increase their sufficient knowledge and experience. Therefore, it is thought that the dimensions Coachability and Freedom From Worry do not fit the model. Therefore, for researchers who will use the measurement tool in different studies, revalidation of the scale in different athlete groups can be encouraged.

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Investigation of Balance Performance in Soccer in Terms of Positional Differences

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Ethical Statement: It is declared that scientific and ethical principles have been followed while carrying out and writing this study and that all the sources used have been properly cited.

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Abstract

The aim of this study was to investigate balance performance in soccer in terms of positional differences. For this purpose, 18 healthy male soccer players participated in the study. The mean age of the participants was 21,06 ± 0,87 years, mean height 175,2 ± 6,98 cm, mean body weight 67,70 ± 5,96 kg. The study protocol was approved by the ethics committee of Selcuk University, Faculty of Sport Sciences. Dynamic balance tests with eyes open and eyes closed were used to evaluate the balance performances of the athletes. One-way Anova test and Paired Sample T test were used to evaluate the data obtained. As a result of the statistical tests, there was no significant difference between the positions in terms of balance performances (P>0,05). In addition, no significant differences were found in all other parameters except the eyes open Medial Lateral Stability Index(MLSI) parameter of midfielders (P>0,05). As a result, it can be concluded that the balance performances of soccer players competing as amateurs at different levels in soccer do not show positional differences as a result of our study.

Keywords: Balance, dominant, non-dominant, soccer.

INTRODUCTION

Balance is expressed as a state that includes the coordinated activities of motor, biomechanical and sensory factors, and on the other hand, it represents dynamism as an integrated state of many neurological factors, which appears to be a static state (10). In addition, balance is specific to the movement in which the performance is applied and differs according to each sport branch (21). In soccer, which is one of these branches, balance performance has an important place for the continuity of lower extremity functions (7).

Soccer is a sport branch that involves long times, fast directional running and emphasizes physical parameters such as strength, agility and endurance in addition to tactical and technical skills (1,17). While soccer players control their posture during their movements, on the other hand, they follow the movements of their teammates and opposing team players thanks to their visual information skills (18). At the same time, since soccer is played in a wide area and the tasks undertaken by athletes are different, it is necessary to evaluate soccer players in terms of their positions (15). In a study conducted in this context, Gil et al (6)

reported that anthropometric and physiologic differences were found between soccer players playing in different positions and that they showed different physical and motor characteristics according to their positions and that these differences were compatible with the workload they performed on the field in order to create anthropometric and physiologic profiles of non-elite young soccer players according to their playing positions and to determine their relationship with the selection process. In addition, in today's soccer, it is known that players who play in every position in a team should have many motoric characteristics, and even players who work in the offensive zone should help the defense, and players who work in the defensive line should help the offensive line in the same way (13). This information in the literature clearly shows how important balance performance is in the physical development of the player and in specific tasks related to the game when we examine the players in terms of position (8).

In the light of this information, it is important to determine the balance performance, which directly affects the training and competition performance of soccer players and provides their development, by considering positional differences. In this context, in this study, it was aimed to examine the dominant and non-dominant leg data of soccer players on a positional basis.

MATERIAL AND METHOD

Participants

This study was carried out with 18 male soccer players aged between 20-23 years who played soccer for at least 3 years in the 1st Amateur League, Super Amateur League and Regional Amateur League teams in Konya province. The criterion was that the participants did not have any health problems and sportive injuries.

Table 1. Descriptive statistics of the participants

Variable	N	Mean	SD	Minimum	Maximum
Height (cm)	18	175.17	6,98	162,00	184,00
Body weight (kg)		67,70	5,96	57,20	76,40
Age (years)		21,06	0,87	20,00	23,00

Measurement Methods

Height and Body Weight Measurement

In the study, the height of each subject was measured with a stadiometer with an accuracy of 0.01 meters (m) and body weight (BW) was measured with an electronic scale (SECA, Germany) with an accuracy of 0.1 kilogram (kg). During the height measurements, the volunteers were standing with bare feet, heels together, knees stretched, body and head erect, and eyes facing forward. When the sliding caliper bar touched the head of the volunteers, it was stopped and the closest value was recorded as the height value in centimeters (cm). During weight measurements, subjects participated with bare feet and wearing shorts that would not affect their weight. The value obtained on the scale screen was recorded in kg.

Identification of the Dominant Foot

The leg with which the participants kicked (kicked) the ball was defined as dominant. The dominant leg of the participants was determined according to their answer to the question "Which leg do you primarily use when kicking a ball".

