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Impact of Social Structure Characteristics of High School and University Students Playing Fencing Sports on Collective Efficacy and Goal Orientation*

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Abstract

The aim of this study is to determine whether the social structural characteristics of high school and university students who participate in fencing are related to their collective efficacy and goal orientation. This study uses a descriptive (survey) research model based on quantitative observation. The research is limited to fencing athletes who are active in licensed, high school, and university education in 2020-2021 Academic Year. Task and Ego Orientation in Sport Questionnaire (TEOSQ), which was developed by Duda (8) to measure the goal orientation of fencing athletes participating in the study, was adapted for Turkish athletes by Toros (25), Collective Efficacy Scale (CES), which was developed by Riggs et al. (19) to measure their collective efficacies adapted for Turkish athletes by Öcel (18) and the socio-demographic information form were used to measure the characteristics of social structure. In the analysis, independent samples t-test, Pearson Correlation test, one-way analysis of variance test (Anova), Tukey post hoc test, and Tamhane's post hoc test were performed.

As a result of the research, it was determined that there was no significant difference between the collective proficiency levels of the athletes according to gender, being a national athlete, educational status of their parents, duration of continuing fencing and family income. It was determined that there was a significant difference according to the number of cases. It has been determined that there is no significant difference between the goal orientation and sub-dimensions of the athletes according to gender, age, educational status, whether there are other licensed fencing athletes in the family, whether they are national athletes, duration of fencing, number of siblings and family income. While no significant relationship was found between collective efficacy and goal orientation and its sub-dimensions in male athletes and athletes over the age of 14, a significant relationship was found between collective efficacy and ego orientation in female athletes. While a significant relationship was found between goal orientation and its sub-dimensions, and between ego orientation and goal orientation in athletes aged 16 and older, no significant relationship was found between task and ego orientations in athletes aged 14-15.

Keywords: Fencing, social structure, collective efficacy, ego and task orientation

Eskrim Sporu Yapan Lise ve Üniversite Öğrencilerinin Sosyal Yapı Özelliklerinin Kolektif Yeterlik ve Hedef Yönelimine Etkisi

Özet

Bu araştırmanın amacı eskrim sporu yapan lise ve üniversite öğrencilerinin sosyal yapı özelliklerinin kolektif yeterlik ve hedef yönelimleri ile ilişkisi olup olmadığını saptamaktır. Bu çalışmada nicel gözleme dayalı betimsel (tarama) araştırma modeli kullanılmıştır. Araştırmanın örneklemini 2020-2021 Eğitim-Öğretim Yılında aktif lisanslı, lise ve üniversitede öğrenim görmekte olan 302 eskrim sporcusu oluşturmuştur. Araştırmaya katılan eskrim sporcularının hedef yönelimlerini ölçmek için Duda (8) tarafından geliştirilen Türk sporcuları için uyarlanması Toros (25) tarafından yapılan Sporda Görev ve Ego Yönelimi Ölçeği (SGEYÖ), kolektif yeterliklerini ölçmek amacı ile Riggs ve ark. (19) tarafından geliştirilmiş, Türk sporcular için uyarlanması Öcel (18) tarafından yapılmış olan Kolektif Yeterlik Ölçeği (KYÖ) ve sosyal yapı özelliklerini ölçmek için Sosyo-Demografik Bilgi Formu kullanılmıştır. Analizlerde; bağımsız örneklem T testi, Pearson Korelasyon testi, tek yönlü varyans analizi (Anova) testi, Tukey post hoc testi ve Tamhane's post hoc testleri uygulanmıştır.

Araştırma sonucunda sporcuların kolektif yeterlik seviyelerinin cinsiyet, millî sporcu olup olmama, anne ve babasının eğitim durumu, eskrim sporuna devam etme süresi ve aile geliri durumuna göre anlamlı bir farklılık olmadığı tespit edilirken, yaş, eğitim durumu, ailede lisanslı başka eskrim sporcusu olup olmaması ve kardeş sayısı durumuna göre anlamlı bir farklılık olduğu tespit edilmiştir. Sporcuların hedef yönelimi ve alt boyutlarının cinsiyet, yaş, eğitim durumu, ailede lisanslı başka eskrim sporcusu olup olmaması, millî sporcu olup olmaması, eskrim sporuna devam etme süresi, kardeş sayısı ve aile gelir durumuna göre anlamlı bir farklılık olmadığı belirlenmiştir. Erkek sporcular ve 14 yaş üstü olan sporcularda kolektif yeterlik ile hedef yönelimi ve alt boyutları arasında anlamlı bir ilişkiye rastlanmazken, kadın sporcularda kolektif yeterlik ve ego yönelimi arasında anlamlı bir ilişkiye rastlanmıştır. Kadın, erkek, 16 yaş ve üstü olan sporcularda hedef yönelimi ve alt boyutları arasında ve ego yönelimi ile hedef yönelimi arasında anlamlı bir ilişkiye rastlanırken, 14-15 yaş sporcularda görev ve ego yönelimleri arasında anlamlı ilişkiye rastlanmamıştır.

Anahtar Kelimeler: Eskrim, sosyal yapı, kolektif yeterlik, ego ve görev yönelimi.

INTRODUCTION

Sports are the works that one does with great efforts to increase its success by using the ripple effect it has on the person psychologically and physically and the desire to compete, such as ambition (27). Sport is a very important factor in the social sphere. It is effective in the acquisition of social values and in social development. In a sporting environment, people have the opportunity to express themselves. An important improvement is achieved in personality and self structure. This shows that sport is of great importance in human life (15).

When the social structure is taken widely, society is an organization of interpersonal relations consisting of human beings, which can be changed and maintained despite being changed. Young people's hopeful, healthy and social life can be achieved through sports activities. The concept of success gained in sports has become an indicator of the development of the level of social structure and has created a perception of the concept that can lead individuals to happiness or pessimism. Sports in Turkey and all over the world has found meaning as a universal language, entered into the finest detail of the lifestyle of societies and is shaped by social structure (2).

All athletes want to have success and taste the pleasure that comes with success (14). As in any sport, winning and being the best is very important for fencing. Fencing is basically based on sword defense and attack systematics and is an active competition sport reminiscent of an accelerated chess game with its strategic nature, energy, speed and effort, movement economy, endurance and continuity, adaptation to opportunities in terms of measure and timing, priority of intuition and movement, stability, analysis power, superiority in patience and sociability, strategic elements in tactics and competitions in their exercises (20).

Collective efficacy can be defined as sharing responsibilities for success and believing that everyone will do their part in the eyes of the potential and abilities of any team. Collective efficacy is the belief they share about the common characteristics and skills of regulating the behavior of the group, thinking about how to act and implementing it (11). Individuals' belief in collective efficacy affects the type of social future they aim for, how hard they will strive in this field, and the resilience they will show when they realize that their collective efforts have not succeeded in yielding results (14). The belief in efficacy plays an important role in determining the motivational level of the individual (4).

Goal orientation can be defined as the types of goals that individuals set in order to achieve success and the efforts made by the athlete in line with this goal. According to the theory of goal orientation, individuals achieve a sense of success when they reach their goals. These feelings of achievement are achieved by achieving the goals and their value is given by the athlete according to the achievement of the goal (16). Many personality surveys have shown that athletes have important common characteristics. These characteristics are the need to succeed at a high level. This is called achievement requirement. According to this theory, according to some successful athletes, it is more important to get high level satisfaction than activities that require success. The perception of success varies for each individual. Each individual is obliged to determine his or her own behavior of success (6).

Theory suggests two main trends in achieving and achieving goals (21). These two orientations, which are determined as task and ego orientation, are related to the judging of one's abilities. Individuals with task-oriented goals; focusing on learning new skills, hard work, skill development and mastery of the task; individuals with ego orientation concentrate on their superior abilities, skills and want to defeat their opponents with much less effort (24).

The goals set by the individuals during the goaling phase and their efforts to achieve the goal are a source of personal motivation. This is one of the most effective techniques for improving a person's performance and efficiency. In the field of sports and academic performance; There is an important and positive relationship between individual success goal orientations and performance (5). How individuals interpret success is essential for the motivation for success. Therefore, in order to understand the possible effect of different motivational methods, the meanings that individuals place on success should be based (17).

This research was carried out to determine whether the social structures of high school and university students who play fencing sports are related to their collective efficacy and goal orientation.

METHOD

In this research, a descriptive (scanning) research model based on quantitative observation was used. The scanning model is a research approach that aims to describe a past or current situation as it exists. The subject of the research, the individual or object, is tried to be defined in its own conditions and as it is. There is no effort to change them in any way, to influence them (13). With the decision of Necmettin Erbakan University Social and Humanities Scientific Research Ethics Committee on 13.11.2020 dated 2020/76, there was no objection to the ethical implementation of the research.

Universe and Sampling

For a 0.05 tolerable error in the sample selection, a sample of 375 people from a universe of 11,000 people is sufficient (28). In this context, the sample of the study consisted of 302 fencing athletes selected from the universe by accidental sampling method.

Data Collection Tool

"Demographic Knowledge Form" was used to measure the social structure characteristics of fencing athletes participating in the study, "Collective Efficacy Scale" was used to measure their collective efficacy and "Task and Ego Orientation Questionnaire in Sports" was used to measure their goal orientation.

Demographic Information Form

The demographic information form prepared by the researcher in order to collect information about the athletes participating in the study consists of questions to determine the gender, age, education status of the athletes, whether there is an individual in the family who is doing fencing other than himself/herself, whether he/she is a national athlete, the level of education of the parents, the duration of his/her continued fencing, the number of siblings, the total income of the family, the region in which he/she lives.

Collective Efficacy Scale

The Collective Efficacy Scale was developed by Riggs et al. (19) to measure the individual's belief in the capacity of the group of which he is a member, and was adapted for Turkish athletes by Öcel (18). The 5-type likert scale consists of a total of 7 items. The increase in total score expresses a high belief in collective efficacy. In the factor analysis study, it was determined that the substance factor loads ranged from 0.65 to 0.87. The internal consistency values of the scale are calculated as 0.70.

Task and Ego Orientation in Sport Questionnaire

Toros (25) adapted the Task and Ego Orientation in Sport Questionnaire developed by Duda (8) for Turkish athletes in order to reveal individual differences in goaling. The 5-type likert questionnaire consists of 13 items, 7 of which are tasks and 6 of which are ego orientation. The reliability coefficient of the sub-dimension of the questionnaire was determined as 0.87 for task orientation, 0.85 for ego orientation and 0.86 for questionnaire as a whole. The three-week test retest reliability is 0.65 for task orientation and 0.72 for ego orientation.

Analysis of Data

SPSS 22 statistical package program was used in the analysis of the data. Analytical test method was used to analyze the values of skewness and kurtosis in the analysis of normality of the data. It has been determined that the data shows normal distribution. Pearson Correlation test, independent sample t test for binary comparisons, one-way variance analysis (Anova) test for multiple comparisons were applied to determine the relationship between scales. In order to determine which groups are caused by the difference in groups that differ significantly; Tukey post hoc test was performed in groups found to be homogeneously dispersed and Tamhane's post hoc test was performed in groups found not to be homogeneous.

RESULTS

Scale Cronbach Alpha (Reliability) Values

Cronbach alpha values of the scale; Collective Efficacy = (,719), task orientation sub-dimension= (,818), ego orientation sub-dimension = (,831), total goal orientation questionnaire = (,830).

Normalization Analysis of Data

Skewness and Kurtosis values were looked at for normalization analysis of the data. The values Skewness and Kurtosis are shown in Table 1.

Table 1. Analysis of normality of data

	Skewness	Kurtosis
Collective Efficacy	,718	,102
Task Orientation	-,543	-,332
Ego Orientation	-,140	-,505
Total Goal Orientation Questionnaire	-,286	,012

The data showed normal distribution due to skewness and kurtosis values from - 1.5 to +1.5 (23).

The socio-demographic information form, which determines the social structure characteristics of fencing athletes, is given in Table 2.

Table 2. Socio-demographic information form

Variable	**Group**	**N**	**%**
Gender	Male	151	50,0
	Female	151	50,0
Age	14-15	93	30,8
	16-18	95	34,5
	19 years and older	114	37,7
Education Status	High school	132	43,7
	University	170	56,3
Are there any other fencers in the family?	Yes	99	32,8
	No	203	67,2
National Athlete	Yes	129	42,7
	No	173	57,3
Father Education Status	High school and below	132	43,7
	University and above	170	56,3
Mother Education Status	High school and below	161	53,3
	University and above	141	46,7
The Duration of Continued Fencing	1-2 years	46	15,2
	3-5 years	83	27,5
	6 years and above	173	57,3
Number of Siblings	1	64	21,2
	2	145	48,0
	3	58	19,2
	4 and above	35	11,6
Monthly Family Income	2401-4000 TL	69	22,8
	4001-5500 TL	56	18,5
	5501-7000 TL	45	14,9
	7001-8500 TL	40	13,2
	8501-10000 TL	33	10,9
	10000 TL and above	59	19,5
Geographic Region	Marmara	45	14,9
	Black Sea	26	8,6
	Central Anatolia	114	37,7
	Aegean	39	12,9
	Eastern Anatolia	7	2,3
	Mediterranean	51	16,9
	Southeastern Anatolia	20	6,6

The collective efficacy and goal orientation of fencing athletes according to gender variability is given in Table 3.

Table 3. Independent sample t test by gender variable

	Group	N	$\bar{x}$	Sd	t	p
Collective Efficacy	Male	151	2,56	,553	1,023	,307
	Female	151	2,49	,601		
Task Orientation	Male	151	4,17	,600	,364	,716
	Female	151	4,15	,706		
Ego Orientation	Male	151	3,27	,868	1,113	,266
	Female	151	3,14	1,05		
Total Goal Orientation Questionnaire	Male	151	3,75	,568	,965	,335
	Female	151	3,68	,714		

*p<.05

There was no significant difference as a result of the independent sample t-test to determine whether there was a significant difference between collective efficacy, goal orientation, total score and sub-dimensions according to gender variable status.

The collective efficiacy and goal orientation of fencing athletes according to the age status variable is given in Table 4.

Table 4. One-way variance analysis by age status variable (Anova)

		Group	N	$\bar{x}$	Sd	F	p	Significant Differences
Collective Efficacy	A	14-15 age	93	2,33	,467	8,567	,000*	A<B,C
	B	16-18 age	95	2,57	,590			
	C	19 age and older	114	2,64	,612			
Task Orientation	A	14-15 age	93	4,16	,672	,026	,974	
	B	16-18 age	95	4,17	,630			
	C	19 age and older	114	4,15	,665			
Ego Orientation	A	14-15 age	93	3,08	,900	1,350	,261	
	B	16-18 age	95	3,30	,941			
	C	19 age and older	114	3,23	1,03			
Total Goal Orientation Questionnaire	A	14-15 age	93	3,66	,585	,692	,502	
	B	16-18 age	95	3,77	,632			
	C	19 age and older	114	3,73	,702			

*p<.05

As a result of the one-way variance analysis (Anova) to determine whether there is a significant difference between collective efficacy, goal orientation, total score and sub-dimensions according to age status, a significant difference in the collective efficacy scale (p=.000<.05) was found, while no significant difference was found between the goal orientation questionnaire total and sub-dimension. In order to determine which groups the significant difference originated from, the precondition for homogeneity of variances was checked and it was determined that the variances were not distributed homogeneously (L=4,537 p=,011). Therefore, Tamhane's post hoc test was performed and it was determined that the significant difference was due to 19 years and older and other groups.

The collective efficacy and goal orientation of fencing athletes according to the education status variable is given in Table 5.

Table 5. Independent sample t test by education status variable

	Grup	N	$\bar{x}$	Sd	t	p
Collective Efficacy	High school	183	2,45	,543	-3,907	,000*
	University	119	2,68	,596		
Task Orientation	High school	183	4,16	,658	,015	,988
	University	119	4,16	,651		
Ego Orientation	High school	183	3,19	,922	-,367	,708
	University	119	3,23	1,03		
Total Goal Orientation Questionnaire	High school	183	3,71	,613	-,240	,811
	University	119	3,73	,694		

*p<.05

While a significant difference in collective efficacy (p=000<.05) was detected as a result of the independent sample T test to determine whether there was a significant difference between collective efficacy, goal orientation total score and sub-dimensions according to the educational situation, no significant difference was found in the questionnaire and sub-dimensions of the goal orientation.

The collective efficacy and goal orientation of fencing athletes according to the status variable of whether there are any other licensed fencing athletes in the family is given in Table 6.

Table 6. Independent sample t test by status variable if there are any other licensed fencing athletes in the family

	Group	N	$\bar{x}$	Sd	t	p
Collective Efficacy	Yes	99	2,65	,644	2,697	,007*
	No	203	2,46	,534		
Task Orientation	Yes	99	4,09	,619	-1,279	,203
	No	203	4,19	,634		
Ego Orientation	Yes	99	3,22	,878	,194	,846
	No	203	3,20	1,00		
Total Goal Orientation Questionnaire	Yes	99	3,69	,650	-,581	,562
	No	203	3,73	,644		

*p<.05

While there was a significant difference in collective efficacy (p=007<.05) as a result of the independent sample T test to determine whether there was a significant difference between collective efficacy, goal orientation total score and sub-dimensions according to the status of any other licensed fencing athletes in the family, no significant difference was found in the goal orientation questionnaire and sub-dimension.

The collective efficacy and goal orientation of fencing athletes according to the "Are you a national athlete?" variable is given in Table 7.

Table 7. "Are you a national athlete?" Independent sample t test by status variable

	Grup	N	$\bar{x}$	Sd	t	P
Collective Efficacy	Yes	129	2,50	,576	-,710	,478
	No	173	2,54	,580		
Task Orientation	Yes	129	4,09	,711	-1,718	,087
	No	173	4,22	,605		
Ego Orientation	Yes	129	3,22	,990	,156	,876
	No	173	3,20	,948		
Total Goal Orientation Questionnaire	Yes	129	3,68	,726	-,840	,402
	No	173	3,75	,578		

*p<.05

No significant difference was found as a result of the independent sample t-test to determine whether there was a significant difference between collective efficacy, goal orientation, total score and sub-dimensions according to the national athlete status variable.

The collective efficacy and goal orientation of fencing athletes according to the number of siblings is given in Table 8.

Table 8. One-way variance analysis by sibling count status (Anova)

		Group	N	$\bar{x}$	Sd	F	p	Significant Differences
Collective Efficacy	A	1	64	2,43	,547	3,691	,012*	D>A, B
	B	2	145	2,50	,538			
	C	3	58	2,51	,526			
	D	4 and above	35	2,82	,778			
Task Orientation	A	1	64	4,17	,588	,416	,741	
	B	2	145	4,18	,662			
	C	3	58	4,17	,671			
	D	4 and above	35	4,04	,720			
Ego Orientation	A	1	64	3,27	,855	2,978	,032*	D>C
	B	2	145	3,22	,929			
	C	3	58	3,36	,881			
	D	4 and above	35	3,78	1,29			
Total Goal Orientation Questionnaire	A	1	64	3,75	,532	2,304	,077	
	B	2	145	3,73	,637			
	C	3	58	3,80	,626			
	D	4 and above	35	3,46	,837			

*p<.05

A significant difference was found in the collective efficacy scale (p=.012<.05) and the ego orientation sub-dimension (p=.032<.05) in the one-way variance analysis (Anova) to determine whether there was a significant difference between the collective efficacy, goal orientation total score and sub-dimensions according to the number of siblings, while no significant difference was found between the task orientation sub-dimension and the total goal orientation questionnaire. In order to determine which groups the significant difference originated from, the homogeneity of the variances was preconditioned and it was determined that the variances were distributed homogeneously. Collective efficacy (L=6,627 p=,000), ego orientation (L=4,269 p=,006). Therefore, it was determined that the significant difference in the lower dimension of the Tukey post hoc tested ego orientation was due to the group with 4 or more siblings and the groups with 3 siblings, and the group with 4 or more siblings on the collective efficacy scale and the group with 1 and 2 siblings.

In addition to these findings, no significant difference was found as a result of the one-way variance analysis (Anova) test to determine whether there was a significant difference between collective efficacy, goal orientation, total score and sub-dimensions according to the participants' attendance in fencing.

In addition, no significant difference was found as a result of the one-way variance analysis (Anova) test to determine whether there was a significant difference between collective efficacy, goal orientation, total score and sub-dimensions according to the family income status of the participants.

The relationship between the collective efficacy and goal orientation of fencing athletes according to gender variability is given in Table 9.

Table 9. Pearson correlation test to determine the relationship between collective efficacy and goal orientation of fencing athletes by gender variable

			Collective Efficacy	Task Orientation	Ego Orientation	Total Goal Orientation
Male	Collective Efficacy	r				
		p				
	Task Orientation	r	-,070			
		p	,393			
	Ego Orientation	r	,067	,224		
		p	,415	**,006****		
	Total Goal Orientation	r	,007	,726	,833	
		p	,934	**,000****	**,000****	
			Collective Efficacy	**Task Orientation**	**Ego Orientation**	**Total Goal Orientation**
Female	Collective Efficacy	r				
		p				
	Task Orientation	r	-,093			
		p	,258			
	Ego Orientation	r	,271	,352		
		p	**,001****	**,000****		
	Total Goal Orientation	r	,135	,771	,867	
		p	,098	**,000****	**,000****	

*p<.05

Pearson Correlation Test was performed to determine whether there was significant relationship between collective efficacy and total goal orientation and sub-dimensions for male and female fencing athletes. According to the results of the test, there was no significant relationship between the level of collective efficacy of male athletes and the task orientation (r: -,070, p: ,393), ego orientation (r: ,067, p: ,415) and total goal orientation (r: ,007, p: 934), respectively; it was determined that there was a significantly weak relationship between ego orientation and task orientation (r: 224, p: 006), a significantly high relationship between ego orientation and total goal orientation (r: ,833, p: ,000), a significantly high relationship between task orientation and total goal orientation (r: ,776, p: ,000).

While there was no significant relationship between the level of collective efficacy of female athletes and their task orientation (r: -,093, p: ,258) and total goal orientation (r: ,135 p: ,098), respectively; significantly weak relationship between collective efficacy and ego orientation (,271, p: ,001), there was a significantly weak relationship between ego orientation and task orientation (r: 352, p: 000), significantly higher relationship between task orientation and total goal orientation (r: ,771, p: ,000), and a significantly higher level of relationship between ego orientation and total goal orientation (r: 867, p: ,000).

The relationship between the collective efficacy and goal orientation of fencing athletes according to the age variable is given in Table 10.

Table 10. Pearson correlation test to determine the relationship between collective efficacy and goal orientation of fencing athletes by age variable

			Collective Efficacy	Task Orientation	Ego Orientation	Total Goal Orientation
14-15 age	Collective Efficacy	r				
		P				
	Task Orientation	r	-,190			
		p	,068			
	Ego Orientation	r	,169	,131		
		p	,105	,211		
	Total Goal Orientation	r	,002	,711	,791	
		p	,988	**,000****	**,000****	
			Collective Efficacy	**Task Orientation**	**Ego Orientation**	**Total Goal Orientation**
16-18 age	Collective Efficacy	r				
		p				
	Task Orientation	r	-,041			
		p	,697			
	Ego Orientation	r	,179	,325		
		p	,083	**,001****		
	Total Goal Orientation	r	,101	,760	,862	
		p	,330	**,000****	**,000****	
			Collective Efficacy	**Task Orientation**	**Ego Orientation**	**Total Goal Orientation**
19 age and older	Collective Efficacy	r				
		P				
	Task Orientation	r	-,049			
		p	,606			
	Ego Orientation	r	,171	,408		
		p	,069	**,000****		
	Total Goal Orientation	r	,090	,786	,886	
		p	,338	**,000****	**,000****	

*p<.05

Pearson Correlation test was performed to determine whether fencing athletes aged 14-15, 16-18, 19 and older had a significant relationship between collective efficacy and total goal orientation and sub-dimensions. According to the results of the test, the level of collective efficacy of fencing athletes between the years of 14 and 15 years of age and the orientation of the task respectively (r: -,190, p:,068), ego orientation (r: ,169, p: ,105) and total goal orientation (r: ,002, p: ,988) and task orientation and ego orientation (r: ,131 p: 211); a significantly high level of corral between task orientation and total goal orientation (r: ,711, p: ,000), ego orientation and total goal orientation (r: ,791, p: ,000).

While there was no significant relationship between the level of collective efficacy of fencing athletes aged 16-18 and their task orientation (r: -,041, p: ,697), ego orientation (r: ,179, p: 083) and total goal orientation (r: 101, p: 330), respectively; it was determined that there was a significantly weak relationship between task orientation and ego orientation (r: 325, p: ,001), significantly high relationship between task orientation and total goal orientation (r: ,760 p: ,000), significantly higher level of relationship between ego orientation and total goal orientation (r: ,862, p: ,000).

While there was no significant relationship between the level of collective efficacy of fencing athletes aged 19 and older and their task orientation (r: -,049, p: ,606), ego orientation (r: ,171, p: 069) and total goal orientation (r: 090, p: 338), respectively; it was determined that there was a significant moderate relationship between task orientation and ego orientation (r: 408, p: 000), significantly higher relationship between task orientation and total goal orientation (r: ,786, p: ,000), and a very high level of relationship between ego orientation and total goal orientation (r: ,886, p: ,000).

DISCUSSION AND CONCLUSION

When the socio-demographic results of fencing athletes are examined in Table 2, it is concluded that fencing is a sport that appeals to all segments of society regardless of gender, age, geographical region, income level and educational status of the family, the profession of parents, whether there are other fencing athletes in the family.

When the gender variable was examined in Table 3, there was no significant difference between the collective efficacy, goal orientation, total score and sub-dimensions of fencing athletes. Sports lives of male and female athletes from junior to senior in sports life; training programs, nutrition programs and camping period studies are similar in many ways. Both men and women who want to achieve the best performance level must comply with the program determined in both groups. Therefore, it can be said that it is not a coincidence that similar results occur in the collective efficacy obtained, the task orientation, which are the sub-dimensions of the goal orientation, and the ego orientation. When the field is examined in the summer, some similar studies (30, 7, 10, 12, 9) results were found to be in line with the current study findings.

According to the age status variable in Table 4, it was observed that the collective efficacy of fencers varies in proportion to age, and their collective efficacy increases as they age. A large difference was found between athletes aged 14-15 and 16-18 and over 19. It was determined that the difference between athletes aged 16-18 and over 19 was largely not. As a result, it has been observed that collective efficacy increases as age grows. With this finding, it can be said that fencing athletes, who are growing and maturing in age, have increased their belief in their team and their collective efficacy as it makes sports a part of their lives. It has been observed that the age of the athletes does not cause any significant difference in goal orientation and sub-dimensions. When the field was examined in the summer, it was determined that the results of some similar studies (29, 3) were in line with the current study findings.

In Table 5, the collective efficacy of high school and university students was examined according to the education status variable and it was determined that the collective efficacy of university students was higher than that of high school students. There was no significant difference in goal orientation and sub-dimensions. Fencing athletes studying at the university constitute the junior and senior class, and the majority of fencing athletes studying in high school constitute the stars' class. In addition to giving a different perspective on life, the education of fencing athletes who are studying at the university can be explained as developing their collective efficacy by competing in the senior and youth categories depending on maturation and experience.

In Table 6, it was determined that the athlete, who is another individual or individuals in his family who play fencing, has a high collective efficacy and has no effect on their goal orientation and sub-dimensions. It was observed that 1\3 of the fencing athletes who participated in the study were other individuals who were fencing athletes in their family. The high levels of collective efficacy compared to the group, which has other individuals in their family who play fencing, indicates that fencing is not only supported in the family, but also that there is a group that wants to be involved, and that the importance given to fencing in the family has a positive effect on athletes. It is thought that the athletes who participated in the competitions with their family increased their commitment and faith in fencing. It can be said that the athlete, who has the opportunity to discuss fencing rules and his own performance in the house, is more attached to fencing, thereby increasing the level of collective efficacy.

According to the status of national athletes in Table 7, there was no significant difference between collective efficacy, goal orientation and sub-dimensions. It is thought that fencing training is carried out in partnership with national athletes and non-national athletes under the same conditions and because they work with the same coach, there is no significant difference in their collective efficacy, goal orientation and sub-dimensions. Toy's (26) study, which examined the relationship between goal orientation and life saturation of free and greco-roman style wrestlers, also supports the current research.

In Table 8, the number of siblings status was examined, a significant difference was detected in the lower dimension of collective efficacy, ego orientation and the questionnaire of collective efficacy, while no significant difference was found between the task orientation sub-dimension and the total goal orientation questionnaire. It turned out that the collective efficacy of athletes with 4 or more siblings was higher than the collective efficacy of athletes with 1, 2 and 3 siblings. At the same time, it was observed that as the number of siblings

increased, the levels of collective efficacy of the athletes increased in direct proportion. It can be said that the fact that athletes with a high number of siblings have adopted sharing responsibilities within the family and that each individual has a high belief that he/she will fulfill his/her duty also has a positive effect on their level of collective efficacy. It is seen that athletes with 4 or more siblings in the lower dimension of ego orientation have higher ego orientations than athletes with 2 siblings. When the findings are examined in detail, it is seen that the athletes with 1, 2 and 3 siblings have lower levels of ego orientation than athletes with 4 or more siblings. When ego orientation levels were listed, the highest 4 or more siblings, then 3 siblings, then 1 sibling and the lowest level of ego orientation were seen in athletes with 2 siblings. From here, it can be said that the level of ego orientation is not proportional to the number of siblings. However, this can be interpreted as the ego orientation levels of athletes with many siblings are high and the ego orientation levels of athletes with 1 and 2 siblings are low. It can be said that athletes who have many siblings are in a race instinctively to compete with each other as well as to share work in the family and to prove themselves to their parents and to show that they are better, and their levels of ego orientation are also higher.

The continuation of fencing was examined and no significant differences were found between collective efficacy, goal orientation, total score and sub-dimensions. However, it has been observed that as the duration of continuing fencing increases, so do the levels of collective efficacy. The reason for their increased collective efficacy can be attributed to the age variable. It has been seen from the findings that collective efficacy levels increase as they age, which supports the duration of their continued sports. In this study of fencing athletes in the stars, juniors and senior divisions, it can be concluded that the sport has a positive effect on the level of collective efficacy, since it is observed that the collective efficacy levels of the athletes with the highest duration of continuing to play sports are also observed to be the highest. When the field is examined in the summer, some similar studies (1, 3, 22) results were found to be in line with the current research findings.

Family income status was examined and no significant difference was found between collective efficacy, goal orientation, total score and sub-dimensions. At the same time, it is seen that individuals of all levels participate in fencing regardless of family income status. Individuals whose family has incomes of all levels can fencing. This eliminates the prejudice of fencing only made by individuals with high income status. Since equipment is a sport with a high cost of equipment, youth sports centers and the schools they compete in support of individuals with low family income status. Therefore, it should not be overlooked that prejudices can be lifted for fencing sport and the possibility of becoming a fencing athlete can be achieved regardless of income situation.

Table 9 examined the relationship between the collective efficacy and goal orientations and sub-dimensions of male and female fencing athletes, and found no significant relationship between the collective efficacy levels of male athletes and their task orientation, ego orientation and total goal orientation, respectively; it was found that there was a significantly weak relationship between ego orientation and task orientation, a significantly high relationship between ego orientation and total goal orientation, a significantly high level of relationship between task orientation and total goal orientation; while there is no significant relationship between the collective efficacy levels of female athletes and their task orientation and total goal orientation respectively; it was determined that there was a significant weak relationship between collective efficacy and ego orientation, a significantly weak relationship between ego orientation and task orientation, a significantly high level of relationship between task orientation and total goal orientation, a significantly higher level of relationship between ego orientation and total goal orientation. As the collective efficacy levels of female athletes increase, so does their faith in team members, but it is thought that the levels of ego orientation increase due to the increased desire of female athletes to be the best and prove themselves, as their belief in the success of team members increases. It is thought that the ego and task orientation levels of male and female athletes increase their beliefs and commitment to the goal and the meaning they place on success increases, thus increasing the total level of goal orientation.

Table 10 examined the relationship between collective efficacy and goal orientation and sub-dimensions of fencing athletes aged 14-15, 16-18, 19 and older; while there is no significant relationship between the collective efficacy levels of 14-15 age fencing athletes and task orientation, ego orientation and total goal orientation, and between task

orientation and ego orientation; there is a significantly high level of corral between ego orientation and total goal orientation; while there is no significant relationship between the collective efficacy of 16-18 age fencing athletes and their task orientation, ego orientation and total goal orientation respectively; there is a significant weak relationship between task orientation and ego orientation, significantly higher level of relationship between task orientation and total goal orientation, significantly higher level of relationship between ego orientation and total goal orientation; while there is no significant relationship between the collective efficacy levels of fencing athletes aged 19 and older and their task orientation, ego orientation and total goal orientation respectively; it was determined that there was a significant moderate relationship between task orientation and ego orientation, significantly higher level of relationship between task orientation and total goal orientation, very high level of relationship between ego orientation and total goal orientation.

It is thought that the relationship between ego and task orientation levels and total goal orientation increases due to the experience gained by the athletes in the divisions they compete in as they grow older, their commitment to the sport increases their beliefs and the value they place on success.

SUGGESTIONS

1. It has been determined that the more time it take to continue fencing, the higher the levels of collective efficacy. For this reason, promotional and incentive studies can be carried out in order to direct individuals to fencing in order to increase the level of adaptation to society.

2. Special studies can be carried out in the field of collective efficacy for super-minors, minors and U14 athletes in order to increase their collective efficacy levels at an early age.

3. It has been determined that the social structure characteristics of fencing athletes have a great effect on collective efficacy levels. Special mental training programming can be carried out for athletes in order to improve their collective efficacy.

4. In this study, the effect of social structure characteristics on collective efficacy and goal orientations on fencing athletes was investigated and not many studies examining the effect of social structure on other sports branches were found. It can be done to investigate the extent to which social structure characteristics are effective on athletes in other branches.

5. A study should be carried out examining the relationship of the collective proficiency levels of fencing athletes with success.

6. The effect of fencing athletes on their achievements should be examined. If the effect of task orientation and ego orientation levels on success is determined, athletes can be provided with psychological support that brings success in this field.

7. Since research on collective efficacy is usually carried out on team sports, studies can also be carried out that examine its impact on individual sports.

8. The effect of coach behavior on collective efficacy can be examined.

9. The effect of some physical parameters of athletes on the level of collective efficacy can be examined.

10. The effect of coaches' goal orientations on athlete goal orientations and success can be investigated.

11. The goal orientation of the most successful athletes in Turkey can be investigated.

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The Effect of Shoting Techniques on Accuracy Rates in Infrastructure Basketball Players

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Abstract

To examine the shoting percentages of the children training in basketball infrastructure according to the angular positions of the joint areas in the shoting techniques. 15 male basketball players training in the infrastructure voluntarily participated in the research. In our research, two groups were formed as High Shot Rate and Low Shot Rate. High Shooting Rate Group n:7 (HSR) (age 15.4±0.7 years, height 1.83±9.1 m., body weight 80.8±16.2 kg., sports age 7.2±1.8 years), Low Shooting Rate Group (LSR) n:8 (age 15.6±0.9 years, height 1.81±6.9 m., body weight 73±7.8 kg. and sports age 4±2.7 years). A total of 60 shots were fired from the foul line (20 shots), right forward (20 shots) and left forward (20 shots) in both groups. The joint angle values of the shooting start and finishing phases of both groups were compared with the Independent t test. While there is a significant difference between the Group with High Shot Rate and Low Shot Rate between Head, Elbow, Wrist and Knee in the starting phase of the shooting technique ($p<0.05$), the shooting technique has a significant difference between all joint regions in the finishing phase ($p> 0.05$) could not be found. Based on the data we have obtained, attention should be paid to basketball players' elbow and wrist angles from the upper extremity and the knee angles from the lower extremity in the shooting technique. In addition, we think that our study will bring a perspective to those who will work in this field.

Keywords; Basketball, Shoting, Technical Analysis, Performance

INTRODUCTION

Basketball is a complex sport with many performance-related components. Optimizing this complex structure is important for success. This optimization is necessary to bring each performance component to a level, both specifically and in coordination with other features. Basketball is a sportive branch with high physical, physiological, biomotoric, psycho-mental and technical-tactical features. Physical structure, physiological capacity, biomotoric features, psycho(anxiaety,stress)-mental state, technical structure, tactical understanding, team discipline and trainer/sport scientist are very important in the competitive characteristics of basketball (strength, speed, endurance, mobility-flexibility, coordination) (7,8,9,12,13,14). It is difficult to attribute success to a single criterion in basketball (10,11). However, priority features can be found, for example, being tall in the physical structure is considered an advantage (5). It has been emphasized that physical structure, technical, tactical and mental abilities come to the fore in collective (basketball, football, etc.) branches, and they are important in technical tactics as well as physical fitness for optimal performance (27,30).

In sports branches, technique is considered very important. Of course, this naturally has a high technical aspect in some sports branches

(Gymnastics) while it can show a low feature in some sports branches (Athletics/Running). Technical; it means making the basic movements of the branch in the most economical way suitable for the purpose (21,25). Or it is the ideal model of the movement of the sports discipline (6). The ideal model of a branch expresses an optimal movement form, which is formed as a result of applying the movement in different ways many times. The technique of each athlete creates his own unique modeling style.