Dynamic Balance Measurement

Dynamic balance tests with eyes open (EO) and eyes closed (EC) were used to evaluate the balance performances of the athletes. The EO and EC balance tests were performed on both dominant and nondominant leg and the difficulty level of the measurement tool was set as "level 6" in the EO balance test and "level 10" in the EC balance test. For the tests, the athletes were allowed to move the platform freely by looking at the screen to determine the coordinates of the foot position and to determine the ideal foot position. They were instructed to adjust the position of the support leg until they reached a stable position. Once the appropriate position was found, the platform was locked according to the athletes' foot position and the coordinates of this position were recorded by the device. The tests were performed with reference to the

recorded foot position. In order to eliminate the effect of the arms during the tests, the athletes were asked to place their hands diagonally on their right and left shoulders. The athletes were allowed to participate in all tests barefoot and wearing comfortable sportswear, and they were allowed to practice sufficiently before the measurement to get used to the measurement tool.

The duration of the EO and EC balance tests was 20 seconds. During the tests, the test was started after the participant adjusted the center of gravity using visual information from the screen of the measurement tool. For the EO condition, the screen of the measurement tool was turned off during the test and the participants were asked to look at a point approximately 1 meter away at the participant's eye level. For the EC condition, the eyes of the participants were closed during the test. Participants were asked to maintain the test posture for 20 seconds. At the end of the test, the EO and EC balance scores of the participants were recorded separately.

Ethics Committee Decision

This study was approved by the Non-Interventional Ethics Committee of Selçuk University Faculty of Sport Sciences (Approval number: E. 543913)

Data Analysis

Statistical evaluation was performed using SPSS 29.0 package program. The data obtained in the study were presented as mean and standard deviation. Shapiro-Wilk test was applied to determine the distribution of the data and the data showed normal distribution. According to the result of the normality distribution, One-way ANOVA test was applied to determine the difference in the balance performances of soccer players by position. In addition, Paired Sample T test was applied to determine the difference between dominant and non-dominant foot balance parameters and eyes open and eyes closed balance performance within the group (positional). The results were evaluated at 95% confidence interval and $p<0.05$ was considered significant.

RESULTS

As a result of the tests, the data regarding the comparison of dominant and non-dominant values of the soccer players' eyes open (EO) dominant and non-dominant values by position are presented in Table 2.

Table 2. Positional comparison of dominant and non-dominant data of soccer players with eyes open (EO)

Parameters	Defense players (Mean ± SD)	Midfielders (Mean± SD)	Offense players (Mean ± SD)	f	p
EO-D-OSI	3.63 ± 1.02	3.07 ± 1.26	3.45 ± 1.33	0.34	0.72
EO-D-APSI	2.53 ± 1.09	2.05 ± 0.98	2.68 ± 1.11	0.58	0.57
EO-D-MLSI	2.10 ± 0.76	2.00 ± 0.90	1.72 ± 0.93	0.32	0.73
EO-ND-OSI	3.68 ± 1.06	3.45 ± 0.92	4.40 ± 1.45	1.09	0.36
EO-ND-APSI	2.58 ± 1.00	1.88 ± 1.43	3.38 ± 1.27	2.17	0.15
EO-ND-MLSI	2.17 ± 1.03	2.92 ± 0.97	2.17 ± 0.80	1.28	0.31

EO: Eyes Open, **D:** dominant, **ND:** Non-dominant, **OSI:** Overall Stability Index, **APSI;** Anterior Posterior Stability Index, **MLSI:** Medial Lateral Stability Index. (P<0,05).

As a result of the findings, no significant positional difference was found in dominant and non-dominant balance performance in all findings measured with eyes open.

Table 3 shows the data on the positional comparison of dominant and non-dominant data of soccer players with eyes closed (EC).

Table 3. Positional comparison of dominant and non-dominant data of soccer players with eyes closed (EC)

Parameters	Defense players (Mean ± SD)	Midfielders (Mean± SD)	Offense players (Mean ± SD)	f	p
EC-D-OSI	7.52 ± 1.58	7.05 ± 2.10	6.67 ± 0.92	0.42	0.67
EC-D-APSI	5.98 ± 2.12	5.23 ± 1.97	5.22 ± 0.98	0.37	0.70
EC-D-MLSI	4.71 ± 2.07	3.53 ± 0.73	2.90 ± 1.24	2.41	0.12
EC-ND-OSI	7.25 ± 1.59	6.40 ± 1.60	6.00 ± 1.11	1.16	0.34
EC-ND-APSI	5.22 ± 1.56	4.62 ± 1.39	4.58 ± 1.16	0.40	0.68
EC-ND-MLSI	3.87 ± 0.50	3.43 ± 0.83	3.05 ± 0.75	1.99	0.17

EC: Eyes Closed, **D:** dominant, **ND:** Non-dominant, **OSI:** Overall Stability Index, **APSI;** Anterior Posterior Stability Index, **MLSI:** Medial Lateral Stability Index.