The basics of this formation cover the movements that reach the result in the shortest time unit, use the least energy consumption, and have the lowest error rate against the opponent in team sports. Not every move performed by every athlete is technically acceptable. Because in the formation of the basic movement over time, the positioning of the joint system according to the nerve-muscle coordination is a result of the body's adaptation mechanism. In the adaptation mechanism, the body basically aims to make the movements in the most economical way suitable for the purpose.

When the difficulty level of technical learning is examined in starting sports, it is seen that while a lot of effort is exerted at first, less effort is spent as the technique settles with movement repetitions.

In basketball, technique has an important place in both offensive and defensive systems. In particular, the technical training received in the infrastructure is very important in terms of forming the basis of success in the sportsmanship period. It is important that the technical movement taught in the infrastructure is similar to the ideal model and conforms to its criteria. It is accepted that the correct technical models that children have acquired in the infrastructure will also be the basis for their future sports life. The scientificness, experience and technical evaluation of the trainer/sport scientist plays an important role in the technical development of children or those who are new to sports. In the technical development period, it can be thought that if the strengths and weaknesses are not evaluated in the trainings, it can bring many deficiencies in determining the form of the trainings in the development period. Basketball consists of the basic techniques of dribbling, passing, shooting and rebounding. Although every technique has an important place, the most important factor determining the score of the match is the shot (29). It is considered very important to correct the mistakes in a timely manner, in the infrastructure, to teach the shooting teaching stages and the shooting technical position of the shot correctly. Researchers have made applications on shooting in the field (17). Based on the data obtained by some researchers, six basic teaching points have been proposed for mid-range to long-distance jump shots within the framework of the biomechanical fundamentals of a basketball shot (15).

In basketball, the shot is the most important factor that directly affects the outcome of the match. Drop angle, speed and height of the shot play an important role (18,19). Raiola et al. noted the technical factors that govern shot shooting outside of force as follows: a. Initial height of the ball, b Air resistance, c. Drop rate of the ball, d. Ball exit angle. From a biomechanical point of view, shooting is about the lower limb (feet, leg, and thigh), trunk (stabilizing musculature of the flying body), and upper limb (hand, forearm, and arm). The main muscle groups of the upper extremity that intervene during the movement of the shot are:

Arm Flexor: brachial

Arm Flexors: anterior deltoid, pectoralis (upper fibers), and biceps coracobrachialis

Arm Extensor: triceps

Forearm Pronator: pronator teres

Hand Extensor: extensor the radial and ulnar, radial extensor short and extensor ulnar

Hand Flexor: radial and ulnar

Hand Finger Flexor: lumbrical, interosseous, flexor superficial and deep of the fingers. (24).

In general, the evaluation of shooting technique development is made visually by the coaches on the field (3). Although there are many models in technical evaluation, the American Alliance for Health Physical Education, Recreation and Dance can be given as a few examples of technical tests AAHPERD. The technical evaluation may be difficult to implement due to the necessity of doing it under field conditions. For this reason, trainers and sports scientists mostly prefer laboratory tests. The main reason for this is because of its high validity and reliability (28). However, considering the time, cost and availability of laboratory tests in field conditions, it can be said that it sometimes creates a disadvantage. In addition, it does not comply with the field and competition conditions.

In our country, the evaluation of shooting technique in basketball is done within the framework

of visuality and there are limited studies. The difficulty of technical analysis, the difficulty of evaluating the positions of the joint areas during the movements performed by the priority athlete, as well as the comparison of the movement made with the standards. For example, it was stated that many elements such as the position of the body, the speed of the ball, and the rotation of many elements should be evaluated during the shooting (16). In technical evaluation, it is necessary to evaluate the process from the starting point of the movement to the end point, body positions and the shape of the movement. Due to these difficulties, it is very difficult to perform technical analysis in field conditions. In addition, the fact that basketball is a team sport poses a disadvantage for the sports scientist. Making technical analysis of each athlete separately and validity and reliability in visual evaluations also create some problems. It can be said that the analysis of the body in field conditions is a very difficult and time-consuming process for sports scientists. In this context, there is a need for practical analysis systems with high reliability, suitable for field conditions.

The aim of this study is to analyze the effects of the angular conditions of the joint areas in the shooting position of the basketball players who regularly train in the infrastructure on the shooting percentages by making practically computerized analysis.

MATERIAL and METHOD

15 male basketball players voluntarily participated in our study, who regularly training in the infrastructure of the Anatolian Stars Sports Club (Anadolu Yıldızları Spor Kulübü) in Konya. In our study, two groups were formed as the group with high shooting rate (HSR) and the low shooting rate (LSR) group. Participation in regular training was determined as a prerequisite for the determination of the groups participating in the study. Group with high shooting rate n: 7 (HSR) (age 15.4±0.7 years, height 1.83±9.1 m., body weight 80.8±16.2 kg., sports age 7.2±1.8 years), low shooting rate group (LSR) n:8 (age 15.7±0.9 years, height 1.82±7.3 m., body weight 70.1±7.8 kg., sports age 4.4±2.6 years).

Shot tests were planned over the three zones shown in Figure 1 and 20 shots were thrown from each zone. While shooting from the foul shooting zone (zone 2), the shots from zones 1 and 3 (5.80 m from the projection of the center distance right-left striker zone of the circle) were performed with the jumping shooting technique. Average of the total baskets fired from three (3) regions (for example, 1st Region 10 shot on target + 2nd Region 15 shot on target, 3rd Region 10 shot on target (36/3=12) and 11 or more shots on target (n:7) (HSR) as well as 8 other basketball players (LSR).

In the APPA technical analysis program, the position of the basketball players in the shooting position from the 2nd region, when they take the basketball into their overhead areas, was determined as the Shooting Start Phase (in terms of standardization) and the basketball ball was asked to stay in the hand-off position, which was accepted as the Shooting Finish phase.

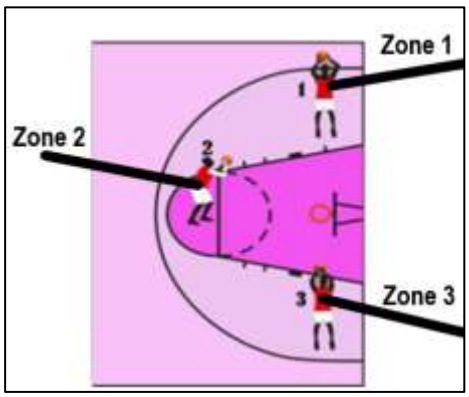

Figure 1. Shooting zones of the infrastructure basketball players participating in the research

High resolution camera and **APPA-BASTECH Technical Analysis Program:** were used in the study.APPA BASTECH Technical Analysis Program: Printed in the Visual Studio IDE using the C# programming language WindowsForm within the framework of the specified algorithm. The codes were written with reference to the joint regions accepted as reference in the technical evaluation in the literature. The photos taken with a digital camera according to the physical posture position in the program were transferred to the designated area within the APPA Bastek Analysis program.

In the physical posture position, 7 regions that can be evaluated angularly according to the Lateral (side) posture (Head, Shoulder, Right Elbow, Right Wrist, Hip, Right Knee, Right Ankle). (22) also conducted angular analyzes on 8 regions in their studies. 3 reference points were determined in the calculation of the interior angle of each region. For example, in the evaluation of the elbow region, Mousla was marked on the program as the lateral deltoid distal point **(1 marker)** as the point where the outer and innermost curves of the cubital region **(2**

markers) and the processus styloid point of the radius **(3 markers)** on the lateral, and a line line between 3 marker points is automatically drawn. drawn by the program. In the next calculation, the second (2) marker point was accepted as the center point and the interior angle was calculated. The interior angle formula was also used as ((180- (sum of two exterior angles)).

Two group comparisons (Independ t test) were used as statistical procedures. Head, shoulder, elbow, wrist, hip, knee-ankle joints were compared angularly between Shot Initiation Stage (HSR) and (LSR). Again, the head, shoulder, elbow, wrist, hip, knee-ankle joints were compared angularly between the Shot End Stage (HSR) and (LSR). In addition to the data we obtained from here, it was requested that the Head, Shoulder, Elbow, Wrist, Hip, Knee, Ankle posture positions of the 2 basketball players who shot the best and the lowest shot were scored according to the Likert system. The angular data obtained by the evaluation made by experienced trainers were also taken into account in order to give an idea in the comparisons.

RESULTS

Table 1. Physical information of the groups with High Shooting Rate and Low Shooting Rate participating in basketball training in the infrastructure

PARAMETERS		n	Mean±SD	df	p
Age (Year)	**High Shooting Rate Group**	**7**	**15,4±0.7**	12	0,552
	Low Shooting Rate Group	8	15,7±0.9		
Height (cm)	**High Shooting Rate Group**	**7**	**183,7±9.1**	12	0,705
	Low Shooting Rate Group	8	182,0±7,3		
Weight (kg)	**High Shooting Rate Group**	**7**	**80,8±16,2**	12	0,002*
	Low Shooting Rate Group	8	70,1±7,8		
Sport Age (Year)	**High Shooting Rate Group**	**7**	**7,2±1,8**	12	0,036
	Low Shooting Rate Group	8	4,4±2,6		

Mean±SD; mean and standard deviation df:: degrees of freedom *p<0,05

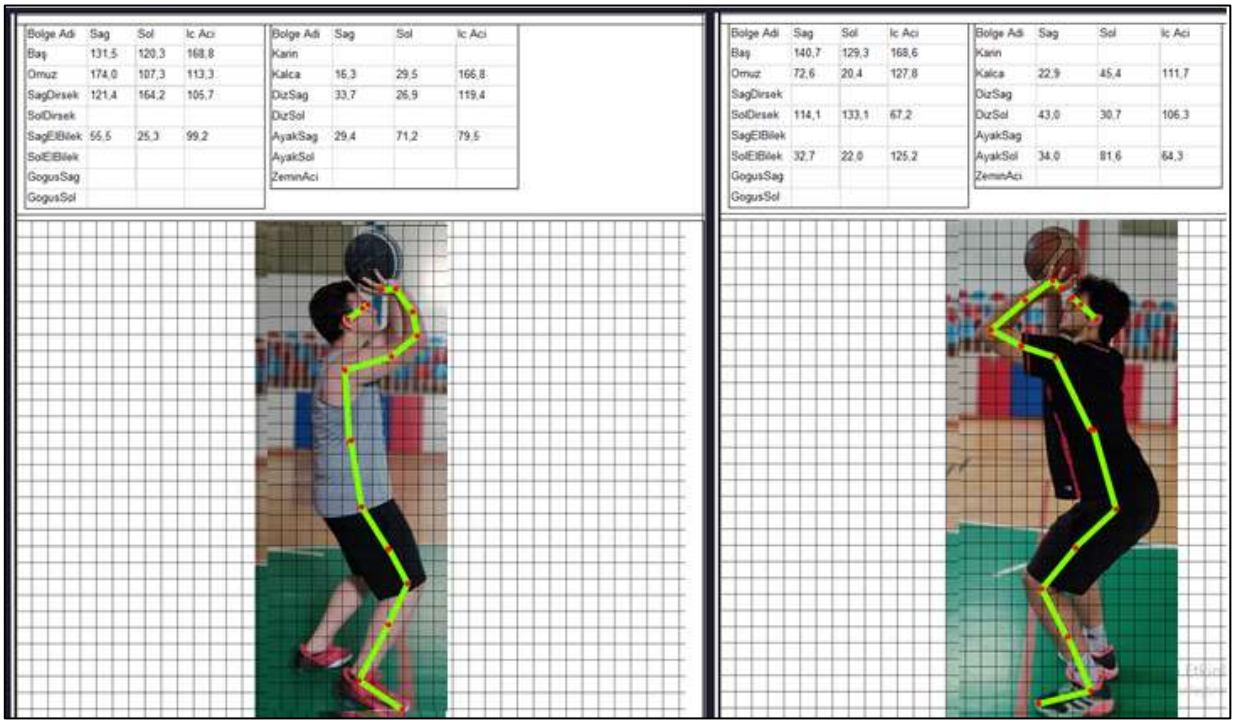

Figure 2. Analysis of the Joint Angles of the Groups with High Shooting Rate (Right Photo) and Low Shooting Rate (Left Photo) Groups Participating in Infrastructure Basketball Training in the Shooting Starting Phase Position.

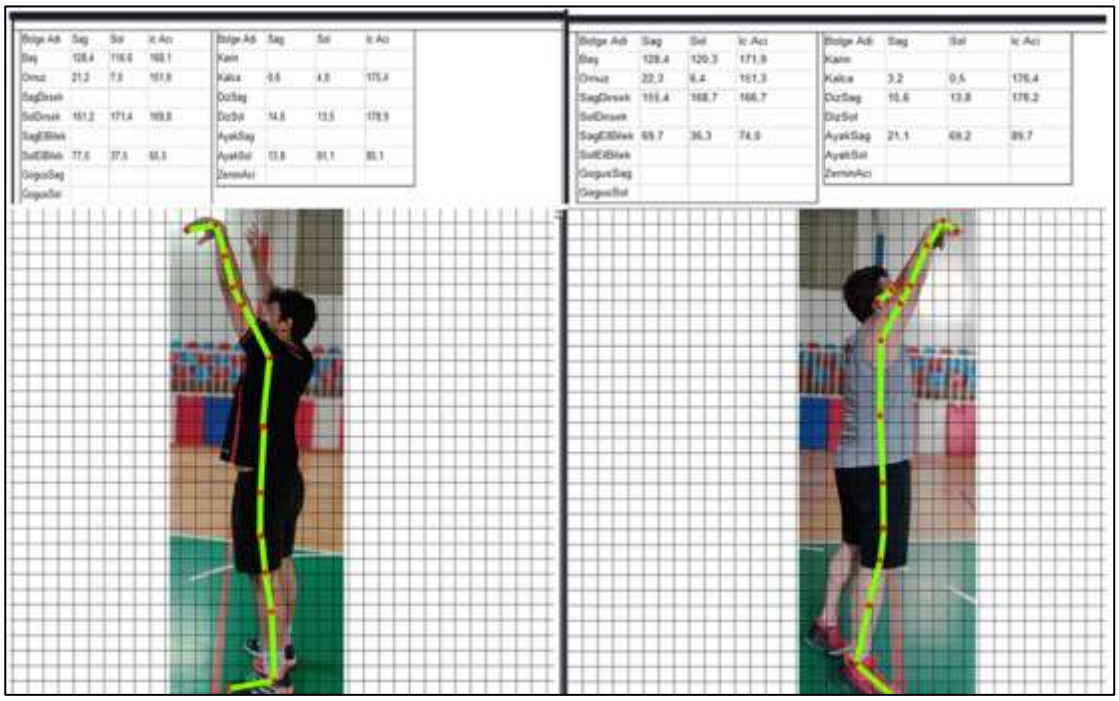

Figure 3. Analysis of Joint Angles of the Groups with High Shooting Rate (Left Photo) and Low Shooting Rate (Right Photo) Groups Participating in Infrastructure Basketball Training in Shooting Finishing Position

Table 2. Regional Shot Rates of High Shot Rate (Right Photo) and Low Shot Rate (Left Photo) groups participating in basketball training in the infrastructure

PARAMETERS		n	Mean±SD	df	p
Zone 3	**High Shooting Rate Group**	**7**	**12,5±2,5**	12	0,001*
	Low Shooting Rate Group	8	7,8±1,4		
Zone 2 (FoulLine)	**High Shooting Rate Group**	**7**	**13,0±2,3**	12	0,002*
	Low Shooting Rate Group	8	8,4±1,8		
Zone 1	**High Shooting Rate Group**	**7**	**11,4±1,9**	12	0,001*
	Low Shooting Rate Group	8	7,4±1,5		
Avarage Shot	**High Shooting Rate Group**	**7**	**12,4±1,2**	12	0,000*
	Low Shooting Rate Group	8	7,8±1,3		

Mean±SD; mean and standard deviation df:: degrees of freedom *p<0,05

Table 3. Comparison of the Joint Angles of the Groups with High Shot Rate and Low Shooting Rate Groups Participating in Infrastructure Basketball Training in the Shooting Starting Phase Position

PARAMETERS		n	Mean±S.D.	df	p
Head (Degree)	**High Shooting Rate Group**	**7**	**157,5±5,8**	13	0,004*
	Low Shooting Rate Group	8	168,6±6,2		
Shoulder (Degree)	**High Shooting Rate Group**	**7**	**120,1±5,1**	13	0,425
	Low Shooting Rate Group	8	114,6±16,8		
Elbow (Degree)	**High Shooting Rate Group**	**7**	**79,6±6,0**	13	0,000*
	Low Shooting Rate Group	8	116,7±8,2		
Hand Wrist (Degree)	**High Shooting Rate Group**	**7**	**91,7±2,0**	13	0,000*
	Low Shooting Rate Group	8	108,4±9,2		
Hip (Degree)	**High Shooting Rate Group**	**7**	**148,9±18,2**	13	0,111
	Low Shooting Rate Group	8	161,1±8,0		
Knee (Degree)	**High Shooting Rate Group**	**7**	**113,9±3,4**	13	0,000*
	Low Shooting Rate Group	8	141,1±10,4		
FootWrist (Degree)	High Shooting Rate Group	7	76,3±6,4	13	0,157
	Low Shooting Rate Group	8	86,8±17,3		

Mean±SD; mean and standard deviation df:: degrees of freedom *p<0,05

Table 4. Comparison of the joint angles of the High Shot Rate and Low Shot Rate groups participating in the infrastructure basketball training in the Shooting Finishing Phase Position

PARAMETERS		n	Mean±S.D.	df	p
Head (Degree)	**High Shooting Rate Group**	**7**	**160,4±12,3**	13	0,674
	Low Shooting Rate Group	8	157,5±13,7		
Shoulder (Degree)	**High Shooting Rate Group**	**7**	**144,0±7,8**	13	0,851
	Low Shooting Rate Group	8	144,7±6,7		
Elbow (Degree)	**High Shooting Rate Group**	**7**	**176,8±2,4**	13	0,091
	Low Shooting Rate Group	8	172,3±6,1		
HandWrist (Degree)	**High Shooting Rate Group**	**7**	**88,2±2,8**	13	0,252
	Low Shooting Rate Group	8	98,0±21,3		
Hip (Degree)	**High Shooting Rate Group**	**7**	**174,7±3,2**	13	0,844
	Low Shooting Rate Group	8	174,1±6,3		
Knee (Degree)	**High Shooting Rate Group**	**7**	**171,4±5,7**	13	0,837
	Low Shooting Rate Group	8	170,7±78		
FootWrist (Degree)	**High Shooting Rate Group**	**7**	**91,8±5,9**	13	0,761
	Low Shooting Rate Group	8	94,7±23,9		

Mean±SD; mean and standard deviation df:: degrees of freedom *p<0,05

DISCUSSION AND CONCLUSION

In our study, we compared the differences in technical shooting (starting and finishing phases) of basketball players with high accuracy in basketball shooting position compared to the group with low shooting rates. In the literature, it is seen that angular values and ball speed have gained weight in basketball shooting analysis. It has been seen that the position of the joint areas that make up the angular probolic (curvilinear) trajectory of the basketball, the kinetic movement chain, the stabilization during the shooting and the neuromuscular optimization in this position are important.

In a similar study by (26), they examined the release of the ball and whether the shot was scored or missed over a certain formulation. In our study, all joint regions were examined as analysis and it was determined that there were significant differences ($p>0.05$) in the wrist regions, especially at the start and end points of the shot, where the differences were found.

Raiola et al., in 2016 (24), stated that in order to change the motion of the ball in the definition of the shot shot they made, the motion force that starts from the feet of the shooter and progresses to the fingertips on the body and ends should be applied to direct the ball to the desired target. In our study, systematic analysis of all joints in all technical movements of the body was made and the angular values of these regions were determined.

Mondoni (20) reported that when various shot shots from different positions and distances are examined, the trajectories of the ball form a parabolic curve depending on the angle of motion of the ball. (24) focused on 4 main issues besides the force in their analysis of the shot. These are: Initial height of the ball, b Air resistance, c. Drop rate of the ball, d. The parts related to the angle of exit of the ball from the hand (wrist volar flexion) were examined. In our study, the stance position of the wrist after the shot was evaluated at the end of the shot in relation to these four basic issues. No statistically significant difference ($p>0.05$) was found between the group with high shot rate (HSR) and the group with low shot rate (LSR). However, there was an angle difference of 10 degrees. In other words, it was determined that the group with high shot rate had lower volar flexion more angularly. When evaluated in terms of this position, it is seen that the fingertips of the group with high shooting rate show a lower position after the ball release position.

In a similar study, increasing angular velocities of both shoulder flexion and elbow extension and an increase in the velocity of the center of mass in the direction of the crucible. Hand-release angles for the two short distances (52-55°) tended to provide the advantage of a steep entry angle to the basket, while those that required the minimum possible release velocity at the longest distance (48 50°) reported (18).

In a similar study by Okazaki, & Rodacki, (23), it was determined that the ankle was 14.37 degrees, the knee 169.84 degrees, the hip 171.8 degrees shoulder, 102.5 degrees, the elbow 139.9 wrists 208.07 degrees when releasing the ball in children. In our study, ankle HSR/ LSR 91.8/84.7. degree, knee HSR/LSR 171.4/170.7 degree, HSR/LSR hip 174.7/174.1 degree HSR/LSR shoulder 144/144.7 degree, elbow 176.8/172.3 degree, wrist HSR/LSR 88.2/98 determined in degrees. Although we think that the differences in some joint areas in our study may be due to our evaluation in the stable shooting position, we also think that the body joint areas may have more closed angular values in jump shot. In our study, it is seen that the joint angular values show parallelism in most of the groups with both high shot rate and low shot rate in the fixed position.

Raiola, and D'ısanto, (24) stated that as a result of the smash analysis, some technical scientific elements referred to in sports practice are provided not only in terms of scientific and theoretical study of the subject, but also as a tool for further validation of training programs at all times. It's a good idea to remember that the highest level of coordination retains the ability of the player to successfully perform the movement, as well as to change and adapt to the "real situation" while maintaining efficiency(1,2).

Silverberg, Tran, & Adcock, (26) et al. reported that shooting accuracy depends on the shooter's skill level and testing. It can be said that besides the skill level is important in accurate shots, it is important to ensure the correct technical formation of the body's positions, nerve-muscle coordination and to do many repetitions in accurate shots.

In the light of the data we have obtained, analysis methods can be used in the practical APPA computer program to determine the shooting technical positions of basketball coaches and sports scientists. However, for the formation of norm values, it is necessary to analyze the steady and jumping shooting techniques of good shooters. Norm values will be formed over time with the increase of these and similar studies, and we think that coaches and

sports scientists working in this field can contribute to the development of the basketball branch by using the data.

Implementation Recommendations

It will be useful for athletes to perform multi-dimensional performance analysis (3 minutes of loading, 1 minute of rest x 3 rounds) in individual sports, anthropometric, posture, strength, anaerobic power, aerobic power and branch-specific tests, and to determine the loading intensities (Zone) in the training periodization based on the determination of the maximals.

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The Estimation of German Football League (Bundesliga) Team Ranking via Artificial Neural Network Model

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Abstract

This study was conducted to estimate the places of teams in league ranking by the analysis of the time intervals of the scored and conceded goals in football using Artificial Neural Network (ANN). In the study, the data of the minutes of the scored and conceded goals (0-15, 16-30, 31-45, 46-60, 61-75, 76-90) in total 918 matches played in 3 seasons (2015/2016, 2016/2017, 2017/2018) in German Soccer League (Bundesliga) were used. Total 12 input values (scored and conceded goals) and 1 output (league ranking) value were obtained. 4 different models were determined. 3 seasons league rankings were estimated by training the first 2 season data. All data were separated randomly for training and testing. League ranking was obtained by normalizing between the range of 0,1 – 0,9. Since the produced value was in the range of 0 – 1, it was multiplied by 100 for a trained network and the league ranking was obtained. It was determined that the model developed according to our findings estimated the league ranking with above 99% accuracy for many teams (test data set) according to the minutes of the scored and conceded goals. The lowest mean square error value was obtained as 0.00004. Consequently, it was determined that the minutes of scored and conceded goals in soccer affect the league ranking of the teams. Obtained ANN prediction model can be a guide for coaches to determine the offensive and defensive organizations.

Keywords: Artificial neural network, ranking, prediction, soccer league

Yapay Sinir Ağları Modeli ile Almanya Futbol Ligi (Bundesliga) Takım Sıralamasının Tahmini

Özet

Bu çalışma futbolda atılan ve yenilen gollerin zaman aralığının Yapay Sinir Ağları (YSA) modeli ile analiz edilerek takımların lig sıralamasındaki yerinin tahmin edilmesi amacıyla yapılmıştır. Çalışma Almanya Futbol Ligi'nde (Bundesliga) oynanmış 3 sezonda (2015/2016, 2016/2017, 2017/2018) toplam 918 maçta atılan ve yenilen gol dakikalarına (0-15, 16-30, 31-45, 46-60, 61-75, 76-90) ait veriler kullanılmıştır. Toplam 12 girdi (atılan-yenilen goller) değerine karşılık 1 çıktı (lig sıralaması) değeri elde edilmiştir. Birbirinden farklı 4 model belirlenmiştir. Takımların ilk 2 sezon verileri eğitilerek 3. sezon lig sıralaması tahmin edilmiştir. Verilerinin tamamı eğitim ve test için rastgele yöntemle ayrılmıştır. Lig sırlaması 0,1 - 0,9 aralığında normalize edilerek lig sıralaması elde edilmiştir. Üretilen değer 0 – 1 aralığında olduğundan eğitilen bir ağ için 100 ile çarpılarak lig sıralaması elde edilmiştir. Bulgularımıza göre geliştirilen modelin atılan ve yenilen gol dakikaları değişkenine göre birçok takım için (test veri kümesi) lig sıralamasını %99'un üzerinde doğruluk oranıyla tahmin ettiği belirlenmiştir. En düşük ortalama kare hatası değeri 0.000044 olarak elde edilmiştir. Sonuç olarak futbolda atılan ve yenilen gol dakikalarının, takımların lig sıralamasını etkilediği tespit edilmiştir. Elde edilen YSA tahmin yöntemi antrenörlerin hücum ve savunma organizasyonlarını belirlemede yol gösterici olabilir.

Anahtar kelimeler: Yapay sinir ağları, futbol, sıralama, tahmin

INTRODUCTION

In order to be successful in senior soccer, most of the players should reach physical, technical, and tactical skills (22). To be able to adapt to the competitions with high intensity for an elite player is only possible through a controlled training process (9). In this process, analyzing matches and the league to increase productivity is necessary for a good team ranking in the league (6, 20). The importance of competition analysis applications is gradually increasing due to their positive contributions to improve team performance using different methods and techniques. Today, with the analysis programs used by an analyst in the technical team in senior teams, match analyses of both home and opposing teams are performed and used in technical and tactical evaluations (8, 19). Coaches can reach a great number of accurate data by using these programs (5). Another program in analyzing competitions is the ANN model. The artificial neural network model is used in many fields including sports (13, 17, 23). Artificial neural networks are computer systems that can automatically apply the talents such as learning a skill, which is an important characteristic of the human brain, producing and discovering new information without getting any help (18). Artificial neural networks, which are implemented simulating electronic circuits or computer software, have talents such as collecting information after a learning process and storing it by means of intercellular connections (21). This model provides to reveal the mutual relations that are unknown and difficult to be understood between the data. To be able to train ANN and to reach the targeted results, intensive input and output sequences are needed. Analysis, generalization, association, optimization, learning, and classification in different issues can be performed by ANN (18). The artificial neural network model has found a wide range of application areas due to its superiorities such as presenting easy solutions to complex problems by means of its talents of being able to learn simple structures special to the problem, to do parallel processing, and to tolerate mistakes (21).

A great number of data can be reached by classical analysis programs used in soccer. However, time and experience are required to interpret this data accurately. A competition and league analysis to be performed by ANN model can decrease the effect of human factor especially in the interpretation of the data, and thus decrease the rate of error. The number of studies on the prediction of league rankings in football using the ANN model is limited (2, 14). There is no study to predict the end of season team rankings of the German football league (Bundesliga). It is thought that estimating the league ranking accurately by using the ANN model in soccer will provide important advantages for coaches, clubs, and betting shops. In this regard, the objective of this study is to estimate the league ranking according to the minutes of the scored and conceded goals in the German soccer league (Bundesliga) by using the ANN model.

MATERIAL AND METHOD

In this study, a machine learning method was used to estimate the team ranking. To develop the model, the ANN model in MATLAB (Neural Network Toolbox) software was used. In the study, the data of the minutes of the scored and conceded goals in 3 seasons (2015/2016, 2016/2017, 2017/2018) in the German soccer league (Bundesliga) were used. The match data of the German soccer league used in the study were obtained from an international analysis company.

Model Parameters

Competitions in football are played as 2 halves of 45 minutes. Total 12 input variables were determined as both scored and conceded goals in the first and second halves of the matches.

Input Parameters

Scored goal variable; The time of scoring goal in the matches played by the teams were evaluated in 15-minute sections. Accordingly, scored goal input variable was separated into 6 sections as 0-15, 16-30, 31-45, 46-60, 61-75, 76-90.

Conceded goal variable; The time of conceding a goal in the matches played by the teams were evaluated in 15-minute sections. Accordingly, conceded goal input variable was separated into 6 sections as 0-15, 16-30, 31-45, 46-60, 61-75, 76-90.

Normalization

In the study, all inputs and outputs were subjected to normalization treatment, and the highest value was 0,9 and the lowest value was 0,1 (17). The formula used in normalization is stated in the equation.

x' Normalized value.

x Initial value.

max (x) Maximum value.

min (x) Minimum value.

$$x' = 0.8\ (\frac{x-\min(x)}{\max(x)-\min(x)}) + 0.1 \quad (23).$$

Artificial Neural Network and Modeling

A neuron is the mechanism deciding whether transmits the information or not depending on the threshold value by evaluating the input value arriving to it (Figure. 1). Neurons can decide by communicating with each other (16).

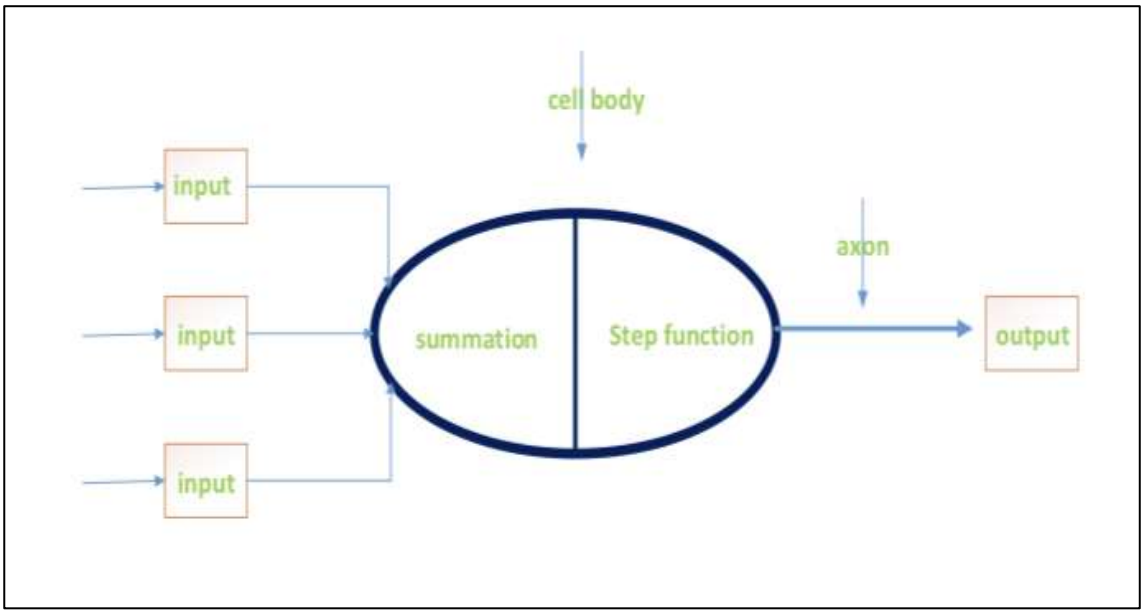


Figure 1. The simple neuron model

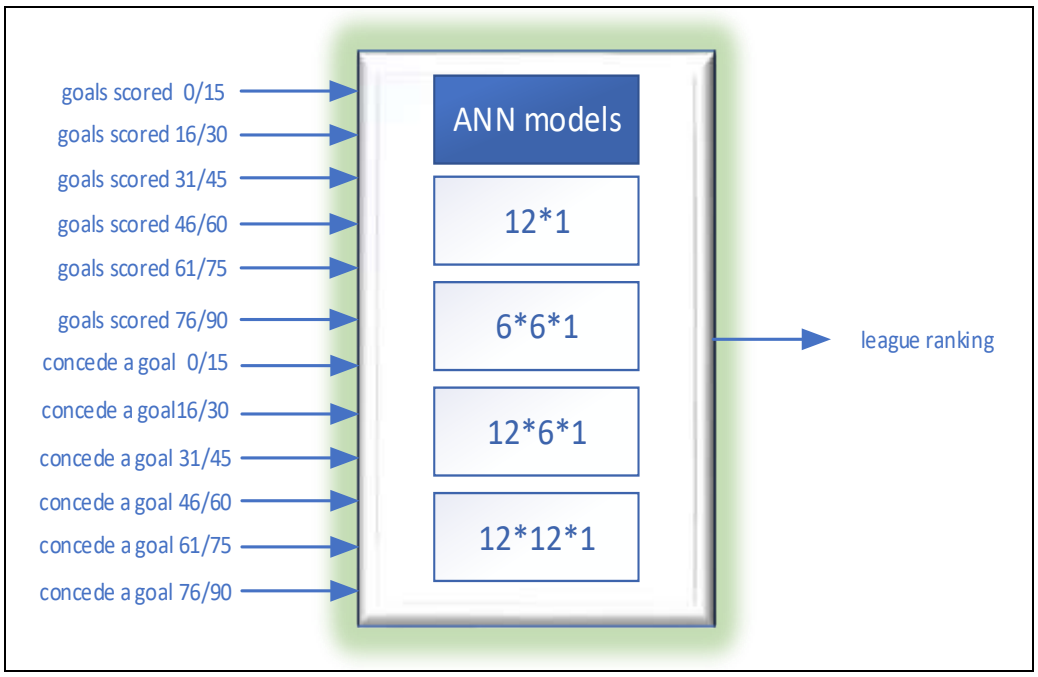


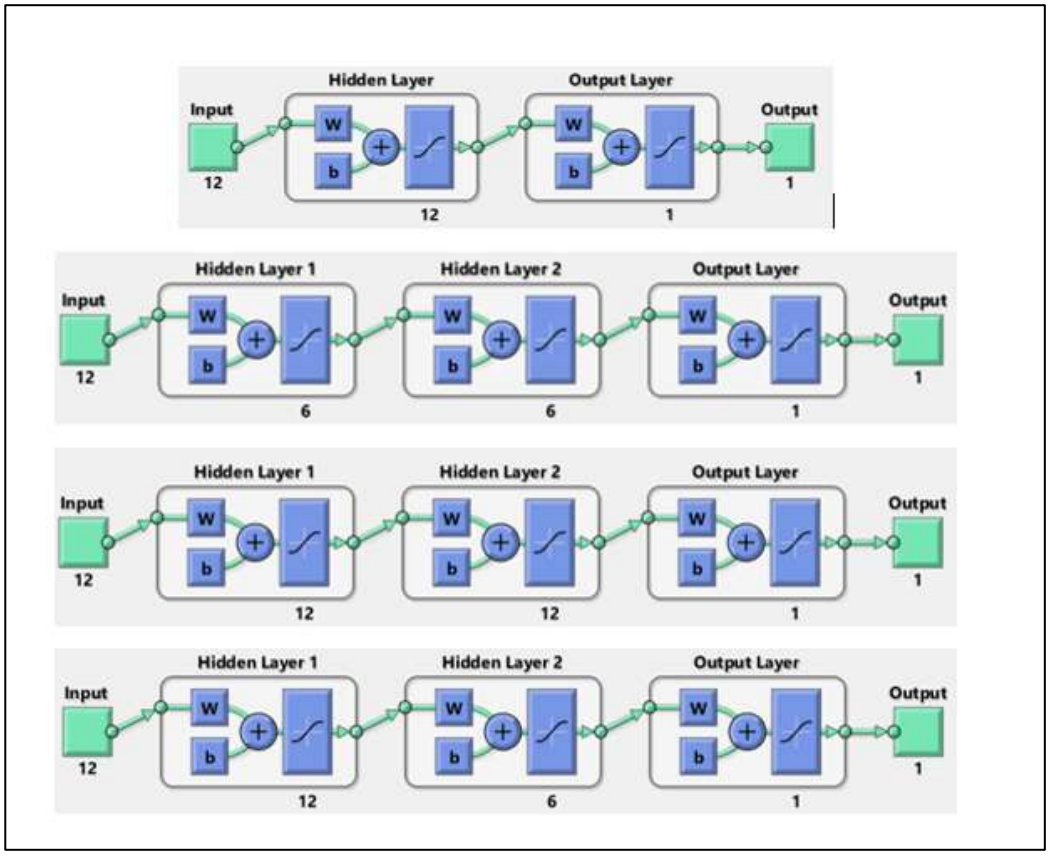
Figure 2. MATLAB artificial neural network models and input, output variables

While the inputs from the entrance level are being transmitted to neurons, there is a weight on the transmission line. Weight factors also work between neurons and inputs. Each input is transmitted to

neurons by being multiplied with weight values. Weights between inputs and neurons are related to the learning process. Neurons having the features of memory and learning create a model between input and output by establishing the network. The created models are designed so that one output will be obtained for twelve inputs.

FINDINGS

The special neural network view of the operated models is given in figure 3. In the models, sequencing was made as input, hidden layer, and output in order from left to right. Models with different layers have 12 input and 1 output values.



The network characteristics of the four established models were chosen as the same. Feed-forward backdrop was operated as the network type. In the networking screen, TRAINGDX was chosen as the training function and the LEARNGDM as the Adoption learning function.

Table 1. Training of best validation performances of models

Model type	Number of layers	MSE
12*1	2	0.00017632
6*6*1	3	0.00053017
12*6*1	3	0.00023022
12*12*1	3	0.000044188

MSE: Mean Square Error

The fewer the mean square error values of the four established models are the less error occurs. In table 1, the smallest error value was obtained as 4.4188e-05 in 12*12*1 model.

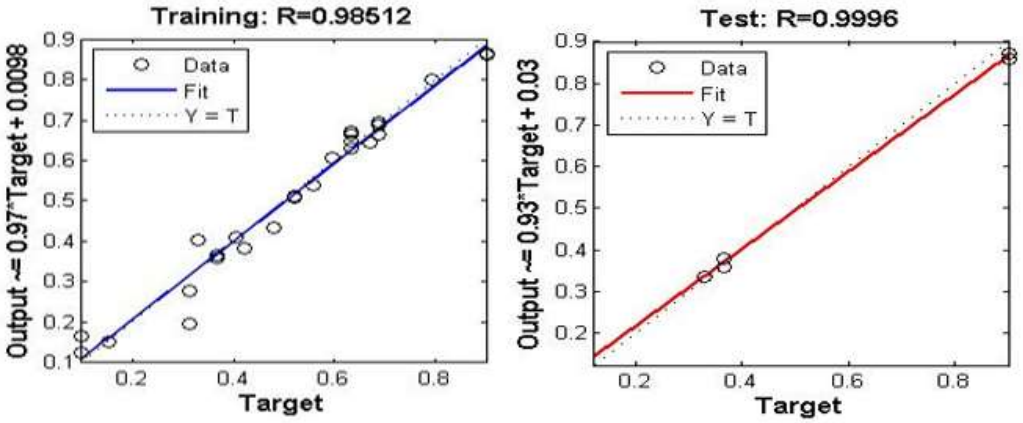


Figure 4. Regression analysis for 12*1 model.

According to Figure 4, the training chart value of the regression analysis performed with 12*1 model type with 2 layers was determined as 0,9851, and the test chart value as 0,9996.

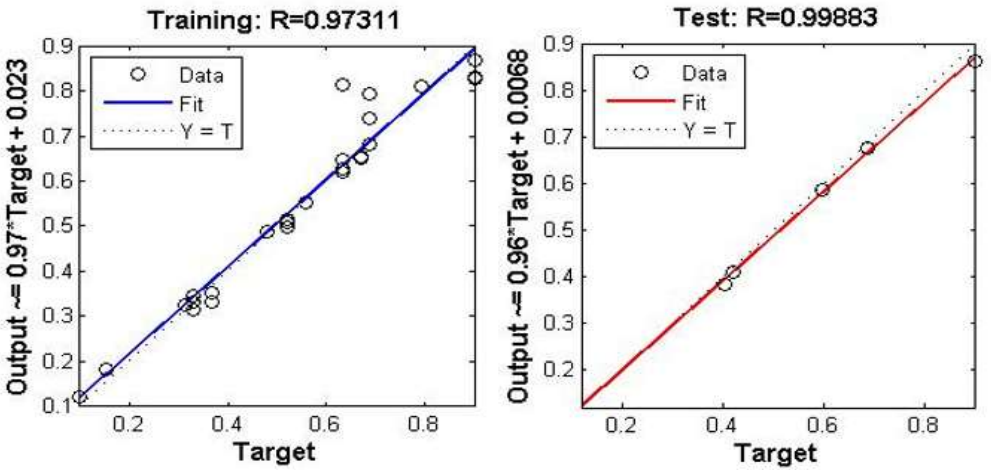


Figure 5. Regression analysis for 6*6*1 model.

According to Figure 5, the training chart of the regression analysis performed with 6*6*1 model type was determined as 0,9731, and the test chart as 0,9988.

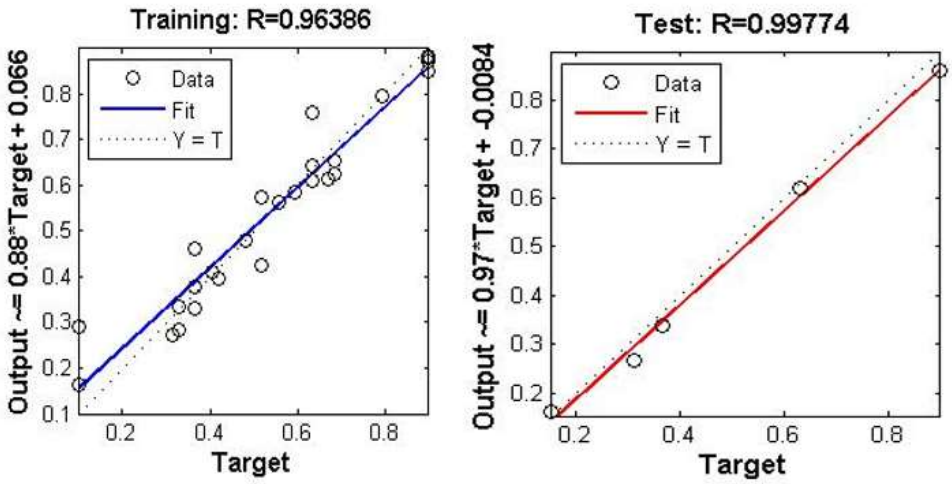


Figure 6. Regression analysis for 12*6*1 model.

According to Figure 6, the training chart of the regression analysis performed with the 12*6*1 model type with 3 layers was determined as 0,9638, and the test chart as 0,9977.

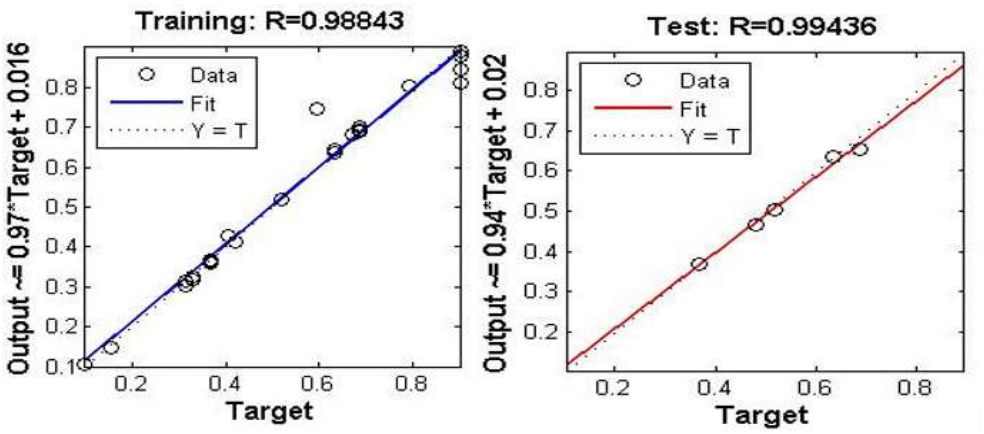


Figure 7. Regression analysis for 12*12*1 model

According to Figure 7, the training chart of the regression analysis performed with the 12*12*1 model type with 3 layers was determined as 0,9884, and the test chart as 0,9943.

Table 2. All regression values

Model type	Training	Validation	Test	All
12*1	0.9851	0.9987	0.999	0.989
6*6*1	0.9731	0.9994	0.9988	0.9808
12*6*1	0.9638	0.9966	0.9977	0.9714
12*12*1	0.9884	0.9993	0.9943	0.9897

In table 2, the four skills of the four models are given separately. The fact that the validity rates of all models are above 99% is remarkable. When compared to other models, the test value of the 12*6*1, of which the training value is the lowest, is 0.99774. It is determined that this value is also close to the other values and it is above 99%.

Table 3. Predicted league ranking results of the German League football teams

Teams	League Ranking	Model 12*1	Model 6*6*1	Model 12*6*1	Model 12*12*1
1	0,1	0,1227	0,1192	0,1644	0,1069
2	0,1470	0,5274	0,5077	0,5238	0,5024
3	0,1941	0,3369	0,3446	0,3227	0,3191
4	0,2411	0,4095	0,3845	0,4117	0,4269
5	0,2882	0,3387	0,3308	0,2819	0,3261
6	0,3352	0,5112	0,4995	0,4245	0,5203
7	0,3823	0,6725	0,8145	0,7598	0,6361
8	0,4294	0,3659	0,3653	0,3799	0,3686
9	0,4764	0,4329	0,4867	0,4817	0,4672
10	0,5235	0,5406	0,5528	0,5619	0,5505
11	0,5705	0,4019	0,3154	0,3345	0,3245
12	0,6176	0,6085	0,5861	0,5841	0,7454
13	0,6647	0,3596	0,3315	0,3298	0,3626
14	0,7117	0,6883	0,6531	0,6596	0,6777
15	0,7588	0,5085	0,5165	0,5762	0,5172
16	0,8058	0,6326	0,6469	0,6425	0,6368
17	0,8529	0,8794	0,8613	0,8793	0,8779
18	0,9	0,6431	0,6534	0,6137	0,6815

The developed model was created by MATLAB, and performance indicator charts (Figure 4, Figure 5, Figure 6, and Figure 7) are presented. The values in the team ranking column are taken in the range of 0,1 – 0,9. It is seen that the teams in the league ranking were estimated with high accuracy (above 99%) according to the results obtained from the input and output values in the developed models.

DISCUSSION

This research was conducted to estimate the league ranking by analyzing the statistics of the matches played in the German (Bundesliga) soccer league for 3 seasons (2015/2016, 2016/2017, 2017/2018) by using the ANN model. While this model was being created, 918 matches (3 seasons) were evaluated according to 12 variables (scored and conceded goals) to determine the most accurate model. In the evaluation, the minutes of the scored and conceded goals (0-15, 16-30, 31-45, 46-60, 61-75, 76-90) in the 1st and 2nd seasons (2015/2016, 2016/2017) were predicted as input variables, and the league ranking in the 3rd season (2017/2018) as the output variable. According to the analysis results by the ANN model, the Bundesliga league ranking was estimated with above 99% accuracy. In a study conducted by Tümer & Koçer (24), Turkish volleyball league ranking was predicted with 98% accuracy by using the ANN model. The input variables used in their study were determined as the teams' winning – losing the game at home and winning – losing the game away, and the output variable as the league ranking. Although this study had a different design from our study, only 66 games were analyzed, input variables were different and it was for the estimation of volleyball league ranking, it supports our study since it predicted the league ranking with high accuracy by ANN model.

In the literature, the number of studies on predicting the league rankings in football with the ANN model is limited. Aka et al., (2) English football league (over 99%); Aka et al., (1) Turkish Super League (over 99%); Kılıç et al., (14) the 2020 Super League (over 94%) predicted the end-of-season team rankings with ANN models developed according to different input variables. It is seen that other studies for the analysis of sport branches by using the ANN model are quite limited in number, and they are for the prediction of the match results. In a study by Ayyıldız (4), game results were tried to be predicted by ANN model by using 596 competition data in the National Basketball Association (NBA) in the 2015-2016 season. In this study, current winning percentages, last 3 games winning percentage, the percentage of winning at home, winning percentages of the year 2014, and handicaps were used for both the host and the guest teams as input variables. The game result was determined as the output variable of the study. According to the result of the study conducted by Ayyıldız (4), NBA games were predicted with above 90% accuracy by the ANN model. In a similar study conducted by Igiri & Nwachukwu (10), it is stated that match results in football were predicted with 85% accuracy by the ANN model. In another study conducted for football, the data of the past 7 weeks were analyzed for the estimation of the 1-week match results in the Iran Pro League. As a result of the study, the match results of 5 out of 6 teams were estimated accurately (83%) (3). In different studies conducted to estimate match results by ANN model, estimations with lower rates were determined (11,12,15).

In above-mentioned studies, the results were estimated by analyzing a few teams and matches. However, in our study, the league ranking was estimated by analyzing a great number of matches such as 918. The fact that the accuracy rate in our study was higher than the above-mentioned studies is thought to be related to the high number of samples used in match analysis.

Since there are many variables affecting the league ranking of the teams in football, predicting the league ranking is quite difficult. It is thought that the economic potential of the teams, physiological and psychological states of the players, the competence of the technical team, material used and the state of the pitch, climate etc. can affect the rankings of the teams at the end of the season. In our study, the goal variable was taken into consideration while estimating the league ranking, and, as a result, it was predicted with a high rate of accuracy. Especially the prediction of the German football league, which is one of the strongest football leagues in Europe, by using ANN model with a high accuracy rate can bring a different point of view to competition analysis in football. It is possible to reach quite a lot of data in the competition analyses performed by the classical analysis systems that are widely used today. However, the high number of data may cause analysis and evaluation times to extend. In addition, personal opinions and suggestions of the expert performing the analysis are used in the inferences obtained from classical analysis programs. This situation can limit the objectivity of the inferences despite the reliable data in the analyses. Also,

mistakes in the inferences by analysts may be the reason for the losses of time, labor, and even performance. In classical performance analysis systems, evaluations can be done according to an annual plan such as before the season, in the middle of the season, and after the season. Thus, the situation can be evaluated by generalizing the whole season (7). In the analyses performed by the ANN model, the fact that inferences are made by the neural network can be considered as a factor increasing the objectivity of the evaluations. In addition, with increasing the evaluation frequencies, it can be ensured that coaches can reach faster and more reliable inferences about their own teams and the opponents.

Consequently, the minutes of the scored and conceded goals in the matches played in 3 seasons in the German (Bundesliga) Soccer League, which is one of the strongest leagues of European soccer was analyzed by the ANN model, and the team ranking was estimated with 99% accuracy. It confirms that the minutes of scored and conceded goals are determinant in ranking together with the other factors affecting the ranking in teams' reaching the targeted ranking in football. This result can be a guide for determining offensive and defensive organizations for coaches.

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Predictors of Crowd Effect in Football: Evidence From Five Major Football Leagues of Europe

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Abstract

This study aims to determine predictors of crowd effect in five major football leagues in Europe. Literature review shows that crowd effect can be determined as size, proximity or density for the analysis. In this study, density was selected among them. Therefore, stadium occupancy rates were used as the crowd effect indicator. As the predictors of crowd effect; total transfer expenditure, total market value, average goals scored per match, UEFA coefficients of each league were utilized as variables of the research. In addition, gross domestic product of each country were included in the analysis as the predictor. Because supporters' economic conditions are also important to afford ticket prices. In this context, data regarding the variables includes from the season of 2005-2006 to 2019-2020 for English Premier League, French Ligue 1, German Bundesliga, Italian Serie A, Spanish La Liga. In this study, panel data analysis was used among quantitative research methods. Stationary of data was determined at the level of I(1). It was indicated through cointegration test that there was a cointegration relationship in the panel. Hence, stadium occupancy rate would move together with other variables in the long term except total market value. According to panel causality analysis results; total transfer expenditure, average goals scored per match, and UEFA coefficients, and gross domestic product are predictors of stadium occupancy rate. Consequently, this study has contributed to the framework of game location theoretically and developed substantial recommendations for professionals.

Keywords: Crowd effect, stadium occupancy rate, crowd density, home advantage, panel causality test

Futbolda Kalabalık Etkisinin Yordayıcıları: Avrupa'nın Beş Majör Futbol Liginden Kanıtlar
Özet

Bu çalışma, Avrupa'daki beş majör futbol liginde kalabalık etkisinin yordayıcılarını belirlemeyi amaçlamaktadır. Literatür taraması kalabalık etkisinin büyüklük, yakınlık veya yoğumluk olarak belirlenebileceğini göstermektedir. Bu sebeple, stadyum doluluk oranları kalabalık etkisi göstergesi olarak kullanılmıştır. Kalabalık etkisinin yordayıcıları olarak liglerin toplam transfer harcaması, toplam pazar değeri, maç başına atılan ortalama gol sayısı, UEFA katsayısı çalışmanın değişkenleri olarak kullanılmıştır. Ayrıca, ülkelerin gayrisafi yurtiçi hasılaları da analize yordayıcı olarak dâhil edilmiştir. Çünkü taraftarların ekeonomik durumları da bilet fiyatlarını karşılamaları için önemlidir. Bu bağlamda, değişkenlere ilişkin toplanan veriler 2005-2006 sezonundan 2019-2020 sezonuna kadar İngiltere Premier Lig, Fransa Lig 1, Almanya Bundesliga, İtalya Seria A, İspanya La Liga'yı kapsamaktadır. Çalışmada nicel araştırma yöntemlerinden panel veri analizi kullanılmıştır. Veri durağanlığı I(1) düzeyinde belirlenmiştir. Eşbütünleşme testi aracılığıyla panelde eşbütünleşme ilişkisi olduğu tespit edilmiştir. Dolayısıyla stadyum doluluk oranı değişkeni toplam pazar değeri hariç diğer tüm değişlenlerle uzun dönemde birlikte hareket etmektedir. Panel nedensellik analizi sonuçlarına göre toplam transfer harcaması, maç başına atılan ortalama gol, UEFA katsayısı ve gayrisafi yurtiçi hasıla stadyum doluluk oranının yordayıcılarıdır. Sonuç olarak, bu çalışma teorik açıdan oyun lokasyonu çerçevesine katkıda bulunmuştur ve profesyoneller için önemli tavsiyeler geliştirmiştir.

Anahtar kelimeler: Kalabalık etkisi, stadyum doluluk oranı, kalabalık yoğunluğu, ev sahibi avantajı, panel nedensellik testi.

INTRODUCTION

Taking advantage of playing the match at home is a deniable fact in today's team sports. Football is one of the most popular team sports today as in the past. It is known that playing the match at home is one of the most important factors that affects the match result in football (22). While home advantage includes positive factors for the home team such as learning/familiarity, travel, rule, and crowd effect, the away team is affected by these factors negatively. Previous studies show that the crowd effect is the most influential home advantage. Home team supporters not only provide motivation and energy to the home team but also discourage the away team on the other hand. Besides, they might affect the decisions of the referee directly or indirectly by making psychological pressure (17). In this context, it can be said that the crowd effect is an important issue that ought to be investigated deeply as one of the significant advantages of the home team. On the other hand, stadium revenues constitute an important part of football clubs' income as well. Therefore, the crowd effect ought to be considered and tried to be taken advantage of by clubs. However, there is a lack of scientific studies about the predictors of crowd effect in the literature. This constitutes the essential originality and necessity of this study.

Conceptual Framework and Literature Review

Home advantage as one of the most significant determinants of the match results in football (23) mainly involves four factors; familiarity/learning, travel, rule, and crowd. Courneya and Carron (4) developed a framework for game location research as Figure 1 below.

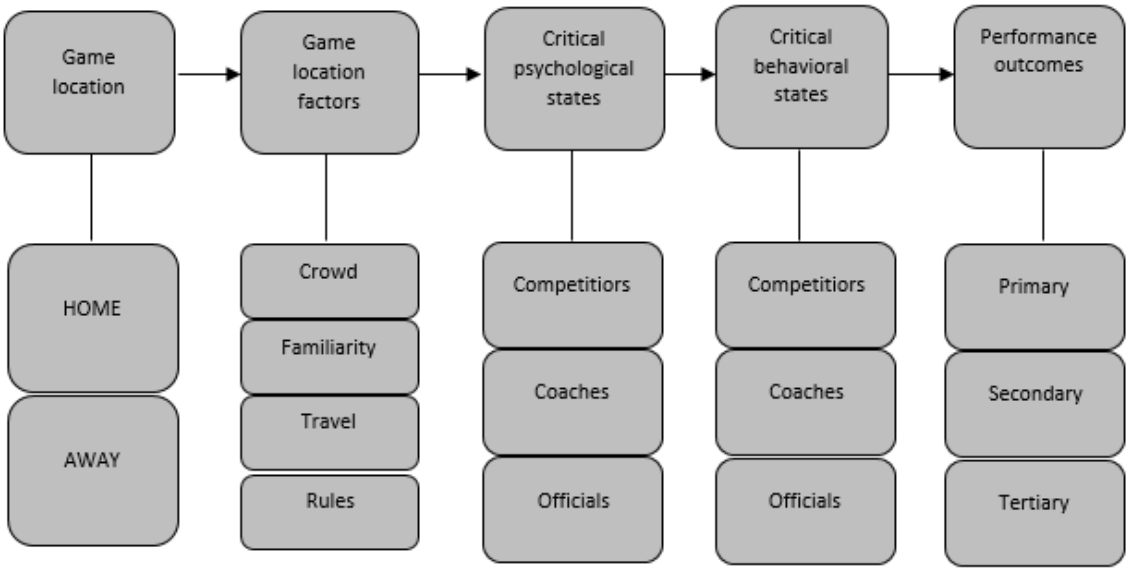

Figure 1: Framework for game location research (Courneya and Carron, 1992: 14)

The framework indicates four factors of playing at home and their effects on coaches, competitors, and officials. Finally, there are performance outcomes as primary, secondary, and tertiary. Familiarity/learning factor means that the home team is used to physical conditions of the stadium such as pitch, dressing room, and so on. Travel factor can cause some mental and physical problems for away team players such as tiredness and jet lag which might affect their performance during the game. Rules factors involve some privileges for the home team for specific sports such as baseball and hockey. Crowd effect which can be determined as size, proximity, or density affects motivation and willingness of home team players. On the other hand, it can make pressure on the referee to make some decisions for the advantage of the home team. Moreover, the crowd effect also impress the away team players and coach. This might cause psychological changes in them which can affect their behaviors as well. These game location factors (familiarity, travel, rules, crowd) can make impacts on the critical psychological states of the game parties (competitors, coaches, officials). These critical psychological states involve both cognitive (e.g., cohesion, confidence, anxiety) and affective (e.g.,

pride, stress, excitement) states. Afterward, these critical psychological states might develop some behaviors. For instance, players might start to play more aggressively, coaches might change the formation of their teams or make some substitutions in the right way or wrong way, the referee might also make some mistakes by gibing subjective decisions. At the end of these all procedures, three kinds of outcomes occur. The primary outcome includes basic statistics such as attempts, penalty, corner, ball possession, and so on. The secondary outcome includes the score of the game such as goals scored and conceded. Lastly, the tertiary outcome reflects the result of the competition like winning, losing, or drawing (4).

Within this framework, there are some studies investigate the crowd effect in the literature. Schwartz and Barsky (24) carried out their study with an extensive sample from various sports such as football, basketball, baseball, and hockey. The study includes more than 4.000 games remarked that spectator support and size were important determinants of performance and outcome of the game. Clarke and Norman (3) analyzed 20.306 football matches of 920 clubs from England between the seasons of 1981-1982 and 1990-1991. They stated that home advantage was worth approximately more than 0.5 goal advantage for the home side. Another conclusion was that home advantage was affected by years.

Nevill et al. (17) investigated the match between Liverpool (home) and Leicester City (away) from the season of 1998-1999. They cooperated with forty qualified referees and showed them 47 cases to assess. Consequently, analysis of the study showed that noise of crowd influenced the decision of the referee. Carmichael and Thomas (2) examined 380 matches from 1997-1998 English Premier League season with twenty clubs. Analysis of their study indicated that the effectiveness of home and away teams were influenced by game location factors such as familiarity and crowd effects.

Picazo-Todeo et al. (21) investigated the first division of the Spanish football league between the seasons of 2002-2003 and 2009-2010. 2.561 matches of 3.040 were available for analysis and they found that the referees tended to book away teams more than home. Endrich and Gesche (6) conducted a study to determine whether referees had home team bias or not. For this purpose, they examined the top two divisions of the German football league and compared the referee decision pre-covid and during covid. Results showed that there were significant differences between pre-covid and during covid in terms of fouls and cards which means home teams were less favored than pre-covid.

Another study belongs to Liu et al. (15) included 720 football matches in the Chinese Super League between 2014-2016. They indicated that home advantage was about 60 percent and home teams had better primary outcomes such as ball possession, penalty, shot on target, corner kick than away teams. Ferraresi and Gucciardi (7) made a comparison for home advantage for the season of 2019-2020 in the first division of the top five leagues (England, France, Germany, Italy, Spain). They stated that playing without audiences because of pandemic, home teams took 0,223 points less and their performance was halved. İnan (2020) collected data from five major European football leagues (England, France, Germany, Italy, Spain) for four seasons from 2015-2016 to 2018-2019. He investigated more than 7000 matches. He found that crowd density and support were very significant determinants of home advantage. On the other hand, Jimenez Sanchez and Lavin (13) carried out a study to compare the crowd effect during Covid-19 and before. They gathered data from eight leagues (Austria, England, Germany 1-2, Italy 1-2, Spain 1-2) and indicated that there was not any significant relationship between playing with a crowd or not except La Liga Santander and Bundesliga 1.

As it is seen from the literature review, home advantage which includes the crowd effect has significant impacts on outcomes of football matches. Crowd effect not only reinforces the home team coach and players but also discourages away team's. In addition, it affects the decisions of the referees as well by making some psychological pressure on them. These facts are supported by the studies above. However, there have been limited studies that investigate determinants of crowd effect for football games.

Some studies tried to investigate determinants of stadium attandance for sports games in the literature. Pawlowski and Anders (18) obtained data from German Bundesliga to understand determinants of stadium attendance. They found that stadium attendance was affected by the circumstance of either home or away team had a chance to be the champion statistically. Pawlowski and Nalbantis (19) supported the previous study with data from Austria and

Switzerland. Another study (1) focused on whether the match was broadcasted or not. They obtained data from English Premier League and Spanish Primera Liga. They specified that the matches were broadcasted on TV in England decreased stadium attendance by 3 percent at the weekend, while 8 percent on weekdays. The situation for Spain was 4 percent at the weekend, while 19 percent (free-to-air matches) for the whole week. To sum up, this study tries to bring a new paradigm to explore determinants of stadium occupancy rate and focuses on the clubs' achievements and operations plus national wealth.

MATERIAL & METHOD

Research Desing

In this study, predictors of crowd effect in football has been investigated and tested. On this purpose, expert opinions has been taken. Hence, the predictors have been determined as gross domestic product of each country (GDP), total transfer expenditure of each league (TE), total market value of each league (MV), number of goals per match for each league (GOAL), UEFA country coefficients (UEFA).

Quantitative research design has been implemented in this study due to the investigation of the causal effect. Moreover, the data include various leagues (English Premier League, French Ligue 1, German Bundesliga, Italian Serie A, Spanish La Liga) and years (from 2005-2006 to 2019-2020). Therefore, panel data analysis has been used to test the research model in this study as an appropriate method for the cross-sectional data.

Research Group

Five major football leagues of Europe (English Premier League, French Ligue 1, German Bundesliga, Italian Serie A, Spanish La Liga) constitute the research group of this study. These leagues are taking place in the top 5 standing according to Association Club Coefficients data of UEFA. Because of the lack of information for other leagues based on long-term in terms of some variables, data has been utilized from these major five leagues in the study.

Instruments

Variables of the study are; gross domestic product of each country (GDP), total transfer expenditure of each league (TE), total market value of each league (MV), number of goals per match for each league (GOAL), UEFA country coefficients (UEFA), stadium occupancy rate of each league (SOR).

The data includes the seasons from 2005-2006 to 2019-2020. The reason of selection the season 2005-2006 as the initial point in this study is that there is a lack of information related to some transfer fees before this season for selected leagues. Therefore, this situation could cause missing data for the "transfer expenditure" variable. Gross domestic product (GDP) data has been obtained from the World Bank database (10). The other data (TE, MV, GOAL, UEFA, SOR) have been obtained from the Transfermarkt database (8). Therefore, this study doesn't require ethics committee approval and has not required specific measurement instruments.

Data Analysis

Empirical analysis has been estimated through the following econometric model.

$$SOR_{it}=\alpha_{it}+\beta_1 GDP_{it}+\beta_2 GOAL_{it}+\beta_3 MV_{it}+\beta_4 TE_{it}+\beta_5 UEFA_{it}+u_{it} \quad (1)$$

Napierian logarithm of all variables in Equation 1 were incorporated into the model.

Im, Pesaran, and Shin (11) IPS test; Levin, Lin, and Chu (14) test; Fisher-Augmented Dickey-Fuller panel unit root test which had been modified by Maddala and Wu (16) were performed to test stationary of the variables in the study.

RESULTS

Stationary test results of the variables were presented in Table 1.

Table 1. Stationarity Test Results

	LLC		IPS		ADF	
	t- statistics	p-value	t- statistics	p-value	t- statistics	p-value
			LEVEL			
SOR	-0.8452	0.1990	-0.4317	0.3330	17.7078	0.0601
GDP	-0.9093	0.1816	-1.1922	0.1166	13.2326	0.2110
GOAL	-1.1067	0.1342	-1.3701	0.0853	16.7753	0.0795
MV	2.6383	0.9958	1.5801	0.9430	7.6425	0.6637
TE	-0.8748	0.1908	-0.8474	0.1984	12.1910	0.2725
UEFA	-1.9408	0.0261	-2.2331	0.0128	20.9681	0.0213
			1ST DIFFERENCES			
SOR	-7.1426*	0.0000	-5.8136*	0.0000	45.1512*	0.0000
GDP	-3.2195*	0.0000	-2.7681*	0.0028	23.8824*	0.0079
GOAL	-6.0031*	0.0000	-5.3889*	0.0000	42.9947*	0.0000
MV	-4.6379*	0.0000	-3.3669*	0.0004	27.9723*	0.0018
TE	-6.6406*	0.0000	-5.6877*	0.0000	42.5158*	0.0000
UEFA	-6.0495*	0.0000	-5.3302*	0.0000	42.7206*	0.0000

Note: * refer to existence of significance levels of %1

As it was shown in Table 1, the H0 hypothesis related to SOR, GDP, GOAL, MV, TE, UEFA could not be rejected at the %1 significance level. Therefore, the variables are unit rooted at zero level I(0). After subtraction of the variables, the alternative hypothesis was supported while the null hypothesis was rejected at the zero level I(0). Thus, it was determined that the variables became stationary.

Pedroni's (20) panel cointegration test which is one of the first generation panel cointegration tests was performed to determine whether the variables move together or not. This test is used in circumstances that do not involve cross-sectional dependence in the panel. In Table 1, it was determined that there was not cross-sectional dependence. Panel cointegration test was developed from the following equation.

$$y_{i,t} = \gamma_i + \alpha_{1i}x_{1_{i,t}} + \alpha_{2i}x_{2_{i,t}} + \ldots + \alpha_{Mi}x_{M_{i,t}} + \mu_{i,t}$$

$$t = 1,2,\ldots,T;\ i = 1,2,\ldots,N;\ m = 1,2,\ldots,M$$

In the equation; T represents the number of observations, N represents the number of countries in the panel, M represents the regression number. In the Pedroni's (20) panel cointegration test; the null hypothesis indicates that there is no cointegration test while the alternative hypothesis indicates that there is a cointegration test. The cointegration test comprises of seven tests. The first four tests show panel statistics while the last three tests show group statistics.

Table 2. Cointegration Test Results

Statistics	t- statistics	p-value
Panel v-statistics	-0.1312	0.5522
Panel rho- statistic	1.4895	0.9318
Panel PP- statistic	-3.9109*	0.0000
Panel ADF- statistic	-4.1689*	0.0000
Group rho- statistic	2.5520	0.9946
Group PP- statistic	-4.8716*	0.0000
Group ADF- statistics	-5.0429*	0.0000

Note: * refer to the existence of a cointegration relationship at significance levels of 1%.

Pedroni's (20) cointegration test results were presented in Table 2. Panel PP- statistic, Panel ADF- statistic, Group PP- statistic ve Group ADF- statistic were significant at %1 level according to the empirical

findings. Hence, the null hypothesis was rejected and the alternative hypothesis was supported. It was found that there was a cointegration relationship in the panel and the variables would move together in the long term.

Causality between the variables was tested through Emirmahmutoğlu and Köse (5) panel causality test. The variables whether at the level of I(0) or I(1) can be used in the panel causality test. In addition, this test can be used in circumstances that do not include cointegration. panel causality test results were shown in Table 3.

Table 3: Panel Causality Test Results

	Statistic	p-value
SOR => GDP	38.481	0.000
GDP => SOR	69.374	0.000
SOR => GOAL	14.522	0.150
GOAL => SOR	22.353	0.013
SOR => MV	19.215	0.038
MV => SOR	6.626	0.760
SOR => TE	3.602	0.964
TE => SOR	24.651	0.006
SOR => UEFA	8.562	0.574
UEFA => SOR	20.589	0.024

According to Emirmahmutoğlu and Köse (5) panel causality test results, there was a bidirectional causality between gross domestic product (GDP) and stadium occupancy rate (SOR) at the %1 significance level. Another causality was from GOAL to SOR at the %5 significance level. Unidirectional causality from SOR to MV was determined at the %5 significance level. There was a unidirectional causality from TE to SOR at the %1 significance level. Unidirectional causality was found from UEFA to SOR.

DISCUSSION

Relationship between gross domestic product of countries (GDP), total transfer expenditure of each league (TE), total market value of each league (MV), number of goals per match for each league (GOAL), UEFA country coefficient (UEFA) for each league, stadium occupancy rate for each league (SOR) were investigated in five major football leagues of Europe (English Premier League, French Ligue 1, German Bundesliga, Italian Serie A, Spanish La Liga) in this study. Bidirectional causality relationship has been determined between GDP and SOR in the Emirmahmutoğlu and Köse (5) panel causality analysis. Moreover, there are unidirectional causality relationships from GOAL to SOR, TE to SOR, from UEFA to SOR.

This study has contributed to the framework for game location research of Courneya and Carron (4) considerably. The framework indicates that the crowd effect is a significant determinant of home advantage. This impact has been supported through various studies in the literature (17, 2, 21, 15, 7, 12, 6). However, there is a lack of research in the literature related to determinants of crowd effect. Therefore, an econometric model has been developed in this study and determinants of crowd effect have been tried to estimate.

This study has found that gross domestic product (GDP), number of goals per match (GOAL), transfer expenditure (TE), UEFA country coefficient (UEFA) are predictors of crowd effect. Hence, it can be suggested that teams should try to score more goals and they might play more offensive in this way. Strategies such as parking the bus in front of the goal might decrease their crowd effect. In this way, the secondary outcome of the match (goals scored and conceded) will be more effective which is a component of performance outcomes in the framework of Courneya and Carron (4).

Another predictor of the crowd effect is transfer expenditure according to this study. This means that clubs ought to make investments in their squads. If they do that, their supporters would tend to pact into the stadium to see new faces. However, the important part here is not the number of new faces who join the

clubs, it is important to sign contracts with talented players who have high market values. But there is an exception here that some of these players are waiting to complete their contract. Later, they make new contracts with new clubs without any transfer fee.

UEFA coefficients for each country league are based on the results of each association's clubs in the five previous UEFA Champions League and UEFA Europa League seasons. The rankings determine the number of places allocated to an association (country) in the forthcoming UEFA club competition (9). UEFA coefficient has been found as a predictor of the crowd effect. Therefore, clubs should try to qualify participation in international tournaments of UEFA. Hence, they will get more spectators in their stadiums. Maybe some fans tend to buy season tickets due to participation of international UEFA tournaments based on clubs.

Lastly, gross domestic product is also a predictor of the crowd effect. GDP is an important indicator of countries' economic growth and attandance at the stadium is also an economical event. For this reason, it was thought that GDP might be a predictor for the model at the macro level. Besides, consumption is one of the essential components of GDP. Football matches are recreational activities that occupy an important place for people's social life. Even if some fans are very loyal and dependent on their team, it is possible that they are not able to afford ticket prices.

These four predictors might be contributed by new studies. Therefore, it is recommended for future studies to estimate other predictors of crowd effect and other leagues might be also useful to test the predictors found in this study. Hence, a framework of crowd effect might be developed in the future which can enlarge the framework of Courneya and Carron (4). Additionally, these predictors can be used as a part of home team advantage studies. The predictors might be tested in other sport activities too.

This study includes some limitations alongside its contributions. For instance, only football matches have been investigated among the sport games. In addition, data has been involved just five major football leagues in the world. Time limitation also should be considered by the readers because the data involve the seasons from 2005-2006 to 2019-2020.