Although there were differences in all findings measured with eyes closed, these differences did not create a significant difference in dominant and non-dominant balance performances.

Table 4 presents the findings of dominant and non-dominant balance performance according to the positions played by the players (defense players, midfielders and offense players).

Table 4. Balance differences for positional dominant and non-dominant data

Variable	Leg	Position	Mean	SD	p
EO-OSI	Dominant	Defense	3.63	1.02	0.93
	N.Dominant		3.68	1.06	
EO- APSI	Dominant	Defense	2.53	1.09	0.60
	N.Dominant		2.58	1.00	
EO- MLSI	Dominant	Defense	2.1	0.76	0.93
	N.Dominant		2.17	1.03	
EC- OSI	Dominant	Defense	7.52	1.58	0.66
	N.Dominant		7.25	1.59	
EC- APSI	Dominant	Defense	5.98	2.12	0.31
	N.Dominant		5.22	1.56	
EC- MLSI	Dominant	Defense	4.72	2.07	0.41
	N.Dominant		3.87	0.50	
EO-OSI	Dominant	Midfielders	3.07	1.26	0.35
	N.Dominant		3.45	0.92	
EO- APSI	Dominant	Midfielders	2.05	0.98	0.76
	N.Dominant		1.88	1.43	
EO- MLSI	***Dominant***	***Midfielders***	***2***	***0.90***	**0.01***
	N.Dominant		***2.92***	***0.97***	
EC-OSI	Dominant	Midfielders	7.05	2.10	0.32
	N.Dominant		6.40	1.60	
EC-APSI	Dominant	Midfielders	5.23	1.97	0.39
	N.Dominant		4.62	1.39	
EC-MLSI	Dominant	Midfielders	3.53	0.73	0.60
	N.Dominant		3.43	0.83	
EO-OSI	Dominant	Offense players	3.45	1.33	0.12
	N.Dominant		4.40	1.45	
EO-APSI	Dominant	Offense players	2.68	1.11	0.17
	N.Dominant		3.38	1.27	
EO-MLSI	Dominant	Offense players	1.72	0.93	0.12
	N.Dominant		2.17	0.80	
EC-OSI	Dominant	Offense players	6.67	0.92	0.36
	N.Dominant		6	1.11	
EC-APSI	Dominant	Offense players	5.22	0.98	0.45
	N.Dominant		4.81	1.33	
EC-MLSI	Dominant	Offense players	2.90	1.24	0.77
	N.Dominant		3.45	0.75	

*: P<0,05

In the EO-MLSI data of midfielders, a significant difference was found between the balance performance of the dominant leg and the performance of the non-dominant leg. In all other parameters, no significant difference was found for all three positions.

DISCUSSION

In the study, it was revealed that there was no positional difference in all values of dominant and non-dominant leg. In addition, in the dynamic balance tests applied with eyes open and eyes closed, there was a significant difference in the data of midfielders in the EO-MLSI parameter, while no significant differences were detected in all other parameters.

In team sports, it has been observed that athletes generally use their dominant legs to perform various tasks such as passing, shooting, intermediate, ball control and also to perform technical movements (14). Considering this fact, it is seen that athletes use their dominant legs more intensively than their non-dominant legs and as a result, asymmetries in the lower extremities are observed (2). In addition, Kocaoglu and Girgin (12) found that the postural control performance of the dominant leg was higher than the postural control performance of the non-dominant leg in the comparison of the postural control performances of the dominant and non-dominant leg. In the present study, unlike these findings, no significant differences were observed when we compared the dominant and non-dominant leg performances of the athletes. Similarly, no significant differences were observed when dominant and non-dominant leg balance performances were compared in some studies that were in parallel with the findings of the present study (4, 9, 16, 22).

One of the aims of this study was to compare the balance performances of soccer players playing in different positions. In this study, no significant differences were found in the balance performances of soccer players playing in different positions. In contrast to this finding, Jadczak et al (11) reported that static balance performance and dynamic balance performance differed significantly between soccer players playing in different positions. Positionally, the demands of the game differ from the soccer players on the field. The distances traveled by athletes and the related fatigue levels may affect their balance performance. (19) mentioned that there is a close relationship between fatigue threshold and balance performance. In the present study, it was observed that the dominant and non-dominant leg performances of soccer players made a significant difference only in the EO-MLSI parameter of midfield players. In the data obtained in high-level organizations such as the Champions League, it has been observed that midfield players cover more distance than other positions during a competition when the ball is in possession (3, 5, 20). This is thought to be due to the fact that midfielders are more likely to pass and control the ball, possibly leading them to develop superior single limb balance skills (20).

As a result, the importance of balance performance, which directly affects the training and competition performance of soccer players and provides their development, has been revealed with our study. In addition, it was also observed that the balance performances of soccer players playing amateur level soccer did not differ in terms of position.

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