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Systematic Review of the Participation of the Disabled in Physical Education Class

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Abstract

The aim of this study is to provide suggestions for eliminating the existing problems by systematically reviewing the studies on the curricula established on the basis of the participation of students with special needs in physical education classes and the inclusion of these students in the lesson. In this direction, the literature was searched through an online search engine for the research. Accordingly, three databases named Academic Search Complete, Sport DISCUSS and ERIC were searched. Studies conducted between 2018-2020 and keywords were Mainstream and PE ", " Special education need students and PE " and " Disabled students and PE". 22 articles selected according to the Prisma method of Moher et al. (2009) were included in the study and articles that met the determined criteria were analyzed using the continuous comparative analysis technique. According to the results the problems experienced by the students with special needs are generally due to socialization with their peers in the school environment, especially within the scope of physical education lessons, equipment, school - architectural structure, teacher and curriculum. The solution to these problems depends on meeting the educational and physical activity needs of students with special needs, being together with their peers and society, meeting their own needs and increasing their ability to live without being dependent on others as much as possible. The most suitable environment for these to be achieved is the school environment, where disabled people first meet with other individuals, unlike their family members. For this, first of all, the needs of students with special needs should be determined. In this regard, teacher training programs of universities should be expanded. In addition, the cooperation of the teacher, counselor, school psychologist and family is important.

Keywords: Students with disabilities, Physical education, Inclusive physical education, Teaching programs, Teacher training programs.

Beden Eğitimi ve Spor Derslerinde Engelli Öğrenciler: Sistematik Bir İnceleme

Özet

Bu çalışmanın amacı beden eğitimi ve spor derslerinde engelli öğrencilerin derse katılımlarını ve bu öğrencilerin derse dahil edilmesi temelinde kurulan ders programları ile ilgili yapılan çalışmaların sistematik derlemesini yaparak mevcut sorunları ortadan kaldırmaya dönük öneriler sunmaktır. Bu doğrultuda araştırma için çevrimiçi arama motoru aracılığıyla alanyazın taranmıştır. Buna göre Academic Search Complete, Sport DİSCUSS ve ERIC isimli üç veri tabanında tarama yapılmıştır. Taramada 2018-2020 yılları arasında yayınlanan ve Mainstream and PE ", " Special education need students and PE " ve " Disabled students and PE" anahtar kelimelerini içeren makalelerden oluşmaktadır. Moher ve arkadaşlarının (2009) Prisma yöntemine göre seçilen 22 makale çalışmaya dahil edilmiş ve belirlenen kriterlere uygun makaleler sürekli karşılaştırmalı analiz tekniği kullanılarak analiz edilmiştir. Çalışmaya dahil edilen makalelerde ortaya çıkan sonuçlara göre engelli öğrencilerin yaşadıkları problemler genel olarak, okul ortamında özellikle beden eğitimi ve spor ders kapsamında akranları ile sosyalleşme, ekipman, okul - mimari yapısı, öğretmen ve öğretim programından kaynaklıdır. Bu sorunların çözümü engelli öğrencilerin eğitim ve fiziksel aktivite ihtiyaçlarının karşılanmalarına, akranlarıyla ve toplumla bir arada olmalarına, kendi ihtiyaçlarını karşılayabilmelerine ve başkalarına mümkün olduğu kadar bağımlı olmadan yaşamlarını sürdürebilme becerilerinin arttırılmasına bağlıdır. Bunların başarılabilmesinde en uygun ortam, engellilerin aile bireylerinden farklı olarak diğer bireyler ile ilk buluştukları yer olan okul ortamlarıdır. Bunun için ilk olarak engelli öğrencilerin ihtiyaçlarının belirlenmesi gerekmektedir. Bu hususta üniversitelerin öğretmen yetiştirme programları genişletilmelidir. Bununla birlikte öğretmen, rehber öğretmen, okul psikoloğu ve aile işbirliği önemlidir.

Anahtar kelimeler: Engelli öğrenciler, Beden eğitimi, Kapsayıcı beden eğitimi, Öğretim programları, Öğretmen yetiştirme programları.

INTRODUCTION

According to the United Nations Convention on the Rights of Persons with Disabilities, persons with disabilities are persons with long-term mental, physical, perceptual or intellectual impairments that prevent their full and active participation in society under equal conditions with other individuals (7). Disability types are classified as follows, according to Aver (4); physical, traumatic brain injury, muscle disease, vision, hearing, mental or emotional disability, chronic illness, autism, down syndrome, hyperactivity, dyslexia, mental disability and multiple disability.

It is very important for disabled individuals to fulfill their social roles for their social adaptation. Determining the needs of disabled students by taking their competencies and disabilities into account and placing them in appropriate educational environments can facilitate social adaptation (19). Inclusive education used in this context serves as an important tool to encourage the participation of students with disabilities (44). According to the inclusive education philosophy, enabling students with disabilities to participate in a general education environment supports their holistic development and increases their opportunities to reach educational goals (5).

Physical education is an important lesson for students with disabilities, allowing students to interact with each other more than in other subjects. Physical education can be used as a tool for the inclusion of disabled students and can contribute to their meaningful interaction with other children (45). Inclusion of disabled students in physical education classes has been widely discussed in national (45) and international (40) studies.

According to these studies, although it is difficult to meet the educational needs of disabled students and encourage their social participation (21), there are studies indicating that the inclusion of disabled students in physical education with other students has positive results for both disabled students and non-disabled students (24). Despite this, it is known that disabled students encounter some problems in physical education (6,11,21). In the study conducted by Tanure Alves et al. (46), individual interviews were conducted with seven students with different disabilities. Accordingly, the students stated that being disabled prevents them from participating in physical education lessons and stated that they do not have the same opportunities as other students. Wang (48) stated in his study with disabled students that they had negative experience in including students in physical education lessons. Parallel to these studies, Rekaa et al. (42) received the opinions of students and teachers regarding the participation of disabled students in physical education class environment. As a result, it is seen that disabled students experience difficulties in terms of exclusion and belonging to the class environment in physical education. In a study on the perspectives of disabled students in physical education, Coates and Vickerman (11) stated that although these students were willing to participate in physical education classes, their participation was limited. The reactions from their peers and teachers' inability to know the needs of disabled students negatively affect the participation of students in physical education (11). Haegele and Sutherland (21) also confirmed in their study that disabled students encounter problems such as exclusion, discrimination in physical education. Students with disabilities are of the opinion that they do not find physical education class environments equal and that their disability is a barrier to participation in physical education lessons (46). Current problems may lead to limited participation of disabled students in physical education (17).

Considering the participation of disabled students in the lesson from the perspective of teachers, teachers themselves feel insufficient to integrate these students in the lesson (26). Teachers stated that it is difficult, if not impossible, to include students with disabilities in the lessons (2). They also mentioned that disabled people have limited resources to improve themselves on the subject of physical education (2). According to Bredahl (8), the inclusion of disabled students in physical education lessons is possible with the support of their teachers. Accordingly, the speed or difficulty of the movement prepared by teachers affect the participation of students with disabilities in physical education classes (8). For this reason, Alves et al. (1) emphasize that physical education teachers should improve their professional preparation for the abilities of students with disabilities through critical thinking which is a way of thinking that consists of mental processes such as reasoning, analysis and evaluation (30). The lack of knowledge of physical education teachers regarding specific disabilities and their inability to provide the learning environment to ensure the participation of disabled students is a major problem (16,1,20). Since physical education seem to be more performance-oriented by teachers

(5), it is critical that physical education teachers change their way of thinking about physical education. Classrooms with disabled students can focus on the inclusion process instead of focusing on the performance of disabled students (39).

The theoretical framework of the study is as follows: With the inclusive physical education and sports approach that creates a program, students with disabilities are encouraged to learn together with normal students in physical education lessons (12). Also inclusive physical education classes can increase the active participation of disabled students in lessons (31). However, in order for disabled students to be included by applying this approach sufficiently, teachers must have sufficient knowledge about inclusive physical education and disabled students (36). Teachers need to have a number of competencies to actively engage students with disabilities in physical education lessons: getting teachers experienced with persons with disabilities, professional and academic training to involve students with disabilities; He or she can teach process-oriented lessons rather than performance-oriented ones and organize the classroom environment for disabled students (28). Professional development programs should be prepared for teachers with in-service trainings (36). With teacher education interventions, it can be ensured that teachers show a positive attitude towards disabled students (22). In addition, it may be positive for physical education teacher candidates to gain field experience with disabled students (32). Collaboration with other special education and rehabilitation assistants is also needed (15). Assistants can help teachers by acting on the motive of standardization and professionalization (35).

Studies indicate that effective participation of students with disabilities is generally directly related to effective teaching (35, 36). With the cooperation of other stakeholders, the correct structuring of the environment, policies and curricula, the access and active participation of disabled students in physical education classes can be supported (13). The collaboration of special education teachers and other teachers also guides the normal education teacher to meet the needs of each student (29). The interaction process in which stakeholders act in cooperation can be positive for the active participation of students with disabilities in physical education. To this end, cooperation between stakeholders in the school (teachers, co-teachers, other members of the school community) and third parties (students, family members) should be supported (29,34). Educational strategies for disabled students should be planned and cooperation should be provided for this (29). As a result of all these studies, it is seen that there are some problems between physical education teachers and students with special needs (47).

As a result of these problems, it is seen that the active participation of students with special needs in physical education lessons decreases (46). In order to find the source of this problems and to eliminate it, seems important to scan the literature by making a review. For this reason, the aim of this study is to examine the students with special needs in the field of physical education and the studies established on the basis of the inclusion of these students in the course, and to present the current problems and offer suggestions. This study includes a comprehensive review of the studies published on the participation of students with special needs in physical education classes, and evaluating and synthesizing these studies.

METHOD

This study is based on the Prisma Flow Diagram developed by Moher et al. (38) to make systematic reviews in a certain order. Prisma is an accepted method in the selection of articles for systematic reviews. For this reason, articles selected based on the Prisma method of Moher et al. (38) were included in the study. According to the Prisma flowchart, the following steps are followed respectively. What is done at each stage of the study is explained in detail.

Stage 1: Identification: At the first stage, the research question and framework are determined. Literature is scanned within the framework of the question "What are the variables affecting the participation of students with disabilities in physical education classes?". Accordingly, it is planned to search in 3 databases named Academic Search Complete, Sport DİSCUSS and ERIC with the keywords " Mainstream and PE ", " Special education need students and PE " and " Disabled students and PE ".

Stage 2: Scanning: At this stage of the study, there are searches made in databases with the identified keywords. A search strategy was developed by using keywords specific to the specified question of the systematic review. In order to create an effective screening strategy, experts in their fields have been worked. Searches were made in

three different databases with the determined keywords on 04.11.2020. Thus, a total of 959 articles have been found.

Stage 3: Eligibility: At this stage of the study, the eligibility criteria are determined. These eligibility criteria are chosen among the best criteria to answer the research question. An evaluation checklist is used to determine whether each selected study meets the specified criteria. Each author made this process independently and the evaluations were compared. In cases where there was a difference of opinion, a consensus was reached and the articles were included in the study after each author's approval. The eligibility criteria determined at this stage are as follows: Studies conducted between 2018-2020, being in English, being published in refereed journals, not having duplicated publications, having at least one citation, being accessible in full text, being related to the topic of persons with disabilities in physical education lessons, the lack of program development work, the use of reliable methods in the data collection or analysis process, no scale development work and the feature of being an article.

Stage 4: Inclusion:At this stage of the study, articles fitting the criteria determined at the eligibility stage are included in the study. As a result, 22 out of 959 articles examined in the light of the criteria we determined on the basis of the Prisma method by Moher et al. (2009) have been identified to meet our criteria. As suggested by Moher et al. (2009), the number of studies screened in the systematic review is shown in Figure 1, along with those that are appropriate, those included in the review, excluded, and reasons for exclusion. As a result of the search made with keywords determined from three different databases, 959 articles were reached. It was observed that 114 articles were not in English. The remaining 845 articles were reviewed. It was determined that 278 studies were duplicated publications, not published in peer-reviewed journals or were not cited. The remaining 567 articles were reviewed. The full text of 48 of them could not be reached. The remaining 519 articles were reviewed. It was observed that 451 articles were not published in 2018-2020. The remaining 68 articles were reviewed. It has been observed that 22 of them are not related to persons with disabilities. The remaining 46 articles were reviewed. 8 of them were not related to subjects of physical education or sports lessons. The remaining 38 articles were reviewed. It was observed that 4 of them did not qualify as an article; being congress summaries or papers instead. The remaining 34 articles were reviewed. 2 of them were found to be scale development studies. The remaining 32 articles were reviewed. It was observed that 4 of them did not provide sufficient reliability in data collection and analysis methods. The remaining 28 articles were reviewed. It has been observed that 6 of them are program development activities for disabled students. As a result, 22 studies that met the criteria were included in this article.

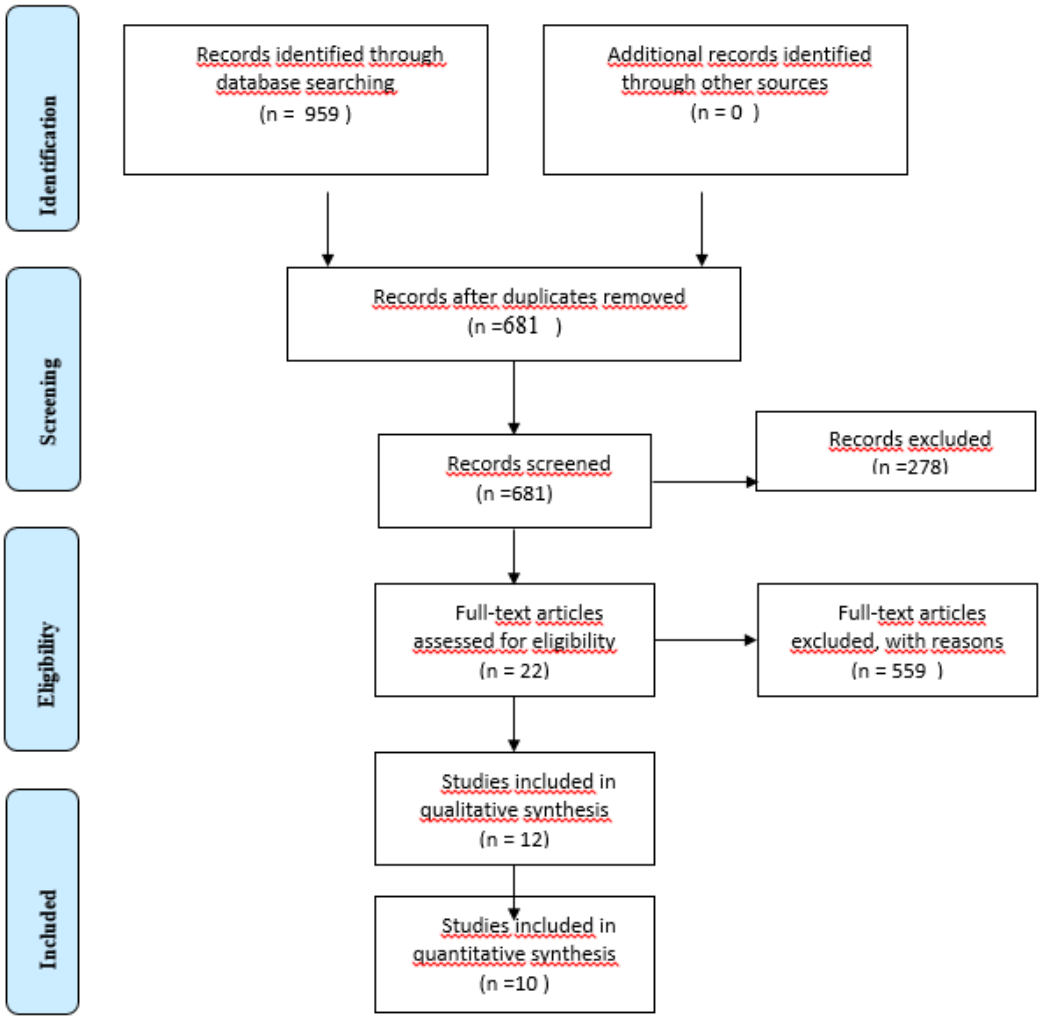

Figure 1. Inclusion Process

(From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). *P*referred *R*eporting *I*tems for *S*ystematic Reviews and *M*eta-*A*nalyses: The PRISMA Statement. PLoS Med 6(6): e1000097. doi:10.1371/journal.pmed1000097)

Stage 5: Analyses: The data were evaluated and analyzed using the technique of continuous comparison with each other (18) to identify and separate topics. The articles were decomposed by the researchers in line with the specified criteria and subjected to an in-depth analysis (such as philosophical position, methodology, data generation methods, data analysis methods, presentation of findings and results, validity and reliability strategies, researcher position and methodology). This information has been recorded in the Microsoft Excel. First of all, whether the stances of the authors were clearly stated, the method of the research and the selection of the disability groups or research groups examined were examined. Then it was determined whether the authors clearly stated the use of a particular methodology (i.e. stated or unspecified), methods used to create and analyze data (such as interviews, interventions), and the presentation of findings and results. It is coded with scientific definitions (eg interview technique, physical activity intervention, program development). Here, the findings and results of each article are reviewed in detail again.

RESULT

22 articles that fit the criteria determined for the study are determined and analyzed in detail. Table 1 includes the identity, purpose, research group, data collection methods, research type and research results of the articles included in the study. Then, the findings obtained are explained in detail. Considering the purposes of the articles included in the study according to Table 1, physical education lesson experiences of female athletes, professional development of physical education teachers, problems faced by disabled students in physical education lessons and how the facilitators are in terms of teachers, teachers' attitudes, teacher resilience levels were examined. Studies on teacher assistants, on the other hand, compiled scientific studies to produce solutions to possible problems, determine their perceptions about their experiences by accompanying severely disabled students, the importance of pre-service teacher education and how it should be developed. Considering the purposes of the studies about disabled students, it is examined how students react to the values and practices found in physical education classes, how students experience curriculum based on traditional sports and performative skills, their perception of inclusion in physical education and factors that facilitate or inhibit their participation, their involvement in learning, psycho-physiological disorders which may restrain physical education activities. The results of the study on the effects of mentally disabled children on the physical qualities of children to improve and social interaction between disabled and non-disabled students were conducted. Moreover, the opinions of the parents of disabled and non-disabled students regarding integrated education were determined. Finally, only one study has focused on identifying possible risks for personal injury from using home-made equipment. In addition, Table 1 shows that teachers and students with disabilities have some problems in the classroom environment (33).

Table 1. Identification, Purpose, Research Group, Data Collection Methods, Research Type and Research Results of the Articles Included in the Study

Study Year	Goal	Research Group (Teacher, Student, Parent Type of disability)	Data Coll. Tools and Analysis	Research Type	Result
Apelmo (2019) Sweden	It is to examine the physical education lessons of physically disabled young female athletes.	Paralympic professional female athletes (n = 10) Three male trainers.	Individual interviews Thematic analysis	Qualitative Descriptive Retroactive	They highlighted problems with exclusion and specific treatment experiences in physical education classes. Women avoided seeing themselves as victims. These problems can be reduced with teachers experienced in the field of disabled people.
Haegele et al., (2018) Brazil	It is to examine the attitudes of physical education teachers towards students with disabilities before and after participating in a professional development workshop.	Physical education and sports teachers (n = 90)	Physical Education Teachers' Attitudes-Decisions Questionnaire * ANOVA and inferential statistics.	Quantitative Experimental Cross-sectional	The two-day workshop education had a positive effect on the teaching attitudes of physical education teachers towards disabled students in their classes. It has created awareness.
Farr (2018) England	It is to find solutions to possible problems by compiling the studies about teaching assistants working to help teachers in England.	Teaching assistants tasked with helping teachers.		Review	Collaboration with other educators is needed. Assistants should act on the motivation of standardization and professionalization and help the teacher, as in the job descriptions, instead of the student, and should be clearly aware of their roles.
Maher (2018) Britain	It is to analyze how special education needs coordinators and learning support assistants conceptualize involvement in secondary schools in Britain.	12 special education needs coordinators and 12 learning support assistants were included in the study.	Individual interviews Open, linear and selective coding	Qualitative Descriptive Cross-sectional	The effects that residents have on physical education norms and values can be used by authors, coordinators, and school officials to develop an inclusive culture.
Tanure et,al.,(2020) Brazil	It is the examination of how disabled students can react to the values and practices found in physical education classes.	Different physically disabled students (n = 7)	Semi-structured interview form and reflective field notes Thematic and content analysis	Qualitative Descriptive Cross-sectional	Students with disabilities stated that being disabled constitutes an obstacle to participating in physical education classes and they do not have equal opportunities as others. It has been observed that they have negative experience.

Wang (2019) China	Identifying the perceptions of students with special needs regarding inclusion in physical education and the factors that facilitate or hinder their participation.	20 special education students (12-16 years old) Mentally and physically disabled students	Individual interviews Content analysis	Qualitative Descriptive Cross-sectional	It showed that the majority of students had negative experience in inclusion and limited participation in physical education activities was common.
Haegele et, al., (2018) USA	It is the examination of the problems faced by disabled students in physical education and sports lessons and the facilitators in terms of teachers.	168 physical education teachers participated (72% female)	The adapted version of the 4-item scale developed by Shields and Synnot (2014) was used. * Open coding and Kohen chi-square.	Quantitative Descriptive Cross-sectional	The problems faced by students are due to the teacher or the program. Barriers and facilitators are interrelated but not related to teachers' years of seniority. Teachers found that students' different disabilities made participation difficult.
Chatzipanteli & Dean (2020) Greece-England	To examine students' involvement in learning in the field of physical education.	Children with learning difficulties	"Teaching Style Practices" reviewed the discussions in the literature	Qualitative Descriptive	A suitable environment should be created for student-centered approach, equal conditions, education classes, creating task sheets for students, collaborative approach, equality of education, and for disadvantaged students to feel talented.
Rekaa et.al.., (2019) Norway	It is the compilation of studies examining teacher attitudes and student experiences. Both qualitative and quantitative studies have been examined.	Mainstreaming students		Compilation	It reveals that disabled students experience exclusion and lack of belonging to physical education. Teachers perceive themselves inadequate and a resource problem has arisen.
Kudryavtsev ve diğ., (2019). Russia-Poland	To examine the problems and solution suggestions regarding the realization of the inclusive education model in physical education and sports classes in universities	University students: 782 students and 148 students with different disability groups (physically disabled n = 90, musculoskeletal diseases n = 45, visually impaired n = 8 and hearing impaired n = 5)	ECG and Simulators T test in independent groups	Quantitative Experimental Longitudinal	The inclusive education model has been successfully implemented.
Mead, et al., (2019) USA	Identify possible risks of personal injury as a result of the use of homemade equipment and examine the acceptability and legal risks of such equipment.	Legal lawsuits filed against physically disabled people and physical education teachers working in special education institutions and their results	By reviewing the literature Content analysis	Qualitative	The authors determined that properly made homemade or modified equipment can be used by students with disabilities, as long as the risks of using the equipment are clearly explained to the student and parents and consent is obtained.

Petriea et al., (2018) New Zealand-Ukraine	To examine to what extent students' negative experience in physical education classes affect future participation in activities related to physical activity in school and community settings.	An elementary school teacher (Joel) It was stated that he worked in the young disabled group	Teacher's (Joel's) Experience: Personal diaries, student works and dialogical speech records were used. Critical analysis	Qualitative	It is possible to get to know the students, to be understanding against the difference in positive aspects, to work creatively, to share the curriculum design and learning activities with their students.
Layne, & Blasingame, (2018) USA	To analyze the perceptions of physical education students about the designed field experience by providing the opportunity to work with a severely disabled student.	The severely disabled student experience of physical education students, Classroom teachers 71 (female = 20, male = 51)	Perception scale, Interviews Anova, inductive coding technique	Mix Experimental	Physical education department students can be a valuable part of the physical education department program, providing field experience to work with severely disabled students.
Erofeeva et al., (2019) Russia	To examine the results of studies on the effects of physical education and sports activities on the correction of psycho-physiological disorders and the physical qualities of mentally retarded children.	Mild mentally retarded students (primary school n = 50)	Student dynamics throughout an academic year t-test, Fisher's criterion	Quantitative Experimental Longitudinal	Physical education activities are closely related to the improvement in motor function of students with disabilities.
Houston et al., (2018) USA	To examine the activity levels of physically disabled children in inclusive physical education recess settings.	Primary school students: 6-11 years old 7 males 3 females total 10 physically disabled	One to one observation, field notes and SOFIT ANOVA	Quantitative	Students with disabilities are at higher risk for sedentary life due to physical limitations
Sadziak, et al., (2018) Poland	To determine the level of resilience in normal school physical education teachers and special education school teachers.	198 physical education teachers: 127 normal 70 private school teachers from private and public schools (Silesia)	The Resilience Questionnaire in the Polish version of the Ego Resilience Scale ANOVA	Quantitative	The highest level of endurance was demonstrated by physical education teachers in special education schools.
Qi & Wang (2018) China	To determine the social interaction between disabled and non-disabled students in physical education.	One middle school student with autism, two middle school students with attention deficit / hyperactivity disorder, 42 classmates (17 girls, 25 boys) and a physical education teacher	Observation, Focus group meeting, Quantitative data: AIPE-S Questionnaire Qualitative data: Coding and thematic analysis	Mix	In general physical education classes of disabled students, there was almost no social interaction with their non-disabled classmates.
Charaśna & Blachucik, (2018) Poland	To examine the opinions of parents of disabled and non-disabled students regarding inclusive education	Disabled and non-disabled student parents Guardians of different types of disabled students (n = 130) and	Interview	Qualitative Descriptive	Parents of disabled students are more satisfied when education takes place in a mixed environment.

		guardians of non-disabled students (130) Participants are the 30-57 age group and residents of the Opolskie Voivodeship.			Both parent groups value the presence of two teachers in the classroom and the positive results of the inclusion system (cooperation).
Yeo, & Tan, (2018) Singapore	Examine the social and academic impact of being involved in education for physically disabled children.	A total of 60 students from primary and secondary schools (30 physically disabled, 30 normal), 8-16 age group	Self-Esteem Scale-Strengths and Difficulties Questionnaire * Chi-square test, *T test in independent groups	Quantitative	Similar level of self-confidence, but peer problems. They participate less in school activities.
Reina et al., (2019) Spain	It is to examine the effect of a training program called Incluye-T on Spanish in-service physical education teachers' self-efficacy	Physical education teachers (n = 229)	Self-efficacy scale * ANOVA, cronbach alpha, normality tests	Quantitative Semi-experimental	It was observed that there was an increase in self-efficacy in teachers.
Lieberman & Grenier, (2019) USA	Universal Design for Learning: Preparing suggestions for Teacher Preparation and Professional Development.	Program development		Qualitative	The universal design program helps pre-service teachers to identify multiple ways of engagement, representation tools, and means of action expression.
Maher & Fitzgerald (2020) England	Pre-service teacher education and continuous professional development: To determine the perspectives of physical education teachers in special education schools.	Physical education teachers working in special education schools (n = 6)	Interview *Thematic analysis	Qualitative	In-service training should be given more importance and professional development programs should be developed.

Analysis

Considering the research groups of the articles included in the study, the research groups consist of disabled and non-disabled student groups including all age groups from primary, secondary, high school and university's physical education departments, physical education teachers working in general and special education schools, parents of disabled and non-disabled students, Paralympic female athletes and trainers. When the research groups are examined according to the type of disability, they generally cover different types of disabilities. Particularly mentioned in studies are learning disabilities, physical and mental disabilities. Eight studies are quantitative (cross-sectional, longitudinal, quasi-experimental and experimental), two mixed, and 12 qualitative (qualitative-descriptive, review, review) according to type of research.

Data were collected with attitude, self-efficacy, and self-esteem scales, semi-structured interview forms, individual and focus group interviews, different activities, one-to-one accompaniment, and program editing interventions. According to the results of the articles included in the study in line with these findings, it was revealed that the problems experienced by disabled students were generally associated to socializing with their peers in the school environment, especially in the context of physical education and sports, equipment, school - architectural structure, teachers and teaching programs.

DISCUSSION and CONCLUSION

The aim of this study is to review the studies on disabled students in the field of physical education, their teachers, and the curriculum established on the basis of the inclusion of these students in the course, and to make a systematic review and to reveal existing problems and offer suggestions. According to the results of the articles included in the study, the problems experienced by disabled students generally originate from socializing with their peers in the school environment, especially within the scope of physical education lessons, equipment, school-architectural structure, teachers and teaching programs (3,9,10,14,23,27,40,46,39,42,48). According to the findings of the study, the results were discussed under two sub-headings as student, teacher - teaching assistant. Studies on curriculum development are also included under the sub-heading of studies on teacher-student assistants.

Studies on students: Physical education activities are closely related to the improvement in motor function of disabled students. In addition, activities suited to specially selected abilities and physical exercises adapted during the natural morpho-functional development of the students' body contribute to recovery. However, there is a significant improvement in the functional abilities of all body systems of disabled students (14). However, today, students with disabilities face some problems in the school environment, especially within the scope of physical education lessons, arising from their peers, teachers and even the school structure. These problem factors negatively affect the physical, social, sensory and psychomotor development of students with disabilities. For example, according to Houston, van der Mars and Lorenz (27), disabled students constitute the risk group in the "still life" field. The reason for this is the physical and school environment problems that disabled students encounter in the school environment.

Another problem that disabled students face in the school, physical education classroom environment is that, according to Qi and Wang (40), they have almost no social interactions with their classmates who do not have disabilities in physical education classes (46). According to Yeo and Tan (25), this situation reveals the self-confidence problem in students with disabilities and this results in less school activity participation (48). Therefore, disabled students gain negative attitude towards physical education lessons (46). However, Apelmo (3), Rekaa, Hanischb, and Ytterhus (42) argue that the reason for the negative attitudes of disabled students towards the lesson is related to the exclusion of students in the physical education class environment. However, even though disabled students have difficulties in the classroom environment, women avoid seeing themselves as victims. However, the fact that education and training takes place in an integrated environment satisfies the parents of disabled students (9).

Other problems that disabled students encounter in the physical education class environment may arise from the teacher and the curriculum (23). According to the authors, these problems can be reduced by teachers experienced in dealing with disabled people. According to Petriea et al. (39), this situation is possible with the teacher getting to know

his or her students, being understanding of the positive differences, working creatively, sharing the curriculum design and learning activities with his or her students. Moreover, Chatzipanteli and Dean (10) argue that a student-centered approach to ensure equality, creating education classes, creating task pages for students, using a collaborative approach, and creating a suitable environment for disadvantaged students to feel themselves talented is required. Furthermore, physical activities that will increase self-esteem and motivation should be organized for disabled students. Furthermore, interventions by the government and schools are important to remove architectural barriers, provide financial support, and provide tailored education programs (48).

Studies with teacher-teaching assistant: Although there are some problems that teachers face and have to struggle with, Sadziak et al. (43) show the highest level of endurance during lessons by physical education teachers working at the schools of students with special needs. Despite the school structure and equipment problems, Mead et al. (37) tried to find solutions by determining that properly made home-made or modified equipment can be used with disabled students as long as the risks of using the equipment are clearly explained to the student and parents and approved.

The reason for teacher and program related problems is that teachers consider themselves inadequate professionally. Also, there is a problem with the lack of resources and materials required for the course to whom special education needs students. Another problem related to the student's perception of the lesson is negative because the teachers can not able to teach the lesson that will ensure the active participation of the student. Therefore, teachers need additional professional development training. Maher and Fitzgerald (36) suggested more emphasis on in-service training and development of professional development programs. In particular, Haegele et al. (22) mentioned that physical education teachers must participate in this additional professional development training in order to include students with disabilities, gain acceptance in their classes, and learn effectively. For example, they found a positive effect of a two-day workshop training intervention on physical education teachers' attitudes to teaching disabled students in their classes.

The researchers tried to find solutions by developing a program specific to physical education against the problems caused by teachers and programs. In this context, according to Kudryavtsev et al. (31), the inclusive education model is successfully implemented. van Munster et al. (47) stated that the universal design program is important for teaching planning. Here, it is emphasized that determining multiple engagement ways, representation tools, and action and expression tools can help pre-service teachers in planning their teaching. As a result, an increase in teachers' self-efficacy was observed (41).

Teacher candidates, who are a valuable part of physical education programs, are required to gain field experience by working with disabled students (32). According to Farr (15), there is a need for the cooperation of other assistant educators. Therefore, the curriculum of disabled students should be supported by assistants. Trainees should be clearly informed about their roles.

PRACTICAL APPLICATION

The results of the articles included in the study indicate that students' disability prevents them from participating in physical education lessons, they do not have the same opportunities as other students, they have problems with integration with their peers in physical education and they are at risk in terms of health with their sedentary lifestyle. It has been observed that they have negative experience on the subject and have difficulties in their belonging to the class environment and they think they are excluded. In fact, in line with these feelings and thoughts, disabled students are negatively affected by their physical, psychomotor, sensory and social development.

The solution of these problems depends on meeting the educational and physical activity needs of disabled students, being together with their peers and society, meeting their own needs and increasing their ability to continue their lives without being dependent on others as much as possible. The most suitable environment for achieving these is the school environment, where the disabled meet other individuals outside of their family for the first time. For this, the needs of disabled students must first be determined. Cooperation between teachers, counselors, school psychologists and family is important in this regard.

Through regular seminars and meetings, families of both disabled students and non-disabled students can be educated to become more conscious.

In addition, through these seminars and meetings, teachers will have the opportunity to get to know the student and define the needs of the students. Thus, they can reach common solution suggestions in line with the student's needs.

Educational games adapted to cooperative learning can be planned for the inclusion of disabled students in physical education lessons. These educational games can enable disabled and non-disabled students to understand each other, communicate and get together with each other. This will greatly help disabled students to change their feelings and thoughts in a positive way.

Education programs should be prepared according to student needs. This is possible by improving the professional competencies of teachers and teacher training programs of higher education institutions. However, in higher education institutions that are responsible for the training of teachers to work in special education schools, these programs are very rare and in limited areas. For physical education in particular, there are very few programs in Turkey. However, working in special education schools requires expertise. Therefore, it is imperative to have more programs for the disabled. Therefore, teacher training programs in private education institutions will also provide expertise in the field. Teacher candidates who will graduate from these programs should be employed in private schools. According to the data of the Economic Cooperation and Development Organization (OECD-EU), approximately 15% of the world population (approximately 1 billion) consists of disabled individuals. In Turkey, the number of individuals with disabilities by the National Disability Database is around 1.5 million. Especially in Turkey, it cannot be said that the architectural structure of all private and public institutions and organizations, including schools, and the city infrastructure and superstructure are suitable for disabled individuals. Disabled individuals' reconciliation with the society and with themselves depends primarily on the regulation of these negative physical structures. This arrangement will not only provide physical relief, but also increase their self-confidence about how much emotional importance is attached. Finally, education shapes the future of countries as a force that moves a society forward. Disabled individuals, who constitute a substantial part of the society, are the most important factor that can demonstrate their existence as a power, to have a good education, to find a job and to be productive.

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Opinions of Football Referees on the VAR System and VAR Training

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Abstract

The purpose of this research is to examine the opinions of football referees who are actively working under the Turkish Football Federation about the video assistant referee (VAR) system and its education. Interview method, one of the qualitative research designs, was used in the research. Research data were collected through a semi-structured interview form developed by the researcher.The research group consists of 20 football referees who are actively working in different classifications determined by maximum diversity sampling, one of the purposive sampling methods, which is one of the non-probability sampling strategies. In the research, the data were evaluated by content analysis method. According to the results of the research, the positive and negative categories of the referees' thoughts on how the VAR System applied in the world's major leagues and in our country affect the spirit of the football game and the pleasure of watching; fair decision, the formation of trust, the decrease in the pace of the game and the decrease in the pleasure of watching, they express their opinions against the spirit of football and the adaptation problem and under the name of negative impact categories, respectively; VAR application with a general philosophy of "minimum interference, maximum benefit", which provides a more systematic and open to advice environment, where the referees express their opinions of self-confident decision, mental comfort, excessive stress and conflict in decision making. In their thoughts that more definite decisions were taken together with the decision diversity and the contribution of the decisions to the game categories; final and clear decisions, variability in interpretations and decisions, decrease in the number of errors, increase in the rate of finding the truth, correction of the decisions affecting the result, objectivity and maximum benefit, the referees expressed their opinions on how the newly implemented VAR System in the world and in our country will contribute to the development of the game in the future. Under the categories of positive contribution and fair play; In their thoughts on the VAR System, which has been in practice in various leagues of the world and in our country for a short time, and the opinions of the referees on the training given to the referees; under the categories of gradual education, being advantageous, being useful and not being sufficient, respectively; increase in the levels of success and education of referees, expert educators and high level opportunity recognition, critical position analysis, upbringing equipped referees, gaining a different perspective and position uncertainty to be examined.

Keywords: Football Referee, VAR System, VAR Training

Futbol Hakemlerinin VAR Sistemi ve VAR Eğitimi Hakkındaki Görüşleri

Özet

Bu araştırmanın amacı, Türkiye Futbol Federasyonu'na bağlı faal olarak görev yapan futbol hakemlerinin VAR Sistemi ve eğitimi hakkında görüşlerinin incelenmesidir. Araştırmada nitel araştırma desenlerinden görüşme yöntemi kullanılmıştır. Araştırma grubunu olasılıksız örnekleme stratejilerinden biri olan amaçlı örnekleme yöntemlerinden maksimum çeşitlilik örneklemesi ile belirlenen farklı klasmanlarda faal olarak görev yapan 20 futbol hakemi oluşturmaktadır. Araştırma verileri, araştırmacı tarafından geliştirilen yarı yapılandırılmış görüşme formu yoluyla toplanmıştır. Araştırmada veriler içerik analizi yöntemi ile değerlendirilmiştir. Araştırmanın sonuçlarına göre hakemlerin dünyanın önemli liglerinde ve ülkemizde uygulanan VAR Sistemi'nin futbol oyununun ruhuna ve seyir zevkine nasıl bir etkisi olduğu hususundaki düşüncelerinde olumlu ve olumsuz kategorileri adı altında sırasıyla; adil karar, güven oluşması, oyun hızında düşme ve seyir zevkinde azalma, futbolun ruhuna aykırı ve adaptasyon sorunu görüşlerini ifade ettikleri, VAR Sistemi her bir durumu / kararı otomatik olarak "kontrol" ettiği için hakemlerin müsabaka yönetimlerindeki stres yönetimine nasıl bir katkı sunduğuna ilişkin düşüncelerinde olumlu ve olumsuz etki kategorileri adı altında sırasıyla; özgüvenli karar verme, zihinsel rahatlık, stres oluşması ve karar vermede çelişki görüşlerini ifade ettikleri, hakemlerin futbola daha sistematik ve tavsiyeye açık bir ortam sunan, genel felsefesi "minimum müdahale, maksimum yarar" olan VAR uygulaması ile birlikte daha kesin kararlar alındığı hususundaki düşüncelerinde karar çeşitliliği ve kararların oyuna katkısı kategorileri adı altında sırasıyla; kesin ve net kararlar, yorum ve kararlarda değişkenlik, hata sayısında azalma ve doğruyu bulma oranında artış, sonucu etkileyen kararların düzeltilmesi, objektiflik ve maksimum yarar görüşlerini ifade ettikleri, hakemlerin dünyada ve ülkemizde yeni uygulanan VAR Sistemi'nin gelecekte oyunun gelişimine nasıl katkılar sunacağı hususundaki düşüncelerinde olumlu katkı ve adil oyun kategorileri adı altında; yanlış kararlarda azalma, hakeme inanç ve güven, oyuna müdahalenin azalması, performansa odaklanma, adaletli sonuçlar, incelemenin şeffaf olması ve aldatmaların azalması görüşlerini ifade ettikleri, hakemlerin dünyanın çeşitli liglerinde ve ülkemizde kısa bir süredir uygulamada olan VAR Sistemine ve hakemlere verilen eğitimlere yönelik görüşleri hususundaki düşüncelerinde aşamalı eğitim, faydalı olma ve yeterli olmama kategorileri adı altında sırasıyla; hakemlerin başarı seviyelerinin ve eğitim düzeylerinin artması, uzman eğitimciler ve üst seviye imkân tanınması, kritik pozisyon analizi, donanımlı hakemlerin yetişmesi, farklı bakış açısı kazandırma ve incelenecek pozisyon belirsizliği görüşlerini ifade ettikleri tespit edilmiştir.

Anahtar Kelimeler: Futbol Hakemi, VAR Sistemi, VAR Eğitimi

INTRODUCTION

Football is a sport that has become the focus of attention of a large audience, both in Turkey and in the world. Football, which is a sport used for prestige and commercial purposes both in Turkey and in other countries, has become an industry where large-scale incomes are obtained in the increasingly globalized world (4). While industrialization in football rapidly increased, football grew economically, the competitive environment increased, and it was no longer contented with just playing football, but it became played to win, succeed and earn a profit on the results obtained (5). In fact, it is seen that countries are making efforts and investments to organize football organizations organized by FIFA (Fédération Internationale de Football Association) in their own countries. The importance of football reveals that the instant decisions made by the football referees during the match are also of great importance (4).

With the increase in this interest in football, football has become a different sector and professionalized cadres have emerged in this field (11). When we look at the competitions played from the lowest category to the highest category, it is seen that the referee staff who manage the match is the subject of discussion rather than the score of the match. The reason for this is that everyone has a certain level of knowledge and skill in terms of whether the decisions made by the referees are wrong after the training of people who have taken their place in football and the developing technology. For this reason, referee decisions, which are of great material and moral importance, show that the job of football referees is not easy (4).

With the industrialization of football, it has become imperative to transform the green fields, which are seen as the focal point of large investments, into a fair and transparent environment that will minimize mistakes as much as possible. In order to

create a standard management approach, the use of technology in football has been increasingly given importance in recent years and significant studies have been carried out in this field. The most important and prime example of this is the Video Assistant Referee System, which is called the VAR System briefly (6). The VAR System; it is a system that provides the opportunity to watch the position again and change the decision in the positions that the referee misses, in which intense objections are made, in the positions that affect the score of the match and in the positions that the referee gave wrong.

It can be said that the VAR System, which has been frequently mentioned in world football in recent days, is one of the most important technological systems used in football organizations. So much so that the VAR System is a technological system that ensures that the referees return to the right decision by watching the wrong decisions made during the match on a monitor again, thus protecting the teams from material and moral damages that may occur, and relieving the referees as a conscience about the position. As a result, in football, which is the leading sport in the world in terms of popularity, the VAR System, which is frequently mentioned today, has brought up the questions of what kind of benefit it will have on football or what effects it will have on football referees, and what changes will it cause in referee decisions. In addition, with this research, it will be tried to determine how the football referees, who are the most important part of the VAR System, will adapt to this system, how the training given to the referees by the Turkish Football Federation contributes to this new system, and how the opinions and evaluations of the football referees about the VAR System are.

MATERIAL and METHOD

Model of the Research

Qualitative research method was used in this research. Qualitative research is defined as an effort to make sense of events as part of a specific context and interaction (19). Phenomenology research design, one of the qualitative research designs, was used in the research. Qualitative research designs can be defined as a strategy that determines the approach of the study to be carried out and guides the consistency of various stages thanks to the determined approach (21). The phenomenology research design, which is one of the qualitative research designs, focuses on how individuals understand the phenomena they live and experience, what meanings they attribute to them, what they feel, how they describe them, and what meanings they share with other people (19). With the decision of Necmettin Erbakan University Social and Humanities Scientific Research Ethics Committee on 13.11.2020 dated 2020/80, there was no objection to the ethical implementation of the research.

Research Group

The research group consists of 20 football referees (18 Men, 2 Women) who are actively working in the 2020-2021 Football Season. The determined research group was selected according to the purposive sampling method (18), which is one of the most used non-probability sampling strategies in qualitative research, and the maximum variation sampling method, which is one of these purposive sampling methods (1, 21).

Table 1 shows the distribution of football referees, who constitute the research group, according to their gender, age, classification, task duration, education status, profession and interview date.

Table 1. The numerical distribution of the football referees, who make up the research group, regarding the refereeing gender, age, classification, task duration, education status, profession and interview date

Codes	Gender	Age	Classification	Task Duration	Education Status	Profession	Interview Date
H1	Male	23	RR	5	Master's Degree	Academician	05.01.2021
H2	Male	35	CRC	12	Bachelor's Degree	Teacher	07.01.2021
H3	Male	22	RAR	3	Undergraduate	Student	09.01.2021
H4	Male	27	RAR	5	Bachelor's Degree	Officer	11.01.2021
H5	Female	22	RR	2	Undergraduate	Student	13.01.2021
H6	Female	25	CR	5	Undergraduate	Student	14.01.2021
H7	Male	24	RAR	2	Bachelor's Degree	Educator	15.01.2021
H8	Male	30	CR	10	Bachelor's Degree	Officer	17.01.2021
H9	Male	28	CAR	10	Bachelor's Degree	Nurse	19.01.2021
H10	Male	25	RAR	5	Bachelor's Degree	Teacher	21.01.2021
H11	Male	22	RAR	6	Associate's Degree	Student	23.01.2021
H12	Male	23	RR	6	Undergraduate	Student	24.01.2021
H13	Male	22	RR	5	Associate's Degree	Student	25.01.2021
H14	Male	25	RR	5	Bachelor's Degree	Teacher	27.01.2021
H15	Male	31	CAR	11	Doctorate	Academician	28.01.2021
H16	Male	30	CR	12	Bachelor's Degree	Teacher	29.01.2021
H17	Male	30	CAR	11	Bachelor's Degree	Teacher	31.01.2021
H18	Male	28	CAR	6	Bachelor's Degree	Teacher	01.02.2021
H19	Male	29	CAR	6	Bachelor's Degree	Teacher	02.02.2021
H20	Male	28	CR	10	Bachelor's Degree	Teacher	03.02.2021

RR: Regional Referee **CR:** Classification Referee **RAR:** Regional Assistant Referee **CAR:** Classification Assistant Referee

Data Collection Tools

In this research, "Personal Information Form" developed by the researcher and semi-structured "Interview Form" were used as data collection tools.

In the "Personal Information Form" prepared to collect qualitative data, there is information about the independent variables of "referee's gender, age, classification, task duration, education status and profession". There were 5 open-ended questions in the "Interview Form".

In the research, the implementation of the semi-structured "Interview Form" developed by the researcher was carried out between January 5 and February 3, 2021, with the permission and appointment of the participants, and the interviews were carried out on the basis of voluntariness in the participants' own work or in different meeting environments.

The interviews were recorded with a tape recorder with the permission of the participants and to minimize data loss, and this provided significant convenience for the researcher. An interview lasted an average of 15-20 minutes. At the beginning and end of the application, the researcher told the participants that the research would only be used for scientific purposes, all personal information would be kept confidential, and all raw data were kept by the researcher in order to resolve ethical issues.

The audio recordings obtained from the interviews were transcribed word by word by the researcher, edited and turned into a 35-page document.

Data Analysis

The data were evaluated by content analysis method (21). In content analysis, researchers examine communication products. In general, these are written documents or communication data recorded with technological systems. In a broader sense, content analysis is a research method used to make reproducible and valid inferences from texts or other meaningful content to contexts of use (17). In the content analysis method, it is necessary to conceptualize the data first, then organize it logically according to these concepts, and determine the themes that explain the data (21).

Content analysis consists of four stages: coding the data, finding the themes, organizing the data according to the codes and themes, defining and interpreting the findings (21).

Validity and Reliability of the Research

Validity and reliability in a study; they are important concepts in terms of revealing the scientificity, credibility, measurability, generalizability and reproducibility of that study (16). In this context, the strategies of credibility, long-term interaction, depth-focused data collection, expert review, participant confirmation, confirmability, transferability, and consistency were used to ensure the validity and reliability of this research (21).

RESULTS

In this part of the research, findings based on the results of the analysis of qualitative data are included.

Table 2. Findings on the opinions of referees on how the VAR System applied in the major leagues of the world and in our country has an effect on the spirit of the football game and the pleasure of watching

Category	Themes	Codes	Participants	Frequency
Positive Effect	Fair Decision	Using of VAR System Contributes to Making Fair Decisions in Competitions	H3, H5, H7, H16	4
	Trust Building	Using the VAR System Increases Confidence in the Referee and His Decisions	H11, H18	2
	Total			6
Negative Effect	Decrease in Game Speed and in Viewing Pleasure	The Adverse Effects of the Navigational Pleasure Due to the Use of the VAR System Slowing the Flow Rate of the Game	H1, H2, H4, H5, H6, H9, H10, H12	8
	Against the Spirit of Football	Most Judges' Decisions Interfering and Forgetting That Football Is a Game of Mistakes	H8, H10, H16, H17, H19	5
	Adaptation Problem	Delayed Referee Decisions Due to VAR System Interfering with Positions, Distracting Players from the Game	H12	1
	Total			**14**

When Table 2 is examined, the opinions of the referees participating in the research on how the VAR System applied in the major leagues of the world and in our country have an effect on the spirit of the football game and on the enjoyment of watching are "Fair Decision" and "Trust Building" under the category of "Positive Effect"; Under the "Negative Effect" category, it was determined that the codes were "Decrease in Game Speed and in Viewing Pleasure", "Against the Spirit of Football" and "Adaptation Problem". Example sentences that make up these codes are given below:

"…The VAR System is not only a system developed to prevent mistakes made, but also takes place in our lives as a system that causes fair decisions in competitions. In this regard, I think it should be applied in all leagues in order to prevent mistakes." (H3-Fair Decision)

"…I think it has a positive impact. After making the right decisions, the trust in the VAR System and the referee of the match increases day by day…" (H18- Trust Building)

"…The sudden stop of the game in the fast-paced game has caused boredom by the people. In addition, long monitor reviews and delayed decisions have reduced the viewing pleasure to low levels." (H4- Decrease in Game Speed and in Viewing Pleasure)

"…I think it has a negative effect. Because mistakes will always happen and there are mistakes in the spirit of football, I think that the pleasure of watching has decreased with the VAR System and it is against the spirit of the game..." (H19- Against The Spirit of Football)

"…While waiting for a decision to be corrected, the rhythm of the game played and the players drops, so the player may experience disconnections from the game, and this situation creates problems in adapting to the game."(H12- Adaptation Problem)

Table 3. Findings on how referees contribute to stress management in match management as the VAR System automatically 'controls' each situation/decision

Category	Themes	Codes	Participants	Frequency
Positive Effect	Confident Decision Making	Since VAR System Provides Referees the Opportunity to Correct Wrong Decisions, Referees Can Make Their Decisions Confidently	H3, H4, H5, H9, H10, H14	6
	Mental Comfort	The Referees Don't Experience Stress and Anxiety Due to the Reduction of the Thought of Making Mistakes with the Use of the VAR System	H2, H7, H6, H9, H13, H16, H17, H20	8
	Total			14
Negative Effect	Stress Formation	Having to Correct the Decisions of the Referees with the Use of the VAR System Causes Stress	H1, H4, H11, H15	4
	Contradiction in Decision Making	During the Competition, The Referees Have Thoughts While Deciding If My Decision Is Right Or Wrong	H8, H12	2
	Total			**6**

When Table 3 is examined, the opinions of the referees on how the referees contribute to the stress management in the competition management, as the VAR System automatically 'controls' each situation / decision, are "Confident Decision Making" and "Mental Comfort" under the "Positive Effect" category; Under the "Negative Effect" category, it was determined that it consisted of "Stress Formation" and "Contradiction in Decision Making" codes. Example sentences that make up these codes are given below:

"…Fear of referees to make wrong decisions before or during the match can sometimes cause loss of self-confidence. With the VAR System, the referees will decide with confidence as they know the possibility of correcting the wrong decisions to be made…" (H3-Confident Decision Making)

"The constant criticism of the referees for the mistakes they made before the VAR System could cause problems both in terms of performance and mentality. With the arrival of the VAR System, the thought of making mistakes decreases and the referees relax mentally and I think that the system affects the decision performance of the referees in a positive way. (H16-Mental Comfort)

"I believe that this system puts extra stress on the referees, as the VAR system causes the referees to think that I made the wrong decision while making the decision." (H1-Stress Formation)

"…VAR System told the referee during the match, was my decision correct? I think that it causes the referees to conflict while making decisions and to get stressed during the match. I see this situation as a negative aspect of the VAR System." (H12-Contradiction in Decision Making)

Table 4. Findings that more precise decisions are made with the VAR application, which offers a more systematic and advisory environment to football and whose general philosophy is "minimum intervention, maximum benefit

Category	Themes	Codes	Participants	Frequency
Variation of Decisions	Definite and Clear Decisions	Activation of the VAR System in Critical Positions Enables the Referees to Make Correct Decisions for Positions	H4, H6, H9, H11, H14, H17	6
	Variability in Comments and Decisions	Seeing Inconsistencies in Decisions and Comments in Leagues Where the VAR System is Applied	H2	1
	Total			7
Contribution of Decisions to the Game	Decrease in the Number of Errors and Increase in the Rate of Finding the Right	The Use of VAR System Enables Referees to Make Final and Correct Decisions and Contributes to Reducing the Number of Errors	H1, H8, H12, H13, H14, H15, H16, H19, H20	9
	Correction of Decisions Affecting the Outcome	Enabling the Correction of Incorrect Decisions by Using the VAR System	H3, H5	2
	Objectivity	Due to VAR System Ensuring Impartiality Between Teams, It Leads to Providing Justice in the Decisions Made in the Competition	H10	1
	Maximum Benefit	Minimum Intervention of the VAR System to the Game, Maximum Benefit to the Nature of Football	H3	1
	Total			**13**

When Table 4 is examined, it is seen that the opinions of the referees participating in the research that more definite decisions are made with the VAR application, which offers a more systematic and open environment for football, and whose general philosophy is 'minimum intervention, maximum benefit', under the category of "Variation of Decisions", "Definite and Clear Decisions" and "Variability in Comments and Decisions"; Under the category of "Contribution of Decisions to the Game", it was determined that it consisted of "Decrease in the Number of Errors and Increase in the Rate of Finding the Right", "Correction of Decisions Affecting the Outcome", "Objectivity" and "Maximum Benefit". Example sentences that make up these codes are given below:

"…I think that more precise and clear decisions are made. Clear decisions are made at the point where the ball is not played or in positions where the ball is but no one can see it. These decisions are clearer decisions for the referee to influence the outcome of the match…" (H9-Definite and Clear Decisions)

"I think that VAR and its philosophy, which are included in the rules of the game, are governed by various decisions and different interpretations in the applied leagues. While the number of interventions in similar positions is very low in some leagues, the number of interventions in other leagues is higher, which is proof of the variability in comments and decisions. No matter how much we benefit from technology, it leads to the conclusion that the realities of the country are more influential in transforming philosophy into behavior, since people are involved." (H2-Variability in Comments and Decisions)

"I think that when the decisions made by the referees are right or wrong, errors are minimized with the VAR System, and correct and fair decisions are maximized." (H13-Decrease in the Number of Errors and Increase in the Rate of Finding the Right)

"…If we think that the VAR System is involved in correcting the wrong decisions that affect the outcome of the game, we see that it intervenes at a minimum level, and if we think in order to

correct the wrong decisions that affect the outcome of the game (goal, red card, penalty), we see that it exists for clear final decisions." (H3-Correction of Decisions Affecting the Outcome)

"…Definitely the VAR System brought objectivity to football. He also served justice. For this reason, an atmosphere of trust was created among the players, fans and spectators…" (H10-Objectivity)

"I definitely think it is a system applied for maximum benefit. At the same time, it should be maintained in the form of minimum intervention, otherwise it will negatively affect the flow of the game…" (H3-Maximum Benefit)

Table 5. Findings on the opinions of the referees on how the newly implemented VAR System in the world and in our country will contribute to the development of the game in the future

Category	Themes	Codes	Participants	Frequency
Positive Contribution	Reduction in Wrong Decisions	Enabling the Correction of Incorrect Decisions by Using the VAR System in a More Accurate and Planned Way in the Future	H3, H9, H11, H14, H16	5
	Belief and Trust in the Referee	With the Development of the VAR System, the Errors will decrease to the Minimum Levels, and the Faith and Trust in the Referees will increase	H3, H5, H10, H13	4
	Decreased Intervention to the Game	Minimizing Game Intervention Without Disrupting the Course of the Game of the VAR System	H6, H8, H17	3
	Focusing on Performance	Players Focusing on Their Own Performance Instead of Objecting to Referees	H2, H18	2
	Total			14
Fair Play	Fair Results	VAR System Prevents Obvious Errors and Ensures Impartial Decisions About Positions	H4, H7, H12	3
	Transparency of the Review	Clearly and Transparently Displaying the Results of the Investigation Made with the VAR System to the Stakeholders Increases Confidence in the System	H7, H20	2
	Reduction of Deceptions	Reduction of Unsportsmanlike Behaviors Towards Referees with the Development of the VAR System	H2	1
	Total			**6**

When Table 5 is examined, it is seen that the opinions of the referees participating in the research on how the newly implemented VAR System in the world and in our country will contribute to the development of the game in the future, under the category of "Positive Contribution", "Reduction in Wrong Decisions", "Belief and Trust in the Referee", "Decreased Intervention to the Game" and "Focusing on Performance"; Under the "Fair Play" category, it was determined that the codes consisted of "Fair Results", "Transparency of the Review" and "Reduction of Deceptions". Example sentences that make up these codes are given below:

"…It is certain that it will contribute positively to the development of the game. With the VAR System, there will be a decrease in the wrong decisions made by the referees in the future." (H14-Reduction in Wrong Decisions)

"I think that the referees, who are at the center of the discussions, will stay out of the agenda as much as possible with the VAR system, with the mistakes being reduced to a low level, and the trust in the referees will be full in the future." (H5-Belief and Trust in the Referee)

"Currently, our country is being examined quickly in terms of position analysis, and this is a great thing, and the game is being examined immediately before it gets cold... I think that in the

future, the intervention in the game will decrease with the VAR System, and the VAR System will interrupt the game less without disturbing the course of the game." (H6-Decreased Intervention to the Game)

"…With the development of the VAR system, players will realize what the system is used for and will want to focus on their performance and raise it to the next level instead of constantly objecting to the referee for positions…" (H18-Focusing on Performance)

"…With this system, questions such as questionable offside positions, whether the ball crossed the line or whether there was an erroneous decision will be eliminated. For this reason, it will be an important step towards ensuring the justice system and creating fair results in football in the future." (H7-Fair Results)

"One of the issues discussed in our country about the VAR system is how the examinations are made. I think that the implementation of the VAR System will get better by improving the system in the future and making these reviews more transparent..." (H20-Transparency of the Review)

"…I think that behaviors such as cheating inside the penalty area to win a penalty or exaggerating simple interventions to punish the opposing player with a red card will decrease and disappear over time with the VAR System…" (H2-Reduction of Deceptions)

Table 6. Findings on the opinions of the referees about the VAR System, which has been in practice in various leagues of the world and in our country for a short time, and the training given to the referees

Category	Themes	Codes	Participants	Frequency
Progressive Education	Increasing the Success Levels and Education Levels of the Referees	Providing Trainings in a Systematic Way, Increasing the Training and Success Levels of the Referees	H2, H13, H16, H20	4
	Total			4
Benefit	Critical Position Analysis	Overemphasis on Critical and Important Positions in Training Contributes to Referees' Correct and Consistent Evaluation of Positions	H1, H3, H6, H8	4
	Expert Educators and High Level Opportunity	Referees Take Lessons in Terms of Equipment and Facilities, in High Level Conditions and from Expert Educators	H2, H12, H14, H15	4
	Gaining Different Perspective	Ability of Referees to Gain Different Perspectives on Various Positions in Training and to Make Consistent Decisions in Competitions	H4, H5	2
	Training of Equipped Referees	The Useful and Sufficient Level of VAR System Training Given to the Referees Ensures that the Referees are Equipped in All Ways.	H2, H10	2
	Total			12
Insufficiency	Uncertainty of the Position to be Examined	Uncertainty About Which Positions to Examine Due to Insufficient VAR Trainings and Inconsistent Decisions	H11, H17, H18, H19	4
	Total			**4**

When Table 6 is examined, the opinions of the referees participating in the research on the VAR System, which has been in practice in various leagues of the world and in our country for a short time, and the training given to the referees, are "Increasing the Success Levels and Education Levels of the Referees" under the "Progressive Education" category; Under the "Benefit" category, "Critical Position Analysis",

"Expert Educators and High Level Opportunity", "Gaining Different Perspective" and "Training of Equipped Referees"; It has been determined that under the category of "Insufficiency", it consists of "Uncertainty of the Position to be Examined" codes. Example sentences that make up these codes are given below:

"…Trainings for the VAR System are going through very serious stages, and those who are successful at the end of each level continue their education at the other level. First of all, it is very important to be a successful referee in the field, to be inclined to use technology at a good level and to have a command of foreign languages and related terms, all of which are among the stages of education…" (H2-Increasing the Success Levels and Education Levels of the Referees)

"I think the trainings are beneficial. In addition, in the trainings given, critical and important positions are emphasized too much and the referees are asked to pay extra attention for these positions and to analyze the positions correctly..." (H8-Critical Position Analysis)

"I think the refereeing of our country is very lucky in this regard, because we are at a high level in terms of facilities, technology and equipment compared to other countries, and most importantly, being one of the first leagues to implement this system in Europe puts us a few steps ahead in terms of experience and is at a level to train European referees. It is another advantage for us to have Turkish educators who are experts in the field…" (H2-Expert Educators and High Level Opportunity)

"I think VAR trainings are beneficial. Because by receiving serious training, the referees gain different perspectives and ideas about many positions, and they can easily apply them on the field…" (H4-Gaining Different Perspective)

"…I think the trainings given are sufficient and useful. The most important aspect of the training is that the referees learn the positions and procedure down to the last detail and come to the field as well-equipped referees..." (H10-Training of Equipped Referees)

"I think VAR trainings are not enough. There is uncertainty about which positions will be reviewed. Because many referees can often act inconsistently in their decisions. In order to prevent this, I think it is necessary to focus on this issue in the trainings given…" (H19-Uncertainty of the Position to be Examined)

DISCUSSION AND CONCLUSION

Looking at the results in Table 2, the opinions of the referees on how the VAR System applied in the world's major leagues and in our country have an effect on the spirit of the football game and on the pleasure of watching, under the category of "positive impact", respectively; fair judgment and confidence building; Under the "adverse impact" category, respectively; it is seen that they express their opinions about a decrease in game speed and a decrease in watching pleasure, contrary to the spirit of football and an adaptation problem.

Football referees, which are constantly discussed in today's media, and the positions formed in the struggle sometimes cause a sports agenda that lasts for weeks. With the development of technology, the VAR System, which is a system that is expected to prevent these situations, started to be used for the first time in Turkey in 2018. This system, which was first used for trial purposes in the 1st League matches and achieved good results, was used for the first time at the Super League club level in the fight between Galatasaray and Akhisarspor. Of course, the aim in VAR is not to play a completely flawless and perfect match. Because in football, middle and assistant referees can sometimes make mistakes. It can be said that this system can help to make fair decisions, as the middle referee of the match can see whether it is the right decision with the VAR System, if necessary. From this point of view, the primary aim of VAR is to avoid some major mistakes made by the referees (goal / not a goal, not a penalty / not a penalty, a direct red card, a warning to the wrong player and a disciplinary penalty for sending out). It should not be forgotten that the most important thing in the football game is the performance of the referee on the field,

since the VAR protocol is based on the requirement that the referees "manage the match as if there is no VAR". Despite all these developments, it can of course be said that this system implemented in Turkey also paves the way for positive or negative developments. Similar to the opinions expressed by the referees participating in the research, similar views were expressed by the sportsmen in the interviews they attended. Coach Mustafa Reşit Akçay said, "I think the VAR System is against the spirit of football. Who will play the video by making what decision and when? Loss of time and concentration. Crown with the feet was also on the agenda, but it was abandoned because it cut the speed and concentration of football. I think we should make the game natural with the free opinion of the referees." (12). On the contrary, Coach Abdullah Avcı said, "When we look at the video referee application as nostalgia, it seems as if it disrupts the nature of football, but when we look at today's realities, it seems like a situation that should be in football." (12). In this context, it can be said that the stakeholders of the sport could not come to a consensus on the VAR System. When the literature is examined, Erdoğan (7), in his study in which he examined "The Opinions of Football Players About the Video Assistant Referee "VAR" System, determined that the football players in the study group thought that the VAR System was a technology that reduces referee errors and ensures justice in football. Han et al. (15) in their study examining "The Effect of Video Assistant Referee on the Chinese Super League", after the introduction of VAR, the number of offsides and fouls in the Chinese Super League decreased significantly, the playing time in the first and second half and the total playing time increased significantly, they found that the home team's advantage decreased after the introduction of VAR.

Looking at the results in Table 3, as the VAR automatically 'controls' each situation / decision, the referees' thoughts on how they contribute to the stress management in the competition management, under the category of "positive impact", respectively; self-confident decision-making and mental comfort; Under the "adverse impact" category, respectively; It is seen that they express conflicting views on stress formation and decision making.

Today, with the increasing popularity of the football game and especially in this environment where competition is at a high level, referees also play an important role. The stress and anxiety experienced by the referees while making a decision during the competition may differ according to some variables. Examples of these are the constant and severe objections of the players, the objections of the coach and the technical club, the pressure of the manager and the media. With the development of technology, it will be difficult for referees, one of the important building blocks of football, to adapt to this developing technology, and this will inevitably cause them to experience stress before or during the match. Similar to the opinions expressed by the football referees participating in the research, it is seen that sportsmen express similar opinions in interviews and interviews. Zekeriya Alp, the former chairman of the Central Arbitration Board, stated that they have made progress in the correct use of the VAR protocol, but they have not been able to solve the problem of the game cooling down completely. "It is a difficult task to act as a referee in our country. I regret to say that as all stakeholders of football, we have made this task even more difficult and we are making it harder. In our league, the first half of which is left behind, perhaps the referee's mistakes have never been discussed so much, never before have so many statements and statements been published for a crown, a corner, a penalty, a foul, and especially scenarios have never been produced on social media. It is a pity that as the football family, we have made our referees more debatable with the technology we have brought to minimize the error." (11). When the literature is examined, Erdoğan (7) in his study, in which he examined "The Opinions of Football Players About the 'VAR' System", stated that the VAR System of the players reduced the stress of the referees and increased their self-confidence, but caused a decrease in motivation during the game in the players, determined that they did.

When look at these, as a result; with the implementation of the VAR System, it is seen that the criticisms and pressures made by the sports clubs, the fans and the media on the referees rather than the score of the match before and after the match inevitably cause the referees to experience positive or negative stress. In order for the referees to get rid of this stress and pressure that will occur, the referees need to be self-confident and mentally go out to the competition without thinking about anything.

Looking at the results in Table 4, the referees' opinions that more precise decisions are made with the VAR application, which offers a more systematic and open environment to football, and whose general

philosophy is 'minimum intervention, maximum benefit', under the category of "decision diversity", respectively; final and clear decisions and changes in interpretation and decisions; Under the category of "contribution of decisions to the game", it is seen that they express the views of decreasing the number of errors and increasing the rate of finding the truth, correcting the decisions that affect the result, objectivity and maximum benefit. It is known that in the past, when technology did not develop so much in football, referee mistakes were clearly seen and these mistakes caused material and moral losses. Today, one of the purposes of integrating the VAR System into football is to minimize these referee mistakes and to correct the decisions that will affect the result. Many comments have been made about the benefits of the VAR System. President of the Association of Active Football Referees and Observers of Turkey, Dr. Abdurrahman Arıcı emphasized that the most important benefit of VAR is seen in offside positions, "No goals are scored from offside. This is important because we need to show justice to the public, coaches and players. We need to contribute to good football as a referee. If we can't show justice, there will be problems, this system has come to prevent the clubs from being victims." stated the opinion (8). When the literature is examined, Spitz et al. (20) "Video Assistant Referees (VAR): The Effect of Technology on Decision Making in Football Referees", in their study, stated that the rate of correct decision making increased after VAR intervention, and the accuracy rate of the first decisions made by the referees after the VAR System decreased from 92.1% to 98.3%. They found that it increased.

As a result, since football is a fast-paced game, the referees try to make the right decision by thinking quickly and making as many mistakes as possible while making their decisions in instantaneous positions. For this reason, sometimes there were differences in referee decisions. It is thought that these differences cause problems in the final decision of the referees. With the implementation of the VAR System, it has been observed that more precise and clear decisions are taken, and the increase in the rate of finding the truth is very high. This shows that the VAR System is an important technological development in terms of ensuring justice in the game.

Looking at the results in Table 5, in the opinions of the referees on how the newly implemented VAR system in the world and in our country will contribute to the development of the game in the future, under the "positive contribution" category of the referees, respectively; reduction in wrong decisions, belief and trust in the referee, reduced interference with the game, focusing on performance; Under the "fair game" theme, respectively; it is seen that they express their views on fair results, transparency of the examination and reduction of deception. As in every sports organization, mistakes occur in football. The stakeholders of the sport and everyone involved in this business should strive to make the game more enjoyable and work to minimize the mistakes made. In this context, it can be said that making football more important and making the game more fair so that everyone can enjoy this sport and increasing the trust in the referee, which is one of the most important parts of the game, will increase the enjoyment of watching football. FIFA president Gianni Infantino said: "I think VAR brings more justice to the game. It makes the game cleaner, helps the referees make the right decisions. Thanks to the VAR system, when a decision changes, some of the audience is happy, while others are sad. As a result, justice is served. You won't hear me say anything negative about VAR. Because justice is everything" (9). When examining the literature, Carlos et al. (3) "How Does Video Assistant Referee (VAR) Change the Game in Elite Football?" found that the rate of correction of wrong decisions increased after the VAR application, and then a decrease was experienced in offsides, fouls and cards.

As a result, it is thought that the VAR system, which has been developed with technology for the development of football and adapted to football, will provide the belief and trust in the referees, which is the subject of constant discussion, and will make an important contribution to making the game more fair, reducing mistakes and revealing fair results.

Looking at the results in Table 6, the opinions of the referees on the VAR System, which has been in practice in various leagues of the world and in our country for a short time, and the training given to the referees, are under the category of "progressive training"; the increase in the success level and education level of the referees is under the category of "being useful"; critical position analysis, expert trainers and high-level opportunities, different perspectives, training of qualified referees, under the category of "not enough"; It is seen that they express their opinions about the position uncertainty to be examined. Persons and institutions have always needed training in order to get the highest level of

efficiency from the work they have done. As in every field, education has an important place in football. Since the VAR System is a newly implemented system, it is aimed to get the highest efficiency from this system. In order for the referees to get used to this system in a short time and to use the VAR System correctly and efficiently, the referees undergo various trainings. Sabri Çelik, one of the former presidents of the Central Referee Board, said, "After each match, we train our referees face-to-face with the images of the matches they manage. We show their positive and negative decisions. These trainings will continue until the end of the season. In addition, we reinforce our training by sending video clips from our EPAK analysis center to our referees after the matches they directed and to our observers after the matches they watched." (13). As a criticism of these statements, the President of the Association of Active Football Referees and Observers of Turkey, Dr. Abdurrahman Arıcı "If the VAR System is being discussed, it should be revised. The training given is not enough, it is necessary to give more training. We need to think more." (10). When examining the literature, Armenteros et al. (2) stated in his study "The Use of Video Technologies in Football and Other Sports Referees" that the standards of education and development of elite referees should be the same, but not uniform. In the same study, researchers suggested that FIFA and UEFA should provide technical training and seminars for both referees and referee trainers. In addition, they expressed their views on making a joint effort to reach standardized approaches in education, decision making and performance, and using audio-visual and multimedia resources that support education in training.

The facilities appear to be sufficient. However, despite these, it can be said that the inconsistent decisions made by the referees after the trainings continued and did not reduce the discussions about the VAR System, and that the trainings were not at a sufficient level.

Suggestion

As a result of this research:

In addition to the VAR protocol determined by the TFF, MHK (Turkish Football Federation, Central Referee Board) at the beginning of the season and after the season, further extended VAR System introduction, usage and field applications trainings are given to the referees, and the correct use of the system and the mistakes to be made about the system. It can be suggested to help the referees adapt quickly to this VAR application, which is a new system, by minimizing

In our country, the VAR System trainings, which will be given after the infrastructure of the VAR system is established, should be given not only to the referees who will manage the match, but also to the assistant referees in the field, football players and coaches who constantly object, club managers who increase the debate about the referee in the public, sportsmen and commentators in the media. It can be recommended for the system to work more efficiently.

Due to the scarcity of research on football referees, it is important that TFF and MHK encourage and direct research on football referees. For this reason, it can be suggested that the TFF, MHK pay attention to this issue in terms of the reasons for the referee's errors and arguments and to produce new solutions so that the referees do not encounter these problems.

In future studies:

Since this study on football referees is aimed at improving the VAR system, which is a newly implemented system, similar studies that do not include only referees; It can be suggested that it should be done on football players, coaches or people who are interested in sports, as it will give a different perspective to the researches to be done.

A draft should be prepared by experts in the field that measures the stress, pressure and anxiety levels that may occur on the referees before or after using the VAR system, psychologically and physiologically, and this draft should be applied to the referees before and after the competition throughout the season, and the effects of the VAR system on the referees should be determined. This method can be recommended in terms of shedding light on research.

The lack of participation of the referees using the VAR system in the research due to the newness of the system was seen as a deficiency. For this reason, it can be suggested that the participation of referees who use the VAR system and who have received VAR training in full in future research will gain similar or different perspectives to the research.

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The Effect of Different Types of Warming on Technical Action in Small-Sided Games

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Abstract

It was observed that the desired behaviors and skills developed with the regulations and limitations in the small sided games (SSG). In this study, it is aimed to examine the effect of different warming types on technical actions in SSG for enhance the effect of SSG. Twenty-four male soccer players in the U-16 and U-17 teams who are one of the amateur league teams in Konya (mean age 16.41 ± 0.50 years, mean height 174.62 ± 7.66cm and body weight average 62.33 ± 7.83 kg) volunteered to participate in the study. Before the study, the players were divided into four groups; The first group started static warming up, the second group started dynamic warming up, the third group started warming up with the SSG, and the fourth group started the SSG without warming up. The study was applied as 3x4min/ 4min rest in 20x25m area. All the actions from the beginning to the end of the study were recorded with a camera at a height of 5m and technical actions were determined with Matball Analysis Program. Statistical analysis of the findings was performed by SPSS 23.0 computer program and the arithmetic mean and standard deviation of all parameters were calculated. Kruskal-Wallis test was used to evaluate the difference between the groups, and Mann-Whitney-U test was used to determine which group caused the difference. Differences at $p < 0.05$ were considered significant. Soccer players who participated in SSG with warming up with SSG attempted to play more dribble past in the first set than the groups that did static and dynamic warm ups, and in the third set compared to the group that participated in SSG without warming up and did dynamic warming up. In the first set, it was observed that the group that warmed up with the SSG intercepted the passing way more than the group that did not warm up. In addition, it was observed that received perception of exertion (RPE) of the groups that did not warm up in the first set were higher than the groups that did both static and dynamic warming up. All other parameters were also not significantly different between the groups. As a result, it was observed that the players participating in the SSG without warming up and warming up with SSG had more difficulty in the first set, but they adapted in the following sets. In addition, soccer players with different warming up protocols have shown similar responses to actions in SSG.

Keywords: Dynamic, soccer, ssg, static.

Farklı Isınma Türlerinin Sınırlı Alan Oyunlarındaki Teknik Aksiyonlara Etkisi

Özet

Sınırlı alan oyunlarında (SAO) yapılan düzenlemeler ve sınırlamalarla birlikte istenilen davranışların ve becerilerin geliştiği gözlemlenmiştir. Bu çalışmayla farklı ısınma türlerin sınırlı alan oyunlarındaki teknik parametrelere olan etkisine bakılması amaçlanmıştır. Konya amatör ligde yer alan bir takımdaki U-16 ve U-17 gruplarında bulunan yirmi dört erkek futbolcu(yaş ortalamaları 16.41±0.50 yaş, boy uzunluğu ortalamaları 174.62±7.66cm ve vücut ağırlığı ortalamaları 62.33±7.83kg) çalışmaya gönüllü olarak katılmıştır. Çalışma öncesinde sporcular dört gruba ayrılmış ve 15 dakika süreyle; 1.grup statik ısınma, 2.grup dinamik ısınma, 3.grup topla ısınma yaparak, 4.grup ise ısınma yapmadan SAO'na başlamıştır. Çalışma 20x25m'lik alanda, 4x3setx4dk dinlenme olarak uygulanmıştır. Çalışmanın başlangıcından bitişine kadar tüm aksiyonlar 5m yükseklikte bulunan kamera ile kaydedilmiş ve teknik aksiyonlar Matball analiz programıyla belirlenmiştir. Bulguların istatistiksel değerlendirilmesi SPSS 23.0 bilgisayar paket programıyla yapılarak, bütün parametrelerin aritmetik ortalamaları ve standart sapmaları hesaplanmıştır. Araştırmada gruplar arasındaki farklılığın değerlendirilmesi için Kruskal-Wallis testi, farklılığın hangi gruptan kaynaklandığının belirlenmesindeyse Mann-Whitney-U testi kullanılmıştır. $P<0.05$ düzeyindeki farklılıklar anlamlı olarak kabul edilmiştir. SAO oynadıktan sonra SAO'na katılan sporcular birinci sette statik ve dinamik ısınma yapan gruplara göre, üçüncü sette ise ısınmadan SAO'na katılan ve dinamik ısınma yapan gruba göre daha fazla çalım girişiminde bulunmuştur. Birinci sette SAO ile ısınma yapan grup ısınma yapmayan gruba göre daha fazla pas yolunu kestiği görülmüştür. Ayrıca ısınma yapmayan grupların birinci setteki zorlanma algıları hem statik hem de dinamik ısınma yapan gruplara göre daha yüksek olduğu gözlemlenmiştir. Diğer tüm aksiyon ve parametrelerde gruplar arasında anlamlı bir farklılık gözlemlenmemiştir. Sonuç olarak, SAO ve herhangi bir ısınma yapmadan SAO'na katılan sporcuların ilk sette daha fazla zorlandıkları bununla birlikte sonraki setlerde uyum sağladıkları gözlemlenmiştir. Ayrıca farklı ısınma protokollerindeki sporcuların SAO'ndaki aksiyonlara benzer tepkiler gösterdiği görülmüştür.

Anahtar Kelimeler: Dinamik, futbol, sao, statik.

INTRODUCTION

Soccer is a talent sport that is defined as performance under changing conditions and performance adaptation is expected depending on the conditions (13). Due to the nature of the game, intermittent performances are exhibited quite a lot during the competition. While low-intensity running, in which aerobic metabolism is dominant, constitutes 70% of the competition, 150-250 high-intensity intermittent running is performed during the competition through anaerobic metabolism (2,17). In recent years, coaches have preferred small-sided games (SSG) for the development of both physical and technical parameters, due to meeting these demands of football and, in addition, the development of technical parameters is essential.

SSG is an application that has more possession of the ball and increases the time spent with the ball, which is different from traditional training methods and field practices. In team sports, most of the training units include SSG, which is smaller than the field size in official competitions and the number of players is reduced (4). Since the potential of this training model improves the physical, technical and tactical performance of the players, it becomes the focus of attention of many trainers (18). In addition, scientists are more interested in understanding the different situations in small sided games (1). In addition to the effects of SSG, warming up protocols also provide many benefits on the performance of athletes. When we look at the warm-up practices in soccer, it typically includes static and dynamic stretching exercises as in other branches (1,7). In young soccer players, it is aimed to increase body

temperature in order to increase the range of motion (21) and motor unit speed in warm-up protocols, which can occur with dynamic movements (6).

Since FIFA developed and evaluated the injury prevention programs called "The 11" and "FIFA 11+", it has been shown in many scientific studies how simple exercise-based programs reduce injury events in amateur football players (4). In the light of this information, we aimed to enchance the effect of the SSGs with the most benefical warming up protocols. With this purpose we were to evaluate the effects of different warming up protocols to the small sided games on technical actions.

MATERIAL and METHOD

Participants

This study was carried out with 24 male soccer players aged between 15-17 ages, who are actively playing soccer which is one of the amateur teams in Konya, and who have played soccer for at least 3 years. Participants were included in the test regardless of whether they had right or left feet, and it was determined that the participants did not have any health problems or sports injuries. Before conducting the experiment, all participants were informed of the risks of the study and gave informed consent. For this study, approval was obtained from the non-invasive ethics committee of the Selçuk University Faculty of Sport Sciences (E-40990478-050.99-73807).

Table 1. Descriptive statistics of the physical features for young male soccer players

Variables	N	Mean	Sd	Minimum	Maximum
Height (cm)	24	175.46	6.82	165.00	191.00
Weight (kg)		62.88	8.18	45.00	76.00
Age (years)		16.42	0.50	16.00	17.00

Height and weight measurements

The height of each subject was measured with a stadiometer with a precision of 0.01 meters (m) and body weights (VA) with an electronic scale (SECA, Germany) with a precision of 0.1 kilograms (kg). During height measurements, the volunteers were stopped with their feet bare, heels together, knees tense, body and head straight, eyes facing forward. The sliding caliper rod was stopped when it touched the volunteers' head, and the closest value was recorded in centimeters (cm) as the height value. During weight measurements, the participants had bare feet and wore shorts or swimsuits that would not affect their weight. The value obtained on the scale screen is recorded in kg.

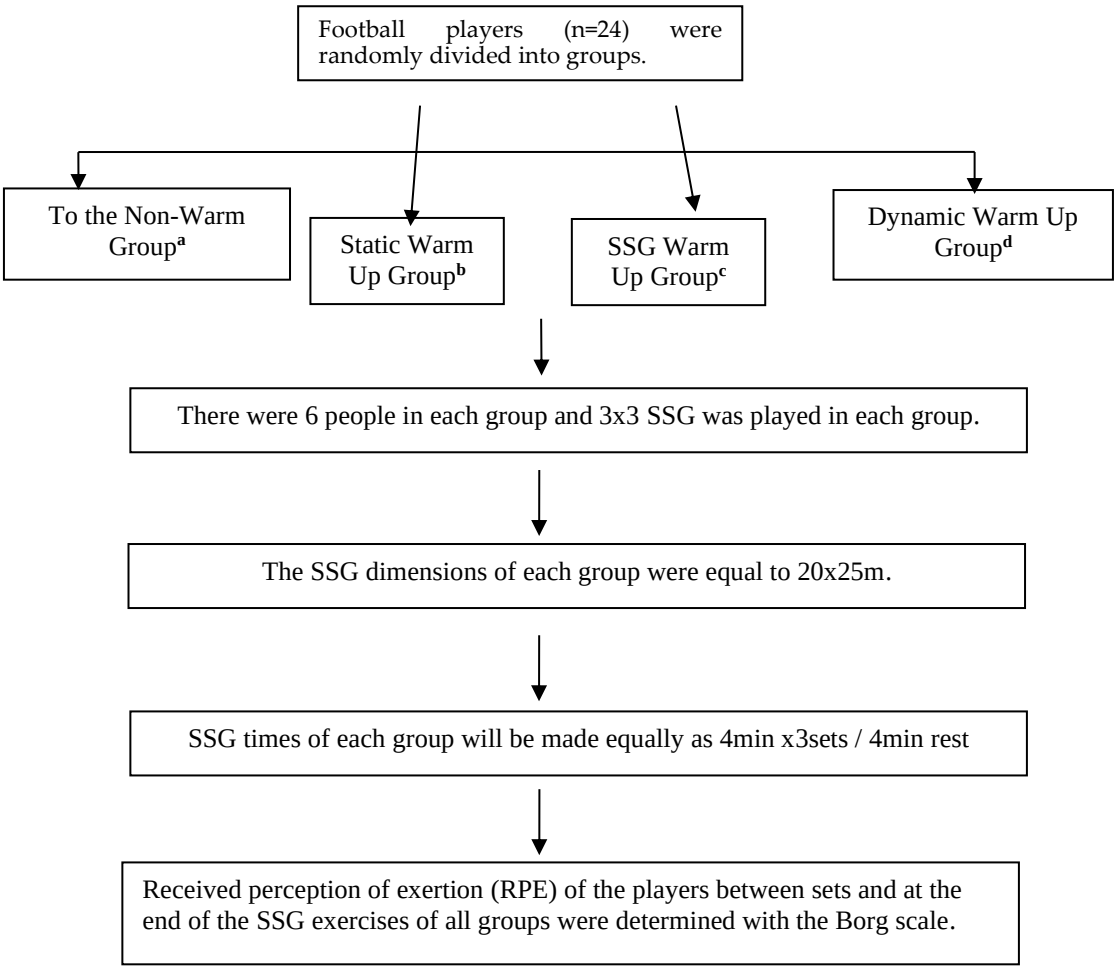
Matball Football Analysis

From the beginning to the end of the study, all the actions will be recorded with the camera at a height of 5m, and a computer-aided matball match analysis software program (Algoritma Bilgi Islem Ltd.Şti) was used in order to better reach the desired positions in small sided games, to evaluate the actions in a short time and to classify the analysis criteria. Actions in small sided games were examined with the computerized notation technique.

Technical Actions

Actions to be examined through the Matball football analysis program were handled and evaluated in 7 categories. These categories are; Data were collected as shooting, passing, negative passing, dribbling, dribble past, intercepting the passing way (IPW) and disrupting the opponent without the ball (DOWB).

Experiment Design



a: It means that the tests are carried out without warming up.
b: It means that the tests are performed after static warming up.
c: It means that the tests are carried out after warming up by playing Small Sided Games
d: It means that the tests are performed after dynamic warm-up.

Table 2. Some technical parameters of young male soccer players in SSG

Dependent Variables	Independent Variable	1.Sets	2. Sets	3.Sets	Total
Shooting	SW	0.83±0.47	1.33±0.49	1.33±0.42	4±0.93
	DW	0.50±0.34	1.5±0.22	1.17±0.48	3.17±0.65
	WSSG	0.83±0.17	1±0.52	1±0.37	2.83±0.60
	WW	0.83±0.17	0.33±0.21	0.67±0.42	1.83±0.60
	P Value	0.574	0.144	0.676	0.274
Passing	SW	7.83±1.42	6.33±1.28	6±1.46	20.17±3.18
	DW	8.67±1.15	9.33±0.56	7.67±0.71	25.67±1.52
	WSSG	9.67±0.99	8.50±1.69	6±0.82	24.17±1.62
	WW	10.33±1.91	8±0.93	11.83±3.46	30.17±6.15
	P Value	0.560	0.342	0.363	0.319
Negative Passing	SW	2±0.37	2.33±0.56	2.17±0.48	6.5± 0.67
	DW	2.17±0.48	2.5±0.22	2.67±0.71	7.33± 0.92
	WSSG	1.5±0.62	2.33±0.76	2.5± 0.56	6.33± 1.31
	WW	2.17±0.60	2.5± 0.62	0.83± 0.40	5.5±0.85
	P Value	**0.754**	**0.989**	**0.117**	**0.472**

SW: Static warming up, **DW:** Dynamic warming up, **WSSG:** Warming up with SSG, **WW:** Without warming up, P<0,05.

It wasn't observed that the change in shooting, passing and negative passing performance parameters among all groups.

Table 3. Dribbling, DP and IPW parameters to the groups in SSG

Dependent Variables	Independent Variable	1.Sets	2. Sets	3.Sets	Total
Dribbling	SW	0.17±0.17	0±0	0.83±0.40	1± 0.52
	DW	0.5±0.34	0.17±0.17	0.17±0.17	0.83± 0.40
	WSSG	0.5±0.22	0.17±0.17	0.83±0.31	1.5± 0.22
	WW	0.17±0.17	0.33±0.21	0.67±0.33	1.17±0.48
	P Value	0.556	0.513	0.377	0.606
DP	SW	0±0a	1.33±0.76	1.33±0.56	2.67±0.92
	DW	0±0a	0.67±0.21	0.5±0.22a	1.17±0.31
	WSSG	1.17±0.40b	1.83±0.75	2.17±0.48b	5.17±1.35
	WW	0.83±0.40	2.17±0.60	0.83±0.48a	3.83±1.22
	P Value	0.021*	0.390	0.050*	0,088
IPW	SW	1.33± 0.42	2.17± 0.75	1.33±0.42	4.83±0.79
	DW	2.17±0.65	1.5±0.43	2±0.26	5.67±0.92
	WSSG	0.83±0.17a	1.67±0.49	1.67±0.33	4.17±0.65
	WW	2.67± 0.49b	1.33±0.61	1±0.52	5±0.82
	P Value	0.028*	0.800	0.332	0.756

SW: Static warming up**, DW:** Dynamic warming up, **WSSG:** Warming up with SSG**, WW:** Without warming up**, DP:** Dribble Past, **IPW:** Intercepting the passing way**, a,b:** The difference between the means carrying different letters in the same column is important (P <0.05). *: (P <0.05).

Soccer players who participated in warming up with SSG (WSSG) with SSG attempted to play more dribble past in the first set than the groups that did static and dynamic warm-ups, and in the third set compared to the group that participated in SSG without warming up and did dynamic warm-up. In the first set, it was observed that the group that warmed up with SSG IPW more than the group that did not warm up.

Table 4. DOWB and RPE parameters to the groups in SSG

Dependent Variables	Independent Variable	1.Sets	2. Sets	3.Sets	Total
DOWB	**SW**	0.83±0.30	0.5±0.34	0.83±0.48	2.17± 0.87
	DW	1±.0.68	0.17±0.17	0.5±0.22	1.67± 0.71
	WSSG	0.33±0.21	0.33±0.21	1±0.26	1.67± 0.42
	WW	0.17±0.17	0.50±0.34	0.5±0.34	1.17± 0.31
	P Value	0.382	0.863	0.508	0.773
RPE	**SW**	10.33±0.42a	12.17±0.31	14.17±0.40	-
	DW	10±1.32a	12.17±0.40	12.83±0.83	-
	WSSG	12±0.26	12.67±0.42	12.5±0.50	-
	WW	12.5±0.34b	12.83±0.40	14±0.26	-
	P Value	**0.023***	**0.558**	**0.135**	**-**

DOWB: Disturbing the opponent without the ball**, RPE:** Received perception of exertion**, a,b:** The difference between the means carrying different letters in the same column is important (P <0.05). *: (P <0.05).

It was observed that RPE of the groups that did not warm up in the first set were higher than the groups that did both static and dynamic warming up. All other actions and parameters were also not significantly different between the groups.

DISCUSSION

It was observed that the desired behaviors and skills developed with the regulations and limitations in the SSG. In this study, it is aimed to examine the effect of different warming up types on technical actions in SSG for enhance the effect of SSG.

Small-sided games have been used to enhance the ecology of training routine on game performance of team sports in the last decade (10). Warming up strategies in pre match for team sports wish to maximal subsequent performances of players, while keeping this period effective duration of less than 16 minutes (15). In this view, SSG may offer additional benefits if implemented as a warm-up strategy in comparison with traditional warm-up activities. So, we did all our warm up routine in this perspective. And also, most research about SSG observed the long-term training effects, a few studies observed SSG as a warm up regimen reporting mixed results. And also, technical aspects of SSG have been widely studied (18,19). Most researchers have used the notational analysis to inspect some indicators, such as passing, receiving, turning, dribbling, intercepting, and shooting (19). Similarly, in this study, we researched these kinds of parameters. And we found that soccer players who participated and dynamic warm-ups, and in the third set compared to the group that participated in SSG without warming up and did dynamic warm-up. In another study, they observed that the number of technical actions was higher in the first two sets. These findings showed us tiredness led to decreases in the numbers of technical actions during the small side games (14). On the contrary this finding, all other actions and parameters were also not significantly different between the groups in this research. Similarly, Gabbett et al. (8) studied the effects of open-skill activities as a warm-up strategy for a team sport player and observed no changes in comparison with a traditional warm up. However, we must know that the effects of the warm up protocols appear to dependent on many factors, such as the type of sport, fitness of player and experience, tasks to be performed, environmental conditions, and constraints imposed by the organizers of the event (3,16).

Many methods are preferred to determine the loads that occur in training. Among these methods, one of the most suitable for soccer and applied safely in a practical way is the received perception of exertion (RPE) (12). Data obtained from indicators such as perceived difficulty levels in soccer have also shown that high intensity can be achieved using the ball (11,20). Similarly, in the first set, it was observed that the group that warmed up with SSG intercepted the passing way more than the group that did not warm. In addition, it was seen that the RPE values of soccer players after SSG are approximately between 5-8.9 (5, 9). These findings nearly, similiar in dynamic warm-up group and static warm-up group. However, it was observed that received perception of exertion (RPE) of the groups that did not warm up in the first set were higher than the groups that did both static and dynamic warming up. According to these findings, before play SSG we can prefer dynamic and static warming up. As a result, it was observed that the athletes participating in the SSG without warming up and warming up with the ball had more difficulty in the first set, but they adapted in the following sets. In addition, soccer players with different warming up protocols have shown similar responses to actions in SSG.

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Assessment of Eccentric-Concentric Exercises Applied in Different Resistances in Terms of Strength

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Abstract

The purpose of this study was to examine the effects of eccentric-concentric exercises applied at different resistances on strength parameters. Thirty-five sedentary volunteers participating in the study were divided into 4 groups by the stratified randomization method according to their mean strength parameters. These groups were named as control group (CG) (age 21.00 ± 2.44 years, height 178.13 ± 6.83 cm, body weight 80.13 ± 12.14 kg), eccentric group (EG) (age 22.22 ± 2.99 year, height 178.22 ± 5.95 cm, body weight 71.22 ± 9.36 kg), con-eccentric group (CEG) (age 21.22 ± 2.86 year, height 177.22 ± 4.68 cm, body weight 71.89 ± 13.93 kg) and modified con-eccentric group (MCEG) (age 21.67 ± 2.59 year, height 177.00 ± 4.30 cm, body weight 75.22 ± 8.16 kg). During the 8-week training period, 4 sets of leg extension exercises with different loads were applied to the training groups 3 days a week. Isokinetic strength outputs were measured both concentrically and eccentrically at 60°s^{-1} ve 180°s^{-1} angular velocities with the Cybex device. SPSS 24 package program was used in the statistical analysis of the data. For normally distributed data, paired sample t-test was used in paired comparisons, and a one-way ANOVA test was used for comparison between three or more groups. Tukey and Dunnett's T3 (non-homogeneous) test was used among the post hoc tests. Wilcoxon test (paired comparisons) and Kruskal-Wallis test were used for nonparametric data. When the intragroup comparisons were examined before and after the training period, it was found that the isokinetic strength outputs of EG, CEG, and MCEG showed a significant increase in all contractions and angular velocities ($p<0.05$), but no parameters increased in CG ($p>0.05$). When the isokinetic pre-test strength parameters between the groups were compared, no significant difference was found ($p>0.05$). While only MCEG increased significantly in 180°s^{-1} concentric strength outputs, 60°s^{-1} and 180°s^{-1} eccentric strength output increased significantly in both MCEG and EG compared to CG ($p<0.05$). As a result, when the strength tests are considered, although the general strength development is seen mostly in MKEG, no statistically significant difference was found between training groups. It is recommended to determine the load in the eccentric phases of the exercises by the eccentric 1RM (repetition maximum), at least as a result of this research, to generate more strength development rates while applying strength training.

Keywords; Eccentric, Contraction, Concentric, Strength.

INTRODUCTION

Muscle strength is one of the key factors of sportive performance, injury prevention, and physical fitness. In light of this knowledge, researchers have focused on the further development of strength (35). Muscle tissues exist in a dynamic state where proteins are synthesized and broken down alternately. Genetics, nervous system activation, environmental factors, hormonal effects, nutritional level and physical activity are listed as six factors that develop and maintain muscle mass (24). There is no doubt, that genetic factors provide the basic frame of reference that modulates each of the other factors that increase muscle strength and endurance. Muscle activity contributes little to tissue

growth without the availability of proper nutrition, especially amino acids, to provide the necessary building blocks. Similarly, specific hormones (eg, testosterone, growth hormone) and nervous system innervation help model and amplify the appropriate training response (24). Without loading, each of the other factors cannot effectively produce the desired training response (29).

Loading in strength training can occur with different contractions of the muscles. These contractions can be commonly performed as concentric (CON), eccentric (ECC) or a combination of both CON/ECC (4). Recently, the physiological effects of eccentric contractions have been investigated, and as the results of these studies emerge, the application of the principles of intensity and frequency, which are among the basic scientific principles of training, gains importance. In the planning of training programs, the number of sets to be loaded is one of the most effective ways of training (10). In traditional strength training, the movements are performed first with a concentric contraction and then an eccentric contraction or vice versa. When the load applied to the muscle is higher than the force produced by the muscle, the muscle lengthens; this is called an eccentric contraction (23). Therefore, muscle forces tend to be highest during lengthening actions (4). Some studies have shown that the eccentric strength capacity can be 120–200% higher than the concentric strength capacity (1,5,8,16,17). The reason for this can be explained by the "winding filaments theory" (28). Nishikawa et al (28) suggested in their study that titin, a large protein, may be involved in the mechanics of muscle contraction, acting as an internal spring that can store and release elastic potential energy. It has been shown that actin rotates as myosin is translated during the cross-bridges cycle (27). The theory states that titin acts as a "winding filament" that is activated by the release of Ca++ and is wound onto the actin filament when rotated by myosin translation in the cross-bridges (26); therefore, it is emphasized that titin can "actively" participate in the force generation of a muscle by stiffening when the eccentric is wrapped on actin during eccentric contractions.

In traditional strength training, concentric 1RM is taken into account when determining strength intensity. Eccentric 1RM is used only in eccentric studies, and in this condition, the concentric contraction pattern is not used (20). The development expected from strength training is directly related to the load on the skeletal muscles in the exercise plan. In general, the load is determined according to the maximum concentric contraction. However, since the eccentric contraction force is higher than the concentric contraction, the exercise is limited to the concentric load. Due to differences in maximal strength capacities (1RM), fatigue levels, and potential muscle damage, it is emphasized by studies that more research needs to be done to establish appropriate training protocols for the frequency, load, and rest required for eccentric actions (20,32). Therefore, this study was to examine the effects of eccentric-concentric exercises applied at different resistances on strength parameters.

MATERIAL and METHOD

Participants

35 sedentary individuals voluntarily participated in this study. For the study, necessary permission was obtained from Selcuk University Faculty of Sport Sciences, non-interventional clinical research ethics committee (21.09.2020/63). Before the study, each of the participants was given detailed information about the risks and inconveniences that may be encountered, and the voluntary consent form was read and signed by the participants.

Inclusion criteria were in the study; being healthy, not doing exercises for 1.5 hours a day and 4 days a week or more for 12 months before the study, and not taking any medical treatment or medication or supplements that could affect the results until 3 months from the start of the study. After determining the quadriceps strength of the participants to participate in the research, groups were formed from people with similar strength averages, taking these data into account. The groups consisted of 3 different experimental groups and 1 control group.

Training Protocol

The training protocol applied to the participants participating in the study was designed using the ECC and combined contraction principles. Literature review and pre-tests were conducted to determine the severity of loading. The 1RM values of the subjects were determined and the number of repetitions of the exercises, their tempo, and the percentage of weight to be lifted was determined in the light of the pre-tests. These tests, which were made one week before the practices, provided the participants with the opportunity to recognize the leg extension device.

Table 1. Training Protocol

Group	Exercise Method	1RM%	Tempo	Number of Repetitions (up to fatigue)
EG	Eccentric	80-85	60^0 s^{-1}	8-10
CEG	Combined	80-85 (CON 1RM)	60^0 s^{-1}	4-5
MCEG	Combined	80-85(CON/ECC 1RM)	60^0 s^{-1}	4-5

EG: Eccentric contraction group, CEG: concentric and eccentric contraction group, MCEG: Modified concentric-eccentric contraction group.

1RM Measurement (Concentric and Eccentric)

Before beginning the study program, the 1RM (maximum repetition) values of the participants were determined for determining the loads. In order for the movement to be regular, the angle and technique were explained to the participants (35). The following steps were followed while determining the 1RM values. After warming up on the cycle ergometer at a rate of 60–70 rpm, standard stretching was done. Before the 1RM measurement, the weights suggested by the literature were taken into account according to the weight of the individuals. The load is increased by 5 to 10 kg after each regular weight that the participants can lift. Participants were not allowed to do more than 5 lifts as fatigue would occur. For the concentric contraction type, 1RM visual animation was followed and the concentric contraction, which they could lift once with knee extension, was recorded as 1RM, taking into account $60^º$ s^{-1} speed tempo. eccentric 1 RM that the participant was able to do once in a controlled manner with knee extension at $60^º$ s^{-1} speed tempo by following the visual metronome was recorded as 1 RM. During the eccentric contraction, the participant's inability to control the descent rate at any time or the completion of the movement before the expiration of 1 second was considered as an error (17).

Eccentric Strength Exercise

In order to prevent the participants from making concentric contractions in eccentric exercises, the load arm was brought to the starting point of the eccentric contraction by the assistants. The assistants followed the tempo animation while lifting the load.

Combined (Concentric + Eccentric) Strength Exercise

In the combined exercise, participants performed traditional concentric and eccentric contractions, respectively.

Modified Combined (Concentric + Eccentric) Strength Exercise

In the modified combined exercise, participants were asked to perform both concentric and eccentric contractions. Different from the traditional combined exercise, loads were applied differently according to the eccentric and concentric 1RM contraction types. With an apparatus attached to the leg extension device, the extra load to be applied during the eccentric contraction phase was placed on this apparatus by the assistants, thereby increasing the resistance and in the concentric contraction phase, this extra load was taken from the apparatus and the resistance was reduced.

Figure 1. A concentric contraction phase, B eccentric contraction phase.

Anthropometric Measurements

Height Measurement

The height of the athletes; In anatomical posture, bare feet, feet together, holding breath, head in the frontal plane, after positioning with the overhead plate touching the vertex point, the measurement was taken in 'cm' with a stadiometer (Holtain Ltd., UK) measuring ±1 mm. (33).

Body Weight Measurement

Bodyweight; It was measured in 'kg' with a scale (Tanita 401 A, Japan) that measures with ±100 g precision when the subjects were only in shorts, bare feet, and in the anatomy posture position (33).

Isokinetic Strength Measurements

Before the isokinetic strength tests, a 10-minute warm-up was done to warm up the leg muscles of the participants. Isokinetic concentric and eccentric measurements were made with Cybex NORM (Lumex Inc, Ronkonkoma, New York, USA) isokinetic dynamometer in Selcuk University Faculty of Sport Sciences kinanthropometry Laboratory.

According to the prepared exercise protocol, the highest isokinetic CON and ECC knee extension were applied in the dominant leg with 2 different motion angle speeds. According to the prepared protocol, the knee extension was performed at $60^{o}s^{-1}$ speed and at $180^{o}s^{-1}$ speed. As a result of studies carried out in similar protocols, 90 seconds of rest was given between sets (11). The best values were recorded in N/m.

Statistical Analysis

SPSS 24 package program was used for statistical analysis of the data. The mean values and standard deviations of the parameters of all subjects are given. The normal distribution of the data belonging to the research was tested with the Shapiro-Wilk test. Skewness and kurtosis values were checked for non-normally distributed data sets, and ± 2 contents were considered to be normally distributed. Paired sample t-test was used in binary variables for normally distributed data, and the one-way analysis of variance (ANOVA) was used for comparing more than 2 variables. Tukey and Dunnett's T3 (non-homogeneous) test, which is one of the post hoc tests, was used to determine which groups caused the differences. Wilcoxon Test (pairwise comparisons) and Kruskal-Wallis test were used for data that did not show normal distribution.

RESULTS

Table 2. Descriptive Statistics of Participants

Variables	Time	CG	EG	CEG	MCEG	P
		Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	
Age (year)	**Pre and post Tests**	21.00±2.44	22.22±2.99	21.22±2.86	21.67±2.59	0.800
Height (cm)	**Pre and post Tests**	178.13±6.83	178.22±5.95	177.22±4.68	177.00±4.30	0.952
Body Weight (kg)	**Pre-Test**	80.13±12.14	71.22±9.36	71.89±13.93	75.22±8.16	0.245
	Post-Test	82.13±13.83	73.22±8.54	72.56±12.23	76.56±7.76	0.230

EG: Eccentric contraction group, CEG: concentric and eccentric contraction group, MCEG: Modified concentric-eccentric contraction group, CG: Control group. Significant difference $p<0.05$.

When the physical values of the participants before and after the training period were compared, no statistically significant difference was found ($p>0.05$) (in table 2). In addition, there was no significant difference according to the comparison of the parameters between the groups (age P=0.800, height P=0.952, first test weight P=0.245, and post-test weight P=0.230).

In table 3, the strength values within the group were compared. In the table, it is stated that all strength values of EG, CEG and MCEG showed a statistically significant increase after the training periods ($p<0.05$). However, no significant change was found in CG strength values ($p>0.05$).

Table 3. Comparison of Pre-test and Post-test Isokinetic (60° s^{-1} and 180° s^{-1}) Strength Values within the Groups.

Variables Newton/m	Time	CG Mean ± SD	EG Mean ± SD	CEG Mean ± SD	MCEG Mean ± SD
	P				
60° s^{-1} Concentric	**Pre Test**	218.50±27.53	221.00±41.55	203.11±50.59	204.67±45.19
	Post Test	218.88±37.39	273.33±68.69	245.00±35.11	269.22±29.92
	P	0.964	**0.008**	**0.001**	**0.002**
180° s^{-1} Concentric	**Pre Test**	158.63±31.62	146.22±27.72	147.78±38.92	153.11±12.89
	Post Test	156.38±24.04	183.78±44.66	196.44±34.92	214.67±48.33
	P	0.759	**0.005**	**0.000**	**0.008**
60° s^{-1} Eccentric	**Pre Test**	252.38±39.93	259.89±67.44	257.00±27.19	236.67±35.60
	Post Test	243.13±36.84	333.56±88.24	308.11±50.93	354.11±35.60
	P	0.517	**0.002**	**0.004**	**0.000**
180° s^{-1} Eccentric	**Pre Test**	236.88±31.29	239.89±55.80	252.00±30.99	243.67±39.84
	Post Test	236.88±46.30	310.89±73.71	299.44±40.55	321.78±38.78
	P	1.000	**0.021**	**0.003**	**0.008**

EG: Eccentric contraction group, CEG: concentric and eccentric contraction group, MCEG: Modified concentric-eccentric contraction group, CG: Control group. Significant difference p<0.05.

Table 4. Comparison of Isokinetic (60° s^{-1} and 180° s^{-1}) Strength Values Between Groups

Variables Newton/m	Time	CG Mean ± SD	EG Mean ± SD	CEG Mean ± SD	MCEG Mean ± SD	P
60° s^{-1} Concentric	**Pre Test**	218.50±27.53	221.00±41.55	203.11±50.59	204.67±45.19	0.742
	Post Test	218.88±37.39	273.33±68.69	245.00±35.11	269.22±29.92	0.073
180° s^{-1} Concentric	**Pre Test**	158.63±31.62	146.22±27.72	147.78±38.92	153.11±12.89	0.937
	Post Test	156.38±24.04**b**	183.78±44.66**ba**	196.44±34.92**ba**	214.67±48.33**a**	**0.035**
60° s^{-1} Eccentric	**Pre Test**	252.38±39.93	259.89±67.44	257.00±27.19	236.67±35.60	0.706
	Post Test	243.13±36.84**b**	333.56±88.24**a**	308.11±50.93**ab**	354.11±35.60**a**	**0.003**
180° s^{-1} Eccentric	**Pre Test**	236.88±31.29	239.89±55.80	252.00±30.99	243.67±39.84	0.472
	Post Test	236.88±46.30**b**	310.89±73.71**a**	299.44±40.55**ab**	321.78±38.78**a**	**0.011**

EG: Eccentric contraction group, CEG: concentric and eccentric contraction group, MCEG: Modified concentric-eccentric contraction group, CG: Control group. The difference between values with different letters in the same line is significant p<0.05.

As a result of the comparison of isokinetic strength values between the groups, no statistically significant difference was found between the pre-test values (in table 4). There was a difference between the post-test values of the groups. Between the 180° s^{-1} concentric post-test values, MCEG (P=0.024) showed a significant increase compared to the control group. Between 60°s^{-1} eccentric post-test values, MCEG (P=0.002) and EG (P=0.015) showed a significant increase compared to the control group. Between the 180° s^{-1} eccentric post-test values, EG (P=0.030) and MCEG (P=0.011) showed a significant increase compared to the control group. However, no significant difference was found between the experimental groups.

DISCUSSION

In the research, the 8-week training program significantly increased the pre-test and post-test strength values of the training groups. However, the strength values of the training groups did not make a significant difference from each other after the training period. Although there was no significant difference between groups, considering the MCEG development rates, it provided more strength than the other groups.

The post-test comparison of concentric 60°s^{-1} strength values between the groups in table 4 shows that the training did not significantly increase the 60° s^{-1} concentric strength increase. However, when the change rates are considered, it is seen that CG increased 0.03%, EG increased 23.23%, CEG 24.73%, and MCEG increased 36.06%. In the study of (35), 41 recreationally active individuals (age 21.1± 1.8 years)

had strength training for 12 weeks. In their study, no statistically significant difference was found between the isokinetic strength outputs of the fast (180°s-1) eccentric study groups and the combined groups training with CON-ECC. Friedmann-Bette et al. (9) performed leg strength training on 25 trained male participants (age 24.4 years) 3 days a week for 6 weeks. They divided the participants into 2 groups, ECC and ECC-CON. According to the strength measurements made at the end of the training, the concentric contraction strength did not differ significantly between the two groups. In their study, Godard et al. (12) divided the recreationally active participants into 3 different groups as the ECC group (9) ECC-CON group (9), and the control group (10) (age 22.4 years) and had them undergo strength training for 10 weeks. While there was no significant difference in terms of strength output, comparisons with the control group show a significant difference. Similar to our study, Gross et al. (13) investigated the effect of eccentric and traditional (CON-ECC) training methods on strength. Similar to our study, concentric strength outputs were found to be numerically superior in the CON-ECC (12%) group compared to EG (10%). In the study of Hortobágyi et al. (18), 48 male and female untrained individuals (age 20.0 years) had strength training done 3 days a week for 12 weeks. The groups were formed as ECC, CON-ECC, CON, and Control. In the study, 10 repetitions and 60° s-1 tempo were used. There was no statistically significant difference in concentric strength test results between strength groups. The results of these studies mentioned in the literature in the field of contractions have similarities to the 60°s1 maximum concentric strength outputs of our study. Although our study and other studies did not emphasize a significant difference between the groups, it was determined that the maximum concentric strength development rates were higher in studies with concentric and combined contractions, while it was lower in groups with only eccentric contractions.

When the 60° s-1 eccentric strength values in table 4 are examined in terms of post-tests between the groups, it is seen that the 60° s-1 eccentric force values of the EG and MCEG groups differ statistically from the control group. Blazevich et al. (2) measured the eccentric strength values of the participants (age 22.8) after the participants had strength training (tempo 30° s-1) for 10 weeks and 3 days a week for 10 weeks. While there was no significant difference between the experimental groups, the strength change rates increased by 39% in the ECC group, while it increased by 36% in the CON group. Similarly, Duncan et al. (7) found the ratio of 60°s-1 eccentric isokinetic strength to be 27.5% in the ECC group and 7.2% in the CON group. In the study of Hawkins et al. (14), some of the 30 untrained individuals had only ECC, the other part only CON, and the rest did not train. According to comparisons, knee extension strength increased significantly in the ECC group (22%) compared to the CON group (17%). In the study of Hortobágyi et al. (18), ECC, CON and CON-ECC and control groups were formed. After 12 weeks of training, the eccentric knee extension strength was determined as 86% in the ECC, 20% in the CON, and 70% in the CON-ECC group. In the study of Kaminski et al. (19), 27 untrained male individuals (mean age 22.9 years) were grouped as CON only, only ECC and control group and they applied leg strength training for 6 weeks. Although there was no statistically significant difference between the experimental groups in terms of knee extension eccentric strength outputs.

When the 180°s-1 concentric strength values were examined in terms of post-tests between the groups, it was seen that only the 180°s-1 concentric strength values of the MCEG group differed statistically from the control group. When the results are evaluated, it is seen that the strength increase rates are similar at the angular speed of 60°s-1, as well as at the angular speed of 180° s-1. In the study of Ünlü et al. (35), they trained at an angular speed of 30°s-1 in the slow eccentric group. At the end of the training, while 24.9% improvement was found at 60° s-1 angular speed, this improvement decreased to 13.5% at 180°s-1 angular speed. Duncan et al. (7) found the 180°s-1 eccentric strength development of the eccentric contraction group to be 25.1%, while the concentric strength development was found to be 1.2%. While they found the 180° s-1 eccentric strength development of the concentric contraction group to be 7.8%, they also found the concentric strength development to be 7.8%.

Most of the studies mentioned above support our study. The majority of the studies on contractions, as we found in our results, show that exercises using contraction type improve that type of contraction more. In other words, it was found that concentric exercises improved more the concentric strength outputs (2, 7, 15, 31, 34) while exercises with eccentric contractions improved the eccentric strength outputs more (3, 14, 25, 34). In a study, it was

emphasized that the control of eccentric force is much higher in alpine slalom skiers, where more eccentric force is used (36). In the light of the information of this study, the contractions in the exercise used in the exercise or the sports branch affect the strength of that contraction more. Although the reason for this is not fully explained, it is thought that the neural, motor unit, and neural pathways used and the differences in hormone release may have increased their contraction strength.

Roig et al. (30) emphasized that in traditional training the intensity of eccentric exercise is well below its maximum potential when the intensity between contractions in concentric and eccentric exercise is equalized. In addition, studies in which loads of eccentric contractions are applied at the same load as concentric contractions have emphasized that growth hormone is at the same level as concentric contractions (21,22). In addition, in studies where eccentric contraction is high, the excessive mechanical load may increase the magnitude of motor unit outputs. Although the mechanisms underlying the unique neural strategies during eccentric contractions are not well understood, it is thought to likely result from a combination of supraspinal and spinal factors (6). In summary, eccentric contractions exhibit unique neural strategies compared to concentric contractions under both maximal and submaximal conditions (4). In the light of this information, the application of the ECC load according to the eccentric 1RM shows that the potential strength outputs of the muscle can be maximized as in the MCEG strength outputs. Participants in the study were informed about their nutrition during the training, but it was not taken under control. This can be cited as a limitation of our study. In the study, the experimental group was selected from male and non-sports individuals. In future studies, the effects on different experimental groups can be investigated.

CONCLUSION

In this study, the effects of different contraction types and exercise loads on eccentric and concentric strength were investigated by adjusting them according to contractions. According to this study, the modified concentric and eccentric exercise method seems to be the most effective method in improving the strength parameters of the participants.

Conflicts of Interest

The authors declare no conflict of interest.

Note

This study was produced from the doctoral thesis titled "Assessment of Eccentric-Concentric Exercises Applied in Different Resistances in Terms of Strength and Hypertrophy" published in 2021.

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Effect of the Pes Planus on Vertical Jump Height and Lower Extremity Muscle Activation in Gymnasts*

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* *Bu çalışma, 640747 numaralı "Cimnastikçilerde pes planus varlığının kas aktivasyonu ve dinamik denge üzerine etkisinin incelenmesi" başlıklı yüksek lisans tezinden üretilmiştir.*

Abstract

The aim of this study was to examine the effect of the pes planus vertical jump height and muscle activation in gymnasts. Forty-four gymnasts (mean age, 12.47±4.34 years) were included in the study. Pes planus was evaluated using a podoscope. Muscle activation was measured with a surface electromyography device during maximum voluntary isometric contraction (MVIC) and vertical jump test. Vertical jump height was evaluated using a contact mat. There was no significant difference in MVIC values of gastrocnemius medialis (GM), soleus (S), peroneus longus (PL), tibialis anterior (TA) muscles of gymnasts with and without pes planus (GM p=0.526; S p=0.157; PL p=0.696; TA p=0.223). In athletes with pes planus, GM muscle in rising phase of vertical jump; in the landing phase, the activation of the GM and S muscles was found to be lower (GMrising phase p=0.004; GMlanding phase p=0.014; Slanding phase p=0.017). In conclusion, it was found that the pes planus had no effect on vertical jump and MVIC values. It was observed that the activation of GM and S muscles was low during vertical jump in gymnasts with pes planus.

Key words: Gymnasts, Pes Planus, Vertical Jump, Muscle Activation

Özet

Bu çalışmanın amacı, cimnastikçilerde pes planusun dikey sıçrama yüksekliği ve kas aktivasyonuna etkisini incelemekti. Çalışmaya 44 cimnastikçi (ortalama yaş, 12.47±4.34 yıl) dahil edildi. Pes planus, bir podoskop kullanılarak değerlendirildi. Kas aktivasyonu, maksimum istemli izometrik kontraksiyon (MIIK) ve dikey sıçrama testi sırasında yüzeyel elektromiyografi cihazı ile ölçüldü. Dikey sıçrama yüksekliği, kontakt mat kullanılarak squat sıçrama yöntemiyle değerlendirildi. Pes planuslu olan ve olmayan cimnastikçilerin gastrocnemius medialis (GM), soleus (S), peroneus longus (PL), tibialis anterior (TA) kaslarının MIIK değerlerinde anlamlı fark bulunmadı (GM p=0.526; S p=0.157; PL p=0.696; TA p=0.223). Pes planuslu cimnastikçilerde, dikey sıçramanın yükselme fazında GM kası; iniş fazında GM ve S kaslarının aktivasyonlarının daha düşük olduğu bulundu (GMyükselme fazı p=0.004; GMiniş fazı p=0.014; Siniş fazı p=0.017). Sonuç olarak, pes planusun dikey sıçrama ve MIIK değerlerine etkisinin olmadığı bulundu. Pes planuslu cimnastikçilerde dikey sıçrama sırasında GM ve S kaslarının aktivasyonunun düşük olduğu gözlendi.

Anahtar Kelimeler: Cimnastik, Pes Planus, Dikey Sıçrama, Kas Aktivasyonu

INTRODUCTION

Gymnastics is an aesthetic olympic branch where systematic and rhythmic movements are performed at high levels in harmony with the body (18). The International Gymnastics Federation has defined 6 disciplines artistic, rhythmic, trampoline, aerobic and acrobatic gymnastics. Trampoline gymnastics include a series or routine of several saltos, twists, and jumps on trampoline. Artistic gymnastics has some different events and requirements between men and women. The six men's events include the floor exercise, pommel horse, still rings, vault, parallel bars, and high bar. Women's artistic events include vault, uneven parallel bars, balance beam, and floor exercise (4,7).

Gymnastics requires a combination of physical fitness components such as speed, agility, strength, balance and flexibility (10). The lower limb muscle function is affected by foot type (13). Deformation of foot arch is important for force transfer and shock absorption, especially in sports including jump or sprint. There is also a specific relationship between arch structure and sports injury (6).

Pes planus is generally defined as a postural disorder caused by lowering or absence of the medial longitudinal arch height of the foot (19). The loads on the foot are not distribute evenly in pes planus. The muscles and other structures compensate unevenly load distribution. Pes planus presents in two forms, defined as rigid or flexible (15,16). The World Health Organisation describes rigid pes planus as a rigid, congenital or spastic deformity of the foot and flexible pes planus as an acquired joint disorder resulting in a valgus foot deformity (28). Pes planus cause several complications such as foot pain, knee pain, low back pain and increase the risk of sport injury. It has been reported that the pes planus was responsible for 60-90% of overuse injuries of the lower extremity. (21, 26).

Jumping is a movement that an individual has made against his or her own body weight. Jumping performance depends on features such as muscle strength, explosive speed, flexibility, body anthropometry and motor coordination (9,17). Jumping is an important motor skill in all gymnastics disciplines and has a decisive role in performance (17). Jumping ability in gymnasts may be affected by lower extremity malalignment such as pes planus (6). Therefore, the aim of the present study was to determine the effect of the pes planus on vertical jump height and muscle activation in gymnasts.

MATERIALS AND METHODS

This is a cross-sectional study. Participants were divided into two groups, athletes with and without pes planus. Forty-four gymnasts aged 8-22 (mean age; 12.47±4.34 years) were included in the study. Gymnasts, who have been training regularly for 2 years (22 artistic and 22 trampoline gymnasts) were participated voluntarily in the study. Gymnasts with acute injuries and a history of lower extremity surgery in the last 6 months were excluded from the study (24). Athletes, their families and coaches were informed about the study. This study was approved by the University Ethical Committee. Sample size analysis was calculated based on a statistical power (1-beta) of 80% and an alpha of 0.05. A sample size of 32 was required for this study (24).

The pes planus was diagnose by photographing the footprint with podoscope (19). The Clarke angle was obtained by calculating the angle between the line connecting the medial edges of the first metatarsal head and the heel and the second line connecting the first metatarsal head (24). Participants were divided into 2 groups according to the Clark angle (<30 with pes planus, ≥30 without pes planus). The dominant leg was determined by as the leg used to kick a ball. Vertical jump height was assessed by the squat jump test using a contact mat (Swift Performance Equipment, Lismore, NSW, Australia). Each participants were asked to stand barefoot for 4 seconds on the mat with their hands touching their hips. Each gymnasts jumped with both feet from a squat position for maximum height and recorded best score of three jump efforts at 30-second intervals (17). The Jack's test is a dorsiflexion test of the thumb. I. MTF joint extension angle is measured by pulling the thumb to passive and active extension (12). The navicular drop test is the difference between the navicular heights measured when the foot is weighted and not (20).

Muscle activation was measured using sEMG (Delsys, USA). Measurements were taken from the dominant extremities of the athletes during vertical jump. For maximum voluntary isometric contraction (MVIC) measurements, the athletes were positioned according to the SENIAM protocol (25). According to SENIAM, the electrodes were placed on the bulge of the muscle for the measurement of gastrocnemius medialis (GM) muscle activation. For soleus (S) muscle activation, electrodes were placed 2/3 of the line between the medial condyle of the femur and the medial malleolus. For tibialis anterior (TA) muscle activation, electrodes were placed on 1/3 of the line between the tip of the tibia and the medial malleolus. To measure peroneus longus (PL) muscle activation, electrodes were placed 1/4 of the line between the head of the fibula and the lateral malleolus. For MVIC measurements, maximum resistance was given to all muscles for 5 seconds and the movement was repeated three times and the highest value was recorded. While measuring the muscle functions of the athletes, the sEMG data during squat jump were analyzed by dividing them into 3 parts as rising phase, staying in the air phase and landing phase. First, the lowest points and peaks of the graph were determined. Delsys Analysis System 4.5.0 application was used in the analysis of the recorded signals. An unprocessed image was recorded from the muscles from which the sEMG signal was received. The sample rate of the signals was then reduced to 1000 Hertz, and then motion artifact was removed with a 20-400 Hertz band-pass filter. The root-square values of the mean squared values of the filtered signals at 0.1 second intervals were calculated. Then, these values were converted into microvolts (μV) and recorded. Analyzes were made by taking into account the signals that the athlete, who was asked to contract the related muscle for 5 seconds isometrically, revealed during the middle 3 seconds for analysis. In order to perform normalization, the MVIC values showing the workload of the muscle were also calculated as %MVIC and recorded as follows.

%MVIC= [Measured value during function (μV) / MVIC measured value (μV)] x 100

Statistical analysis

Statistical analysis was carried out using SPSS (IBM SPSS Statistics for Windows, Version 20.0. IBM Corp., Armonk, N.Y., USA). Data were analysed for the normality of sample distribution with Shapiro-Wilk Test. Independent Sample t-Test and Mann Whitney U Test were used to analyze the differences between the two groups. The relationships between the variables were examined with the Spearman Correlation Coefficient. The significance level was taken as 0.05.

RESULTS

Of the gymnasts participating in the study, 12 were males and 32 were females. According to Clark's angle, pes planus were diagnosed for 7 females and 21 males. Demographic data of gymnasts are given in Table I.

The values of the Clark, navicular drop, I. metatarsophalangeal (MTF) joint extension angles of the participants in the group with and without pes planus are given in Table II.

There was no significant difference between the GM MVIC, S MVIC, TA MVIC and PL MVIC values of the group with and without pes planus (GMMVIC p=0.526; SMVIC p=0.157; TAMVIC p=0.223; PLMVIC p=0.696). (Table III).

A significant difference was observed between the GM rising activation, GM descent activation and S descent activation values between athletes with and without pes planus GMrising phase p=0.004; GMlanding phase p=0.014; Slanding phase p=0.017). (Table IV).

A weak positive correlation was observed between the clark dominant angle values of the participants and the PLMVIC values of the muscles (p=0.048; r=0.3). However, no significant correlation was found between the clark dominant angle values of the participants and the GMMVIC, SMVIC and TAMVIC values (GMMVIC p=0.086; SMVIC p=0.132; TAMVIC p=0.068). (Table V).

The relationship between muscle activation values and clark dominant angle values of athletes with and without pes planus is given in Table VI.

DISCUSSION

This study was carried out to determine the effect of the pes planus on vertical jump height and muscle activation in gymnasts. Our results showed that 63.6% of the gymnasts had flexible pes planus in this study. There was no significant difference between the the gymnasts with and without pes planus for the vertical jump height, but the vertical jump height were approximately 8% higher in the gymnasts without pes planus. Similar to our result, Alexandrovic et al. (1) found that there was no significant difference between the vertical jump height of adolescent individuals with different degrees of pes planus. Mihajlovic et al. (19) evaluated athletes with different degrees of pes planus and they no found a significant relationship between vertical jump height and degree of pes planus. Hu (11) suggested that there was no relationship between the medial arch height of the foot and the vertical jump height in healthy young males. David et al. (8) evaluated the presence of pes planus with the navicular drop test in 105 healthy adults and concluded that there was no difference between the vertical jump heights of individuals with and without pes planus. In our study, the pes planus had not any effect on vertical jump height. This can be explained by the fact that the athletes have flexible pes planus and have not completed their growth and development. Also, gymnastics training consisted of regular ballet and plyometric exercises. Many factors such as anthropometric, physiological and biomechanical characteristics play a role in the jumping action (2). The vertical jump is an explosive activity that requires neuromuscular coordination involving muscles of the ankle, knee, hip joints and trunk (3). To our knowledge, changes in muscle activation can be observed in individuals with pes planus as a result of muscle fatigue following prolonged activity.

In the present study, there was no significant difference between athletes with and without pes planus for muscle activation. To our knowledge, there is no study that divides the vertical jump into phases to examine the activation of the selected muscles during the vertical jump. It was observed that the activation values of GM rising phase, GM landing phase and S landing phase during vertical jump were different from each other in the gymnasts with and without pes planus. In gymnasts without pes planus, it was observed that the GM activation was higher in the rising phase and the activation of the GM and soleus muscles was higher in the landing phase. It was found that the GM and S muscle activations of the group without pes planus were higher than the group with pes planus in the rising and landing phases of the vertical jump; in the landing phase of the vertical jump, the S muscle activation of the group without pes planus was higher than the group with pes planus, and these muscles showed a statistically significant difference between the two groups. The activations of the muscles during the vertical jump may be different (5, 23). It can be explained that the these muscles show greater activation during vertical jump. Other possible explanation for this result is that gymnasts is exposed to loads of similar intensity and duration in the trainings. Moreover, the physical activity, muscle fatigue, and motivation can affect muscle activation (27). Chang et al. (5) compared the muscle activations of young people with and without pes planus during vertical jump and reported that the activations of TA and vastus lateralis muscles of the pes planus group were significantly higher, but the abductor hallucis, gastrocnemius and biceps femoris muscles activation values were significantly lower. Niu et al. (22) observed the muscle activations during landing from different heights in young people and reported that although the S muscle showed earlier activation as the height increased, the TA muscle activated later. Um et al. (27) compared with unilateral and bilateral pes planus and without pes planus. The authors reported that the activation of the rectus femoris, TA, GM and biceps femoris muscles in bilateral pes planus was higher than the other groups, but there was no difference between the groups. Kim and Lee (14) studied the muscle activations in young individuals with and without pes planus on a treadmill at different slopes using EMG. They reported that the TA, vastus medialis, vastus lateralis, PL, GM, gastrocnemius lateralis muscle activations were lower in the group with pes planus than in the group without pes planus.

Our study have several limitations. It can be difficult for young athletes to understand and learn the measurement method. To our knowledge, the learning process should be take longer in order to perform the desired movements correctly. The age range of gymnasts in this study

was wide. The age-related musculoskeletal development level is different, therefore a difference is expected between the activation values of the selected muscles. It is important to measure muscle strength with highly reliable devices in order to reveal whether the height that gymnasts can reach during vertical jump is due to muscle strength or instant activation of the muscle during vertical jump. Also, vertical jump is an explosive activity. Therefore, future studies with camera integration will provide more reliable results to see more clearly the transition time to different phases of jumping. Athletes from two different gymnastic disciplines, which require different skills of their lower extremities, participated in our study. Future studies can be investigated the effect of pes planus with a larger sample and the participation of athletes belonging to only one gymnastics branch.

The results of this study showed that the pes planus had no effect on vertical jump and MVIC parameters. It was observed that the activation of GM and S muscles was low during vertical jump in gymnasts with pes planus. More consistent and objective information can be obtained with different methods to evaluate pes planus in future studies. The effect of the pes planus on performance can be investigated in other sports branches that include jumping activity. In studies based on muscle activation, measuring muscle strength with high-reliability devices will increase the power of the study. Therefore we suggest exercise interventions for improving lower limb muscle strength related to foot deformities.

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Conflicts of Interest

None to declare.

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Table 1. Demographic data of athletes with and without pes planus

	Gruplar	n	$\bar{X}$ ±ss / Median (Min-Max)	t/Z	p
Age (Years) **	With pes planus	28	12.28±4.30	-0.383	0.704
	Without pes planus	16	12.81±4.53		
Height (m) **	With pes planus	28	1.45± 0.182	-0.245	0.807
	Without pes planus	16	1.46±0.169		
Weight (kg) **	With pes planus	28	39.96±16.77	-0.019	0.985
	Without pes planus	16	40.06±16.69		
Body Mass Index (kg/m^2) *	With pes planus	28	18.205(13.19-26.03)	-0.329	0.742
	Without pes planus	16	16.59(13.43-26.03)		

*n: Number of individuals, $\bar{X}$: Arithmetic mean, ss: Standard deviation, p<0,05; t: t value of Independent Sample t-Test, Z: Z value of Mann Whitney U Test, * The results of the independent sample t-test are given with the arithmetic mean and standard deviation values. ** Results of Mann Whitney U test are given with median (minimum-maximum) values.*

Table 2. Examination of Clark, Navicular Drop, I. MTF Extension values of the athletes

Gruplar		n	$\bar{X}$±ss / Median (Min-Max)	t/Z	p
Clark dominant angle (º) **	With pes planus	28	26.95(8.8-29.9)	-5.466	**<0.001**
	Without pes planus	16	31.7(30.5-36.5)		
Clark nondominant angle (º) *	With pes planus	28	24.63±6.62	-3.783	**<0.001**
	Without pes planus	16	30.33±3.35		
Naviküler drop dominant value (cm) **	With pes planus	28	1.13 ± 0.48	-3.737	**<0.001**
	Without pes planus	16	0.61 ± 0.27		
Naviküler drop nondominant value (cm) **	With pes planus	28	1.07 ±0.43	-2.286	**0.022**
	Without pes planus	16	0.73 ± 0.26		
I.MTF Extension active dominant limb angle*	With pes planus Without pes planus	28 16	32.14±5.48 35.56±6.16	-1.903	0.064
I.MTF Extension passive dominant limb angle*	With pes planus Without pes planus	28 16	40.64±5.04 43.81±5.58	-1.927	0.061

*n: Number of individuals, $\bar{X}$: Arithmetic mean, ss: Standard deviation, p<0,05; t: t value of Independent Sample t-Test, Z: Z value of Mann Whitney U Test, * The results of the independent sample t-test are given with the arithmetic mean and standard deviation values. ** Results of Mann Whitney U test are given with median (minimum-maximum) values.*

Table 3. Examination of vertical jump heights and MVIC values of the muscles of the athletes with and without pes planus

	Groups	n	$\bar{X}$±ss / Median(Min-Max)	t/Z	p
Vertical jump height (cm)	With pes planus Without pes planus	28 16	26.9(16.7-28.2) 29.35(17.7-50.9)	-0.817	0.414
GM$_{MVIC}$ (μV) *	With pes planus	28	577.141(204.77-1892,86)	-0.634	0.526
	Without pes planus	16	507.80(378.35-910,04)		
S$_{MVIC}$ (μV) **	With pes planus	28	271±98,16	1.441	0.157
	Without pes planus	16	263±112,11		
TA$_{MVIC}$ (μV) *	With pes planus	28	427.09(213.07-911.72)	-1.220	0.223
	Without pes planus	16	483.54(321.33-849.15)		
PL$_{MVIC}$ (μV) *	With pes planus	28	263.29(120.35-849.22)	-0.390	0.696
	Without pes planus	16	253.69(185.87-575.36)		

*n: Number of individuals, $\bar{X}$: Arithmetic mean, ss: Standard deviation, p<0,05, Z: Z value of Mann Whitney U Test, t: t value of Independent Sample t-Test * Mann Whitney U test results are given with median (minimum-maximum) values. **It is an independent sample t test and the results are given as arithmetic mean±standard deviation. μV:Microvolt cm: Centimeter MVIC: Maximum Voluntary Isometric Contraction*

Table 4. Examination of the activation values of the muscles of the athletes during jumping

	With pes planus Median(Min-Max)	Without pes planus Median(Min-Max)	Z	p
GM rising phase activation (μV)	66.172(43.98-150.64)	95.94(51.02-172.34)	-2.855	**0.004**
GM on air activation (μV)	30.05(2.17-123.25)	37.54(2.93-97.7)	-0.952	0.341
GM landing phase activation (μV)	51.16(20.58-314.08)	85.15(18.72-349.37)	-2.464	**0.014**
S rising phase activation (μV)	106.74(40.60-272.34)	103.2(68.43-260.77)	-0.537	0.591
S on air activation (μV)	28.15(4.42-143.07)	36.72(11.89-211.42)	-1.317	0.188
S landing phase activation (μV)	55.41(12.64-197.51)	108.08(16.45-488.51)	-2.391	**0.017**
TA rising phase activation (μV)	36.9(12.93-89.37)	32.09(13.16-56.29)	-0.927	0.354
TA on air activation (μV)	13.62(1.74-54.57)	17.97(5.96-61.84)	-0.878	0.380
TA landing phase activation (μV)	59.86(16.61-172.93)	61.44(20.79-96.92)	-0.317	0.751
PL rising phase activation (μV)	89.37(39.64-173.52)	85.37(60.64-238.19)	-0.073	0.942
PL on air activation (μV)	36.5(4.29-69.61)	41.69(11.62-109.93)	-0.634	0.526
PL landing phase activation (μV)	67.79(9.09-654.6)	72.7(35.17-358.54)	-1.000	0.317

Table 5. The relationship between the MVIC values of the athletes and the clark dominant angle values

		Clark Dominant Angle		
		With pes planus	Without pes planus	All gymnasts
GM_{MVIC} (μV)	r	-0.288	-0.239	-0.261
	p	0.137	0.374	0.086
S_{MVIC} (μV)	r	-0.251	0.144	-0.230
	p	0.198	0.594	0.132
TA_{MVIC} (μV)	r	0.179	0.11	0.278
	p	0.363	0.684	0.068
PL_{MVIC} (μV)	r	0.381	0.32	0.300
	p	**0.045***	0.228	**0.048***

Spearman Correlation Analysis, p<0,05 μV:Microvolt MVIC: Maximum Voluntary Isometric Contraction

Table 6. The relationship between muscle activation values and clark dominant angle values of athletes

		Clark Dominant Angle		
		With pes planus	Without pes planus	All gymnasts
GM rising phase activation (μV)	r	-0.043	0.165	0.370*
	p	0.829	0.542	**0.013**
GM on air aktivation (μV)	r	0.128	0.508*	0.24
	p	0.515	**0.044**	0.117
GM landing phase activation (μV)	r	0.021	0.093	-0.134
	p	0.916	0.733	0.385
S rising phase activation (μV)	r	0.156	0.236	0.135
	p	0.429	0.38	0.381
S on air activation (μV)	r	0.143	-0.063	0.145
	p	0.468	0.816	0.348
S landing phase activation (μV)	r	0.36	0.436	0.353*
	p	0.06	0.091	**0.019**
TA rising phase activation (μV)	r	0.025	0.523*	-0.028
	p	0.898	**0.038**	0.856
TA on air activation (μV)	r	-0.004	0.088	-0.011
	p	0.985	0.745	0.942
TA landing phase activation (μV)	r	0.015	0.389	-0.035
	p	0.939	0.137	0.821
PL rising phase activation (μV)	r	-0.269	0.361	-0.049
	p	0.166	0.17	0.750
PL on air activation (μV)	r	-0.002	-0.093	0.033
	p	0.99	0.733	0.834
PL landing phase activation (μV)	r	-0.21	0.29	0.025
	p	0.284	0.276	0.874

*Spearman Korelasyon Analizi , *p<0,05 düzeyinde anlamlı . μV:Mikrovolt*

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Analysis of Basketball Trainers Views about Coronavirus-19 Phobia

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Abstract

Quantitative research models were used in the study, which aimed to to assess the phobia related to the coronavirus-19 of basketball coaches working in Turkey Basketball Federation (TBF) and registered to Turkey's Basketball Coaches Association (TÜBAD). 21 women, and 216 men, 237 active basketball coaches in total, who are TÜBAD members at various levels by the Turkish Leagues, participated to the study. While the personal information form developed by the researchers was used to obtain demographic information in the study. The homogeneity and variances of the data were tested, Kolmogorov-Smirnov (KS) test was applied, and it was determined that the data showed normal distribution. Independent Samples t Test was used in pair matches and One Way Anova test was used in multiple comparisons. Results were evaluated at 95% confidence interval and p <0.05 level. Cronbach's Alpha value for the overall scale was determined as .882. According to the results obtained from the findings of the study, no difference was observed in coranavirus 19 phobia values in terms of gender and coaching levels, while statistically significant differences were found in terms of age variables and the status of basketball trainers to practice a different profession besides coaching (p <0.05). It was observed that the differences were not observed in both variables in Somatic, Social, Economic and General Dimensions, but they differed in psychological dimensions and the differences were in favor of lower age groups depending on the age factor. As a result, coronavirus-19 phobia of basketball coaches serving in the Turkey Basketball Federation (TBF) and registered Basketball coach of Turkey's Basketball Coaches Association (TÜBAD) is not related to gender and rank, but young coaches have been determined that most affected group psychologically. Likewise, it was concluded that coaches who did a different profession other than coaching were also adversely affected by the situation and this negative situation might have occurred with the concern of working in multiple groups.
Keywords: Coronavirus-19, Phobia, Basketball coach

Keywords; Basketball, Shoting, Technical Analysis, Performance

INTRODUCTION

According to the information obtained from the data of the World Health Organization, the SARS-CoV epidemic (1) that emerged in 2002 and the H1N1 influenza epidemic in 2009 are the two important pandemics of the last 20 years worldwide. The MERS-CoV epidemic that started in 2012 and has continued until today (2) is another danger that threatens public health. Coronaviruses (CoV) are a large family of viruses that can cause more severe infections such as Middle East Respiratory Syndrome and Severe Acute Respiratory Syndrome, which are common in the society, such as the common cold, and are self-limiting mild infections (1). In December 2019, cases of pneumonia with unexplained occurrence started in Wuhan, China. However, since the etiology of these cases could not be determined, it was recorded as "pneumonia with unknown etiology". The Chinese

Center for Disease Control and Prevention (CDC) has determined that the cause of the disease is coronavirus as a result of intensive studies (3). The novel corona virus 2019 (COVID-19), which starts with symptoms such as fever, weakness, dry cough, muscle pain and shortness of breath and manifests itself within 14 days (2). It has become a global problem that emerged in December 2019 and affected the whole world in a short time. The high value in the ratio of individuals affected by epidemic to those who remain healthy has brought depression, anxiety, stress and fear caused by the Korana virus in people, and has affected countries in many psychological, social, political and economic aspects. The number of deaths due to COVID-19-related causes has reached extremely high values and has also mutated while it has not been fully controlled yet. Visual Capitalist has prepared a detailed list of the riskiest occupational groups that may be exposed to the danger of coronavirus with the data from the Professional Information Network, and the Healthcare workers constitute the highest risk group in this ranking. Flight personnel, barbers, special education teachers, bus drivers, kindergarten teachers and firemen are among the riskiest occupations outside the health sector (1). When looking at the list in the list of professions, a rating of athletes does not attract attention, but at this point, sports trainers or trainers who are in a very close position with people from every profession and even almost every age constitutes the starting point of our research. In the literature reviews, it was concluded that similar epidemics experienced before had serious negative effects and caused fear and anxiety disorders (4). In addition, studies have shown that the COVID-19 epidemic has led to an increase in psychological behavioral disorders such as schizophrenia, anxiety, depression, acute stress disorder anger, alcohol / tobacco use, divorce, and suicidal tendency in societies, including healthcare professionals (5; 6; 7; 8; 9; 10). Sports, whose main purpose is to heal societies in terms of sociological, psychological, and physiological aspects, and which has a common language that unites and integrates societies, is a part of the universal culture that takes its share from this situation and is negatively affected. Therefore, it is also particularly important in terms of health, development and increasing work efficiency (11). Sports activities have also received their share from the precautionary decisions taken within the scope of coranavirus-19. The first measure decision taken regarding the sports competitions in Turkey have been directed to be played without audience. However, all the handball, volleyball, basketball, football and other leagues were postponed immediately (12). In Italy, all educational institutions suspend their educational activities until April 3, 2020 in sports organizations, travel restrictions were imposed, and the Italian National Football League Seria A was suspended until at least 3 April 2020 (13). Germany has closed sports and entertainment centers, theaters, and museums. In China, mass events, including sports competitions, were canceled, and stadiums in the city of Wuhan were turned into mass quarantine centers. Some sports and culture and arts events have also been canceled in France (14). Sports leagues, international sports organizations and multi-branch sports competitions have been postponed or canceled in the world. The matches within the scope of the European Football League were suspended, and EURO 2020 was postponed to a year later. EURO 2020 is an important tournament that emphasizes to the intercultural coexistence and variability of Europe, spanning 12 countries and aiming to improve 60 years of competition. Cancellation of Formula 1 Grand Prix season - China-Vietnam Grand Prix 2020, the Six Nations Rugby Championship in Italy and Ireland, and the world famous and historic horse racing Grand National 2020, the postponement of the French cycling tour, the complete cancellation or postponement of the national championships and world championships, Tokyo 2020 Olympic Games, the center and the stop of this center of a huge sports ecosystem that includes major international events such as postponements, world cup stops and of course the Olympic qualifiers, was postponed by the International Olympic Committee (IOC) (2020) for the first time in its history and the opening ceremony of the games, and The planning to take place on 23 July 2021 (with the participation of approximately 15 thousand athletes, 70 thousand volunteers and 20 million visitors) can be listed as examples of the numerous effects of Covid-19 on sports activities in the field of sports (15). According to the framework drawn by our government for fighting uncertainty caused by Covidi-19 outbreak who has effects in our country and in the world, Turkey Basketball Federation also has been meticulously undertaken a great responsibility from the first moment on. While Turkey Basketball Federation is evaluating all scenarios regarding this sensitive situation, opinions of particularly relevant Ministries FIBA and TBF Board of Health and all our clubs have been taken.

For the reasons that have arisen, in order to prevent the uncertainty from harming our leagues anymore, our Federation Board of Directors has convened today and discussed the related issues. Taking into consideration the future of Turkish basketball, the decisions taken in order to protect the health of the athlete, the manager and the basketball family and which are important for the smooth start of the league organizations are as follows; All basketball leagues have been terminated, No champions will be declared in any league, No relegations / promotions in the statuses announced before the season will be applied, The ranking of the leagues and the representation rights of the clubs in the European cups will be determined according to the legislation and will be announced in the coming days, The next season's league structures, club financial audit and license shall be determined in accordance with the relevant legislation (16).

Therefore, every institution, organization or person producing sports-related goods or services has suffered great losses since the beginning of the epidemic process and has been extremely damaged by the material and spiritual matters. The fact that COVID-19 can be transmitted easily, is not self-limiting, and the appropriate treatment has not yet been found has caused great uncertainty and caused fear and anxiety to spread not only at the individual but also at the social level. Many situations with uncertainty can cause panic behavior and anxiety. Therefore, such a prediction suggests that a pandemic may cause an increase in the number of patients experiencing anxiety disorder and fear (17). About the fear of coronavirus, Üsküdar University Founding Rector Psychiatrist Prof. Dr. Nevzat Tarhan says, "At the moment, we can say that a new disease related to coronavirus has emerged. It may be called coronaphobia. This will definitely have psychological and social consequences. At the same time, there is a disease called misophobia in psychiatry. This is the fear of germs. Fear of germs was normally found in the society to a certain extent. Now we anticipate that this rate will increase. Phobias are socially restrictive ailments. Under normal circumstances, in such threatening situations, we say 'there is stress, no panic' in healthy people. These people turn stress into an uncontrollable stress and become panicked. If the coronavirus is in an uncontrollable state of stress, avoidance behaviors occur in the person. Avoidance behaviors also restrict the person socially in individual behaviors. This disease is not deadly like coronavirus, but it causes serious disability in the person. The person may have problems with family relationships, social contacts, a simple meeting, or leaving home. In fact, people with this type of phobia, for example, cannot even go to the bathroom and walk around the house with socks" (14). In this study, it is seen that coranavirus-19, which makes daily life challenging socially, economically, and spiritually, will remain in our lives longer as "coronaphobia".

MATERIAL and METHOD

The quantitative research model was used in this study. While using the personal information form created by the researchers to obtain socio-demographic information; In order to determine coronavirus phobia, Arpaci et al. The Coronavirus-19 phobia Scale, which was developed by and whose validity and reliability study was conducted, was used (18). Ethics committee approval was obtained from Selcuk University Faculty of Sport Sciences Non-Invasive Clinical Research Ethics Committee with the decision number E-4099040478-050.99-34701 and resolution number 43.

Population of the study and sample group

TÜBAD member coaches serving in various stages of Turkish leagues consisted the population of the study, while the sample group of 21 women members of 216 men, a total 237 active basketball coaches consisted the sample group.

Coronavirus-19 Phobia Scale

In the Coronavirus-19 phobia Scale developed by Arpaci et al. and the validity and reliability studies have been concluded, each item was subjected to a five-point Likert-type grading and participants' participation levels regarding the items were scored as (1) Strongly Disagree, (2) Disagree, (3) Undecided, (4) Agree, and (5) Totally Agree.

Analysis of Data

The homogeneity and variances of the data were tested, Kolmogorov-Smirnov (KS) test was applied, and it was determined that the data showed normal distribution. Independent Samples t Test was used in pair matches and One Way Anova test was used in multiple comparisons. Results were evaluated at 95% confidence interval and $p < 0.05$ level. For this study, the Cronbach's Alpha value for the sub-dimensions was determined as .724 for the Psychological dimension, .717 for the Somatic dimension, .738 for the social dimension, .646 for the economic dimension, and .882 for the whole scale.

RESULTS

Table 1. Covid (19) phobia changes due to gender factor

Gender	n	%	General		Psychological		Somatic		Social		Economic	
			x	Ss	x	Ss	x	Ss	x	Ss	x	Ss
Women	21	8,86	49.24	13.96	19.10	4.44	8.38	3.12	13.86	5.76	7.90	3.82
Man	216	91.14	46.86	12.75	17.83	5.08	8.24	3.39	13.08	4.13	7.70	2.91
		t	.752		1.098		.188		.601		.235	
		p	.419		.231		.842		.431		.769	

As can be seen from Table 1, no statistical change was observed in the dimensions of Covid (19) phobia of basketball trainers depending on gender.

Table 2. Covid (19) phobia changes due to a working in a different profession factor

Different Professions	n	%	General		Psychological		Somatic		Social		Economic	
			x	Ss	x	Ss	x	Ss	x	Ss	x	Ss
No	132	55.70	47.51	13.20	18.51	4.94	7.89	3.50	13.31	4.36	7.80	3.21
Yes	105	44.30	46.51	12.43	17.24	5.08	8.70	3.14	12.95	4.20	7.63	2.70
		t	.590		1.935		-1.831		.638		.426	
		p	.553		.049 *		.065		.522		.664	

As can be seen in Table 2, there is no statistical change in Somatic, Social, Economic and General dimensions depending on the factor of doing different professions in addition to basketball coaching of basketball trainers, it is also was determined to be statistically significant in Psychological dimension in coaches doing different professions compared to coaches those whose only profession is coaching ($p < 0.05$).

Table 3. Covid (19) phobia changes due to age factor

Age	n	%	General		Psychological		Somatic		Social		Economic	
			x	Ss	x	Ss	x	Ss	x	Ss	x	Ss
20-24	13	5.49	51.46	13.42	20.69 [a]	3.57	8.62	3.52	14.46	4.56	7.69	3.22
25-29	44	18.57	49.20	14.07	19.27 [a]	5.12	7.89	2.90	13.59	4.98	8.45	2.91
30-34	37	15.61	45.84	14.19	17.43 [b]	6.02	8.43	3.31	12.86	5.05	7.11	2.50
35-39	37	15.61	47.14	10.62	18.22 [b]	4.45	7.92	2.71	13.03	3.44	7.97	2.88
40 and over	106	44.73	46.05	12.48	17.14 [b]	4.80	8.41	3.76	12.95	3.95	7.55	3.17
		F	.936		2.603		.337		.521		1.211	
		Sig.	.444		.037 *		.853		.720		.307	

[a, b] = Significant difference between groups ($p < 0.05$).

As can be seen in Table 3, while there was no statistical change between age groups in Somatic, Social, Economic and General dimensions, it was determined that 20-24 and 25-29 age group trainers were statistically higher in psychological dimension compared to other age groups ($P < 0.05$).

Table 4. Covid (19) phobia changes depending on the ranking factor

Level Ranking	n	%	General		Psychological		Somatic		Social		Economic	
			x	Ss	x	Ss	x	Ss	x	Ss	x	Ss
E	33	13.92	48.64	13.34	18.48	5.17	8.76	3.45	13.70	5.03	7.70	2.80
D	51	21.52	48.67	13.73	18.96	5.46	8.06	3.05	13.59	4.27	8.06	3.04
C	71	29.96	47.24	13.58	17.94	4.97	8.25	2.97	13.04	4.73	8.00	3.12
B	31	13.08	45.45	13.88	16.74	4.95	8.74	5.11	12.74	3.47	7.23	3.72
A	51	21.52	45.20	9.67	17.31	4.54	7.80	2.82	12.76	3.60	7.31	2.33
		F	.713		1.265		.615		.448		.764	
		Sig.	.584		.285		.652		.774		.550	

As can be seen from Table 4, no statistical change was observed in the dimensions of Covid (19) phobia depending on the Level ranking of basketball trainers.

CONCLUSION

As a result, coronavirus-19 phobia of basketball coaches serving in the Turkey Basketball Federation (TBF) and registered Basketball coach of Turkey's Basketball Coaches Association (TÜBAD) is not related to gender and rank, but young coaches have been determined that most affected group psychologically. Likewise, it was concluded that coaches who did a different profession other than coaching were also adversely affected by the situation and this negative situation might have occurred with the concern of working in multiple groups.

DISCUSSION

The fear of being infected by coranavirus-19 has become a global problem, and it has destroyed humanity psychologically as well as economic and social concerns. As a result, efforts have been made by experts around the world to assess the impact of stress, anxiety, depression, and fear for it. Research in databases such as PubMed, Scopus, and Google Scholar (until May 15, 2020) has revealed five new scales published (22). Coronavirus Anxiety Scale (CAS) (19). Obsession with COVID-19 Scale (OCS) (20), COVID-19 Fear Scale (FCV-19S) (21), COVID Stress Scales (CSS) (22), and Threat Perception from COVID-19 Questionnaire (23). Self-report and Likert type scales attract attention in almost all scales. A clinical grade scale to measure psychological problems related to coranavirus-19 infection has not been seen (24). Moreover, in general, all of the scales were developed before the peak period of the pandemic, and therefore the scales used to determine the post-peak anxiety, fear or stress values may be useful but not sufficient in terms of results (25). In the study, the phobias that coranavirus-19 may have caused by professional trainers actively working in clubs were Analyzed by Arpaci et al. (2020) using the Coronavirus-19 Phobia Scale in terms of gender, doing different professions, age and ranking factors. Since there has not been enough research on this subject, the results of the research have been discussed in limited numbers and with similar studies. According to the results obtained from the research findings, no statistical difference was found in terms of gender and rank factors. In a study conducted on dentists by Rusyan et al. (2020), it was concluded that the perceived anxiety level associated with COVID-19 is not a significant value in terms of gender despite the high risk of infection (26).

Mirzeoğlu and Çetinkanat (2005) reported in their study that there was no statistically significant difference between the anxiety levels of female and male elite athletes (27).

Barbosa et al. (2020) found significant differences in favor of women in terms of fear between men and women in a study they conducted on medical and non-medical personnel working in a hospital in Mexico, and they associated their results with higher fear and emotional scores of women (28). In the studies conducted on athletes in the literature, it has been reported that the anxiety levels of female athletes are higher than that of men (29). In his study, Batu (2020) found that there was a significant difference in favor of female athletes according to the gender variable, while examining the anxiety of swimming athletes to get a new type of Corona Virus (Covid-19) (30). Frost and Henderson (1991) (31) conducted a study on female football players and as a result stated that women's anxiety levels were quite high. Sakaoğlu et al. (2020) (32) studied the level of anxiety during the COVID-19 outbreak and found higher scores in women compared to men, depending on the gender factor. There are also different studies investigating anxiety levels and in which women have higher anxiety scores than men (33; 34; 35; 36). In the results of the research, we conducted on four different variables, the coranavirus-19 phobia levels of basketball trainers showed statistical differences in relation to age factor and the factor of doing a different profession. While a difference was found in the psychological dimension in both factors, no significant difference was found in the other dimensions. The difference determined depending on the age factor was observed in the 20-24 and 25-29 age range, and the result was interpreted as the coaches in younger age group may have greater socialization anxiety than others. In addition, it is possible to say that as individuals ages increase, they are less affected by the causes that trigger phobia or anxiety; however, they can be more successful in emotional control.

It is thought that the age factor is effective in having some phobias. However, (Erbaş and Küçük 2012) conducted a study on high-level basketball players and when analyzed the ages in chronological order, no difference was found (47). Likewise, Türkçapar (2012) studied wrestlers and stated that

their anxiety levels did not differ according to age (38). In a study of n Bingöl H et al. 2012, Aktaş 2009, Develi 2006, Ekşi 2006 and Tekkoyun 2008, it was stated that there was no difference between age and anxiety levels (39; 40; 41; 42; 43).

Hacıcaferoğlu et al. (2015) reported that folk dancers between the ages of 20-22 and 17-19 have higher anxiety levels than those in the older age group and their anxiety level decreases with age (44).

When fear or phobia is mentioned, a tendency to flee or fight in the face of a situation involving danger and threat comes to mind in individuals, and most of the time, anxieties appear as factors that feed fears. In our study, especially active professional trainers were focused on phobia levels and coranavirus-19 phobia levels were investigated. Considering that there is not enough research on this subject yet, it is expected that the research results of the article will contribute to the development of new guidelines in this field at the theoretical level.

Conflict of Interest: The authors have no conflicts of interest to declare.

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Investigation of the Relationship Between Goal Orientation and Life Satisfaction of Tennis Players Participating in Local Tournaments

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Abstract

This study was conducted to investigate the relationships and differences between the goal orientations and life satisfaction of tennis players. A total of 80 athletes, 66 men and 14 women, participated in the Silifke Municipality Sports Club 2021 spring tennis tournament voluntarily. The personal information form developed by the researchers to reach the data of the study, the 13-question "Duty and Ego Orientation Scale in Sports (SGEYÖ)" developed by Duda in (4) the Turkish adaptation of Toros in, (15) the developed by Larsen and Griffin (11), The 5-question "Satisfaction with Life Scale", which was adapted into Turkish by Yetim (21) was used. According to the research result; The inter-variable relations of all participants are presented as correlation coefficients. Here, when the significance relationships in terms of double-ended evaluation are examined, there is a significant relationship between ego orientation scores and task orientation scores ($r=0,238$; $p<0,05$). In addition, age variable and task orientation scores ($r=-0,407$; $p<0,01$) and life satisfaction scores ($r= 0,266$; $p<0,05$) there is a significant relationship between. There is no significant relationship between other variables. ($p>0,05$).

Keywords; Goal orientation, life satisfaction, tennis players

INTRODUCTION

To teach, which is target-oriented, stimulating and educational, to continue on a long journey with historical and theoretical foundations. Especially in the last thirty years, goal orientation theory has been frequently researched as a popular research topic in the fields of achievement motivation and academic motivation and has taken its place in the literature (17). In order for the individual to form a correct integrity with herself and her social environment, it is necessary to determine and satisfy her basic psychological needs. In addition, it is expected that the social environment she is in should support the orientation and behavior of the individual, that is, contribute to the individual in this process (19).

According to Duda and Nicholls (5), ego orientation; Goals that refer to others in sports, such as doing better than others, standing out more, and ranking higher than others. Task orientation, on the other hand, refers to "self-referenced goals" such as performing better than before, learning new things, and mastering a task (5). These two goal orientations are related to the athlete's skill level (13). Task-oriented and ego-oriented behavior dimensions determine the athlete's goal orientation to the extent that they exist in every athlete and these dimensions manifest themselves (7).

It is known that exercise not only adds physical health and vitality to individuals, but also creates positive effects spiritually and mentally. The effect of sports on well-being and indirectly on life satisfaction

becomes more evident as researches in the fields of science, medicine and psychology increase. It is a generally accepted idea that physical vitality and energy-filled life through activities will feed positive emotions and make the individual feel fulfilled (15).

Achievement goal orientations are determined according to the shape of the individual's situation and manifest themselves in the axis of individual differences (8). He commitment of the athlete to her goals can be described as a basic element in success motivation (3).

Although there are not many studies on the relationship between goal orientation and life satisfaction of athletes, the available data show that many factors can affect the relationship between life satisfaction and an individual's task and ego orientation. In another study, Genç et al. in veteran athletes, it was determined that there was a significant difference between the ego orientation sub-dimension and gender, age and sports age variables, and between the task orientation sub-dimension and the gender variable. It was found that there was no relationship between orientation and orientation. Toy's (17) in his study on wrestlers, a significant relationship was found between life satisfaction and task orientation sub-dimension in freestyle wrestlers, a significant relationship between task orientation and ego orientation in free style, Greco-Roman style and all wrestlers, and a significant relationship between task orientation sub-dimension and life satisfaction in all wrestlers.

The aim of this research is to examine the relationship between goal orientations and life satisfaction of tennis players. In addition to the characteristics of the variables in terms of tennis players, comparison of various variables in terms of goal-oriented (task and ego) and life satisfaction levels constitute the focus of the research.

MATERIAL and METHOD

This study was approved by Selcuk University Sports Sciences Ethics Committee (Approval number: 2021-108)

A total of 80 tennis players voluntarily participated in this study. Of the participants, 66 were men and 14 were women. In addition to the personal information form developed by the researchers, the Task and Ego Orientation Scale in Sports adapted to Turkish by Toros 2001 and the Life Satisfaction Scale adapted to Turkish by Yetim 1991 were applied to the participants in 2021.

The data obtained from the participants were transferred to the SPSS 25.0 program and it was determined whether there were missing and incorrect data entries. After the analysis of the data, the total scores of the participants' goal orientation and life satisfaction were calculated, and parametric tests were preferred because the obtained data did not deviate excessively from the normal distribution. Descriptive statistical analysis was made for the demographic information of the students participating in the research, and independent groups t-test was used for two independent groups. One-way analysis of variance (ANOVA) for multiple groups, Tukey's multiple comparison test was used to determine from which groups this difference originated in cases where a significant difference was found in multiple comparisons.

FINDINGS

Athlete's both task and ego orientation; It is thought that the sense of realizing the desired goal in the sports environment and the necessity to go to the result together due to the nature of the sport, push the athlete to act task-oriented at the same time. The sense of having a share in the achievements of the team and the feeling of having a greater say in these achievements may cause the athletes to behave in an ego- and task-oriented manner (10).

It is a generally accepted idea that physical vitality and energy-filled life with activities will feed positive emotions and make the individual feel satisfied with her life. In this respect, it is stated that physical exercises have emotional benefits, develop positive self-concept, increase self-esteem and self-efficacy, nourish positive body image, reduce physiological and psychological stress, and improve feelings of enjoyment and fun (20). However, the level of the relationship between self-esteem, self-concept and sports has not been fully revealed yet (15).

Goal orientation, on the other hand, brings with it life satisfaction as an evaluation that deals with the life of the individual holistically. In this sense, goal orientation and life satisfaction are expressed as the comparison and interpretation of current living standards with the expected living standards of individuals. If the life conditions expected by the individual are close to each other, the individual's goal orientation and life satisfaction level may increase (17).

RESULTS

Table 1. The mean and standard deviations of tennis players' ego angle, location area and life satisfaction scores according to gender.

	Gender	n	$\overline{X}$	ss	t	df	p
EGO ORDER	Male	66	4,0649	,64191	0,764	78	0,447
	Female	14	3,9082	,92685			
TASK ORDER	Male	66	2,9495	1,06256	1,438	78	0,154
	Female	14	2,5119	,87819			
LIFE SATISFACTION	Male	66	4,6636	1,37412	-0,442	78	0,660
	Female	14	4,8429	1,40368			

Male in Table 1 (ego=4,06±0,64) and Female (ego=3,90±0,92) there is no significant difference between the mean scores of ego orientation. (p=0,447). Male (ego=2,94±1,06) and Female (ego=2,51±0,87) there is no significant difference between the mean scores of task orientation (p=0,154). Male (ego=4,66±1,37) and Female (ego=4,84±1,40) there is no significant difference between the mean scores of life satisfaction (p=0,660).

Table 2. The mean and standard deviations of tennis players' ego orientation, task orientation and life satisfaction scores by age variable.

	Age	n	$\overline{X}$	ss	F	p	Post-Hoc
EGO ORDER	18-25	27	3,9735	,71652	1,465	,221	-
	26-33	13	3,7692	,66122			
	34-41	11	4,2597	,62538			
	42-49	15	4,3048	,50034			
	50 and above	14	3,9490	,85275			
	Total	80	4,0375	,69569			
TASK ORDER	18-25(a)	27	3,2099	1,08466	3,495	**,011***	a>e b>e
	26-33(b)	13	3,2051	,98872			
	34-41(c)	11	2,8030	1,18044			
	42-49 (d)	15	2,7667	,78376			
	50 and above (e)	14	2,0833	,75036			
	Total	80	2,8729	1,04108			
LIFE SATISFACTION	18-25	27	4,1556	1,57903	2,408	,057	
	26-33	13	4,8308	1,24592			
	34-41	11	4,6727	1,48667			
	42-49	15	5,4533	1,04599			
	50 and above	14	4,8143	,91640			
	Total	80	4,6950	1,37204			

One-way analysis of variance in Table 2 (ANOVA) according to the results of the age variable and ego orientation scores [F=1,465; p>0,05] and life satisfaction scores [F=2,408; p>0,05] there is no significant difference between the groups in terms of. Task orientation scores [F=3,495; p<0,05] there is a significant difference in terms of. It is seen that the task orientation scores of the 18-25 and 26-33 age group participants are significantly higher than the participants aged 50 and over.

Table 3. The mean and standard deviations of tennis players' ego orientation, task orientation and life satisfaction scores according to sports age variable.

	Sports Age	n	$\overline{X}$	ss	F	p	Post-Hoc
EGO ORDER	1-3	25	3,9029	,83780	,898	,470	-
	4-6	17	4,2605	,53029			
	7-9	8	4,2321	,63401			
	10-12	11	4,0000	,42857			
	13 and above	19	3,9549	,76347			
	Total	80	4,0375	,69569			
TASK ORDER	1-3	25	2,8333	1,11285	2,236	,073	
	4-6	17	2,9804	1,10536			
	7-9	8	3,3750	1,11181			
	10-12	11	3,3030	,77753			
	13 and above	19	2,3684	,83440			
	Total	80	2,8729	1,04108			
LIFE SATISFACTION	1-3	25	4,6720	1,55765	,965	,432	
	4-6	17	4,1647	1,61127			
	7-9	8	5,0250	,99964			
	10-12	11	4,9091	1,26606			
	13 and above	19	4,9368	1,01774			
	Total	80	4,6950	1,37204			

In Table 3, sports age variable and ego orientation scores according to one-way analysis of variance (ANOVA) results [F=0,898; p>0,05], task orientation scores [F=2,236; p>0,05] and life satisfaction scores [F=0,965; p>0,05] there is no significant difference between the groups in terms of.

Table 4. The mean and standard deviations of tennis players' ego orientation, task orientation and life satisfaction scores according to the educational status variable.

	Educational Status	n	$\overline{X}$	ss	F	p	Post-Hoc
EGO ORDER	High School	14	3,6735	,76096	2,415	,096	-
	Licence	57	4,1103	,69201			
	Graduate	9	4,1429	,45175			
	Total	80	4,0375	,69569			
TASK ORDER	High School	14	2,7024	1,09813	1,650	,199	
	Licence	57	2,9942	1,03364			
	Graduate	9	2,3704	,90821			
	Total	80	2,8729	1,04108			
LIFE SATISFACTION	High School	14	4,4857	1,31433	,413	,663	
	Licence	57	4,6947	1,40311			
	Graduate	9	5,0222	1,34330			
	Total	80	4,6950	1,37204			

Educational status variable and ego orientation scores according to one-way analysis of variance (ANOVA) results in Table 4 [F=2,415; p>0,05], task orientation scores [F=1,650; p>0,05] and life satisfaction scores [F=0,413; p>0,05] there is no significant difference between the groups in terms of.

Table 5. Correlation Coefficients of Relationships Between Variables of Tennis Athletes

		EGO ORDER	TASK ORDER	LIFE SATISFACTION	AGE	SPORTS AGE
EGO ORDER	Pearson Correlation	1	,238*	,085	,054	-,084
	Sig. (2-tailed)		,034	,456	,636	,457
	N	80	80	80	80	80
TASK ORDER	Pearson Correlation	,238*	1	-,082	-,407**	-,191
	Sig. (2-tailed)	,034		,472	,000	,089
	N	80	80	80	80	80
LIFE SATISFACTION	Pearson Correlation	,085	-,082	1	,266*	,114
	Sig. (2-tailed)	,456	,472		,017	,314
	N	80	80	80	80	80

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

As seen in Table 5, the inter-variable relations of all participants are presented as correlation coefficients. Here, when the significance relationships in terms of double-ended evaluation are examined, there is a significant relationship between ego orientation scores and task orientation scores (r=0,238; p<0,05). In addition, age variable and task orientation scores (r=-0,407; p<0,01) and life satisfaction scores (r= 0,266; p<0,05) there is a significant relationship between. There is no significant relationship between other variables (p>0,05).

DISCUSSION AND CONCLUSION

The aim of this research is to determine the types of goal orientations and life satisfaction levels of tennis players participating in local tennis tournaments. For this purpose, the findings regarding the relationships between the variables of gender, age, sports age and educational status, ego orientation sub-dimension of goal orientation, task orientation sub-dimension scores and life satisfaction scores were discussed within the framework of research purposes.

According to the statistical findings obtained in the study, no significant difference was found between the goal orientation sub-dimension, (ego orientation and task orientation) scores and life satisfaction average scores of tennis players in the variables of gender, sports age and educational status. The studies of Üngür (18), Toy (17), Kara et al. (9) are in line with our research findings.

As a result of the statistical findings obtained in the study, a significant difference was found according to the ANOVA results in the comparison of the task orientation scores of tennis players, one of the sub-dimensions of goal orientation, according to the age variable.

According to the results, task orientation scores of tennis players aged 18-25 and 26-33 were found to be significantly higher than tennis players aged 50 and over. It is interpreted as the task orientation score increases as the age decreases, and the task orientation score decreases as the age increases. At the same time, there is a highly negative relationship between task orientation scores and the age variable. In similar studies in the literature, it is stated that there is a significant difference between task and ego orientations and age. Duda 1992 (5), Flores et al. the studies of 2008 (6), Cavdarlı 2013 (1) are in line with our research findings. These results are in parallel with the results of the age variable ANOVA in the Pearson correlation table, and it can be said that task orientation behavior is higher in young people.

According to the future of the students obtained in the research, the life satisfaction test will be an important person in her age. According to this result, as the age increases, the level of life satisfaction increases, and as the age decreases, the level of life satisfaction decreases. In the study conducted by Toros (14) when the life satisfaction scores of basketball players according to age are examined, it is seen that older athletes have more life satisfaction than younger athletes. Tabuk (12) reported that there is a significant positive correlation between the age of

the athletes and their life satisfaction. When the results obtained in this sense are examined, it is thought that the relationship of life satisfaction with age may show parallelism with the sense of satisfaction and experience in life areas in a context.

According to the statistical findings obtained in the study, no significant relationship was found between the task and ego orientation sub-dimension of tennis players and their life satisfaction. Toros (15), Toros et al. (16) and Toy (17) reached a similar conclusion with our research by revealing that there is no significant relationship between task and ego-oriented goals and life satisfaction in their studies.

Considering that the group in our research is tennis players participating in local tournaments and they play tennis mostly for recreational purposes, the fact that the athletes do not have an irreparable competition pressure in recreational sports types where there is no performance competition, helps to develop a positive commitment rather than negative mental pressure and anxiety. It can be interpreted as creating a positive effect on creativity, happiness and health (20).

As a result, according to the results of Pearson correlation test, there is a positive and significant relationship in the sub-dimensions of goal orientation, ego orientation and goal orientation. According to this result, as the task-oriented behavior increases, the ego-oriented behavior also increases.

Similar results were obtained with the negative relationship between task orientation and age in the Pearson correlation test results, and the relationship between the results obtained in the t-test table and the relationship between task orientation and age variable. According to this result, Pearson correlation test results and t test results support each other.

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Anxiety of Caught New Type Coronavirus (Covid-19) in Professional Soccer Players

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Abstract

The aim of this study was to investigate the anxiety of catching a new type of coranavirus (Covid-19) in professional soccer players. soccer players 188 including 42 professional soccer players from the Turkish Super League, 32 players from the TFF 1st League, 41 players from the 2nd League, and 73 players from the 3rd League were voluntarily participated in this study . Average age of the players is 25.04 ± 4.831 years; average height of the players is 180.11 ± 6.246 cm; average body weight of the players is 75.23 ± 6.118 kg,; average sports age of the players is 12.82 ± 4.256 years. In this study evaluating the anxiety of professional soccer players about catching Covid-19, the level of anxiety of soccer players about getting Covid-19 was compared according to the status of being caught and not caught, the leagues they played and their game positions. No significant difference was found in the cases of the soccer players catching or not getting Covid-19. The change between the leagues in which the players play does not make any sense. When the anxiety of catching Covid-19 was examined according to the playing positions, a statistical significance was found in the comparison of the social anxiety scores according to the positions played by the players. In conclusion, while there was no significant relationship between the soccer players catching and not getting Covid-19, and their anxiety about catching Covid-19 for the leagues they played, the anxiety levels of catching Covid-19 were statistically significant to the game positions.

Key Words: Covid-19, Soccer, Anxiety, Pandemia

Özet

Bu çalışmanın amacı, profesyonel futbolcularda yeni tip koranavirüse (Covid-19) yakalanma kaygısını araştırılmasıdır. Çalışmaya, yaşları ortalaması 25,04 ± 4,831 yıl, boyları ortalaması 180,11 ± 6,246 cm, vücut ağırlıkları ortalaması 75,23 ± 6,118 kg, spor yaşları ortalaması 12,82 ± 4,256 yıl olan ve Türkiye Süper Liginden 42, TFF 1. Liginden 32, 2. Ligden 41, 3. Ligden 73 profesyonel futbolcu gönüllü olarak katılmıştır. Profesyonel futbolcuların Covid-19'a yakalanma kaygısının degerlendirilmesi amacıyla yapılan bu çalışmada, futbolcuların Covid-19'a yakalanma ve yakalanmama durumları,oynadıkları ligler ve oyun posizyonlarına göre Covid-19'a yakalanma kaygı düzeyleri karşılaştırılmıştır. Futbolcuların Covid-19'a yakalanma ve yakalanmama durumlarında anlamlı bir fark bulunmamıştır (P>0,05). Futbolcuların oynadıkları ligler arası degişimin herhangi bir anlamlılık oluşturmamaktadır. Oyun pozisyonlarına göre Covid-19'a yakalanma kaygıları incelendiginde sosyal kaygı puanlarının futbolcuların oynadıkları mevkilere göre karşılaştırılmasında, istatiksel bir anlamlılık bulunmuştur (P<0,05). Sonuç olarak, futbolcuların Covid-19'a yakalanma ve yakalanmama durumları, oynadıkları ligler için Covid-19'a yakalanma kaygıları arasında anlamlı bir ilişki bulunmazken oyun posizyonlarına göre Covid-19'a yakalanma kaygı düzeyleri istatiksel olarak anlamlı bulunmuştur.

Anahtar Kelimeler: Covid-19; Futbol ; Kaygı; Pandemi.

INTRODUCTION

The spread of the new type of coronavirus (Covid-19), emerging towards the end of 2019, happened by a unexpected speed all over the world. Millions of people worldwide have become infected with Covid-19 and died (19). Covid-19 has infected more than 186 million people in more than 200 countries around the world, causing nearly 4 million deaths as of July 2021. (16). As a result of the increase of Covid-19 worldwide and the occurrence of the pandemic process, the World Health Organization (WHO) has declared a "Public Health Emergency". As the pandemic spreads all over the world, the accompanying fears and anxieties also spread (19). Ornell et al. (17) revealed that the fear caused by a pandemic could increase the levels of stress and anxiety in a healthy individual. Moreover, it might increase them in the individuals with pre-existing psychological disorders. Johnson & Mueller (11) stated in their study that catching a virus or bacterial infection had some consequences including worry, anxiety and fear. Furthermore, examining the studies related to Covid-19, it can be stated that psychological and emotional symptoms, including panic, anxiety and stress, rise (7, 12, 4). Covid-19 has affected sports as well as many areas. In many countries, sports competitions had to be postponed, played without spectators or even cancelled. Athletes under quarantine, coaches and managers, canceled sports competitions, postponed organizations were faced with many negative situations. The world of sports has encountered many adverse conditions consisting of quarantined athletes, coaches and managers, canceled matches, postponed organizations, and others (23). Suspensions of sports activities, cancellation or postponement of organizations have also negatively affected the athletes psychologically and socially (21,18). Increasing cases have also increased the anxiety of catching Covid-19 in athletes (9). Consequentially, it is predicted that the anxiety of catching Covid-19 in athletes may affect their performance in sports competitions. The interruption of the training processes of the athletes due to the new type of COVİD-19, the fear of poor performance, the anxiety, the stress and the emotional confusion resulted by the epidemic also influence the anxiety levels (3). In spite of all the negative statements about anxiety, it is known that if the anxiety level is kept optimal, it will affect performance positively. Yerkes & Dodson (26) theorized that the relationship between anxiety-arousal and performance is not linear but inverted U-shaped. Therefore, the aim of this study is to examine the anxiety of catching the new type of coronavirus (covid-19) in professional soccer players.

METHOD

Subjects

A total of 188 soccer players, 23 goalkeepers, 30 central defenders, 37 full-backs, 63 central midfielder, 17 side midfielder and 18 forwards were examined. These soccer players were playing in different leagues of Turkey 42 professional soccer players from Turkish Super League, 32 professional soccer players from TFF 1st League, 41 professional soccer players from 2nd League, 73 professional soccer players from 3rd League voluntarily participated in the study. The mean age was 25.04 ± 4.831 years, height was 180.11 ± 6.246 cm, body weight was 75.23 ± 6.118 kg, and sports age was 12.82 ± 4.256 years. The study was approved by an ethics board and met the conditions of the Helsinki Declaration. The study protocol was also approved by the Board of Ethics of the Selcuk University, Sport Science Faculty in Konya.

Procedures

Survey method was used as data collection tool in the study. Questionnaire prepared by the Tekkursun et al. (24) consisted of two sections. 'Personal Information Form' in the first part and 'Athletes Anxiety of Caught New Type of Coronavirus (Covid-19) Inventory' in the second part were located. Questions were prepared by using 'Google Forms' so that it helps the soccer players reach to the questionnaires easier. Introductory text of the questionnaire and online form link were sent to the soccer players through e-mail and text message. Questionnaire remained as open access for three weeks, the questionnaire then was stopped when data entry was over and data set was made ready for the statistical analysis.

Personal Information Form

Participants were asked to respond the questions such as age, size, body weight, sports (soccer) age, the status of being caught in the Covid-19 outbreak, playing position, league played during coronavirus.

Athletes Anxiety of Caught New Type of Coronavirus (Covid-19) Inventory

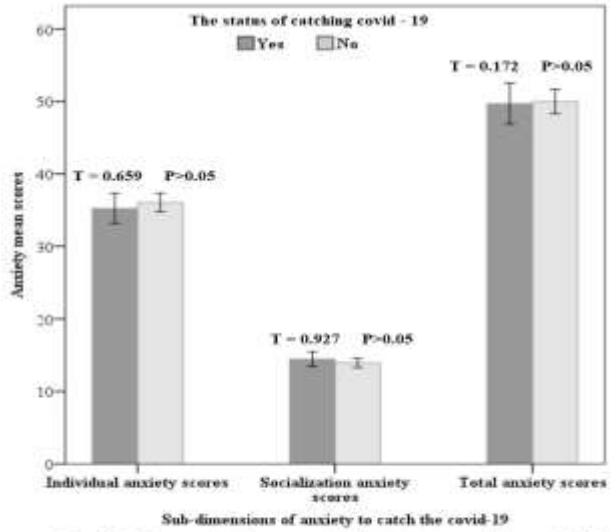
It is a Likert type self-assessment inventory created by Tekkursun et al. (24) consisted of 15 questions and scored between 1-5.There are individual anxiety (item: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11),

socialization anxiety (item: 12, 13, 14, 15) and total score subscales. Each item contains five short answer options to assess severity. It is a 5-point Likert type scale. Evaluation is made as; 1 'I don't agree at all' - 2 'I do not agree' - 3 'I am undecided' - 4 'I agree' - 5 'I totally agree'. Validity and reliability study Tekkursun et al. (2020) found the Cronbach Alpha reliability (internal consistency) score of the individual anxiety subscale to be 0.90, Cronbach Alpha reliability (internal consistency) score of the socialization anxiety subscale to be 0.84 and Cronbach Alpha reliability (internal consistency) score of the total anxiety score subscale to be 0.92.

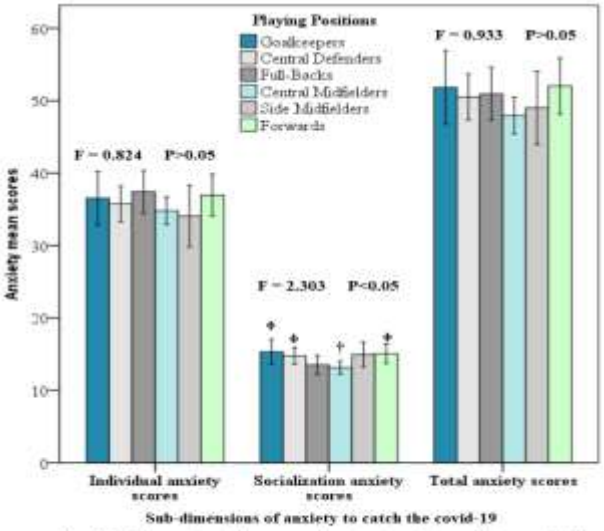
Statistical Analyses

SPSS IBM 22 Statistics program were used for statistical analysis. The continuous variables of the study are presented in mean ± standard deviation and categorical variables were presented in frequency (percentage). The Kolmogorov Smirnov test was applied to examine whether the variables show normal distribution. Independent Samples T test was used to determine the differences between social anxiety and total anxiety score with the situation of caught Covid-19. Mann-Whitney U test was used to determine the differences between individual anxiety and the situation of caught Covid-19. In addition, the ANOVA test was used to comparative of the scores obtained from the subscales of the Athletes Anxiety of Caught New Type of Coronavirus (Covid-19) Inventory according to the playing positions and league levels. The data obtained in this study were tested at a confidence interval of 0.95.

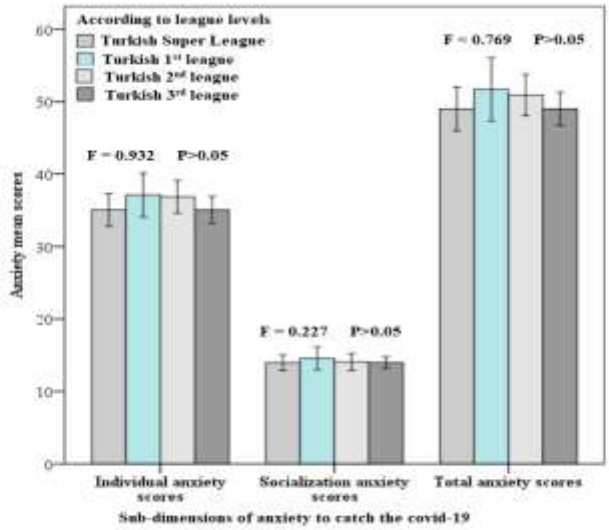
RESULTS



Graphic 1. Comparation the soccer players' of anxiety to catch the covid - 19 according to the status of catching covid - 19.



Graphic 2. Comparison the soccer players' of anxiety to catch the covid-19 according to playing positions.



Graphic 3. Comparison the soccer players' of anxiety to catch the covid-19 according to league levels.

We found that aren't significantly differences according to status of catching covid-19 and playing league in sub-dimensions of anxiety to catch the covid-19 (Graph 1 and 3). At the same time, when the individual anxiety and total anxiety scores of the football players were compared according to the playing positions of the footballers, it was found that there was no significant difference. On the other hand, the socialization anxiety scores of the central midfielders, which is one of the sub-dimensions catching of the Covid-19, were found to be lower than the socialization scores of the goalkeepers, center defenders and strikers (Graph 2).

DISCUSSION

In this study aiming to investigate the anxiety of professional soccer players about catching the COVİD-19, no difference was found in terms of individual, social and total anxiety scores between soccer players who have been caught with Covid-19 before and those who have never been caught. Likewise, there is no difference in anxiety scores according to the league levels of the soccer players. However, although there was no difference between player positions in terms of individual anxiety scores and total anxiety scores, it was observed that social anxiety scores changed significantly in player positions.

During the pandemic, fear of the high risk of infection has impacted the coping potential and performance of elite athletes. Accordingly, it is also stated that there is a relationship between decreased performance and increased anxiety (2). Furthermore, it is emphasized in the literature that anxiety reduction techniques such as breathing exercises for physiological anxiety or mental exercise using imagery for cognitive anxiety should be taught to athletes with high anxiety (25). In a study conducted on amateur soccer players during the Covid-19 process, it was found that there was a low level of positive significance between the psychological performance level and situational anxiety levels of amateur soccer players (1). In another study, which included elite soccer players with and without Covid-19, the anxiety levels of soccer players were examined and it was found that the anxiety levels of elite soccer players who had Covid-19 were found to be positively significant compared to those who did not (10). Çiftçi & Demir (3) examined the fear and anxiety levels of professional soccer players playing in Turkish leagues during the social isolation process of the Covid-19 pandemic, and found a statistical difference between the perceived stress scores of the participants playing soccer in the Super league, TFF 1st league and TFF 2nd league (F=3.822; p= 027) and inadequate self-efficacy perception scores (F=4.441; p=016). Though, their study revealed that there was no difference between Covid-19 fear scores and anxiety scores. The scores of the perceived stress scale ($p<0.05$) and inadequate self-efficacy perception subscale ($p<0.05$) of the participants playing soccer in the super league were found to be statistically higher than the participants' playing in the TFF 2nd league. Esteves et al., (8) investigated the anxiety levels in professional soccer teams during the COVID-19 epidemic in their study. They determined that the duration of the application and the experience of the athletes had a negative relationship with the anxiety components. Additionally, it was observed that the levels of state-trait anxiety were high and close to each other, with only a 5% difference between them. In a study conducted in France to investigate differences in anxiety and motivation to return to sports among elite groups of soccer players with different levels and training habits during the COVID-19 quarantine period, athletes were found to have high levels of anxiety during quarantine. Furthermore, it has been reported that soccer players having an injury before the quarantine process started have higher cognitive anxiety scores to return to the soccer matches that will start after the quarantine compared to the players who did not have any injuries (20). During the COVID-19 epidemic, elite soccer players were found to have lower anxiety states compared to non-elite soccer players (5, 6). In another study conducted to determine the anxiety of competition, the anxiety of catching COVID-19 and the relationship between these two in professional soccer players, it was observed that there was a significant relationship between COVID-19 stress and COVID-19 anxiety (14). In the COVID-19 epidemic, it was determined that there was a weak relationship between fear of COVID-19 and competitive anxiety in professional soccer players during the return to competitions (15). In another study, it was examined whether there was a connection between the mean scores of the Covid-19 anxiety scale and the ages of the athletes participating in the study, and as a result of the study, it was seen that young athletes had better psychological skills (22). In another study, it was observed that soccer players playing at professional level were less affected by the factors affecting their anxiety levels as

their age progressed, and it was determined that they could control their emotions better (13).

In conclusion, when the anxiety levels of both the soccer players playing in different leagues and the soccer players having or not caught the corona virus before were examined, it was seen that they had similar anxiety levels, and this situation is thought to be caused by playing soccer at a professional level. Moreover, it is thought that the central midfielders have a lower social anxiety of catching Covid-19 since their movement directions are related to all positions, and thereby, the social characteristics of these players are developed. In other words, their developed social features due to their position have influenced the anxiety of catching Covid- 19. In addition, it is thought that goalkeepers have higher social concerns about catching Covid-19, as they are less in touch with other positions due to their position.

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Examination of Secondary School Students' Brand Awareness, Brand Loyalty, Brand Functions, and Factors Affecting Brand Loyalty According to Levels of Playing Team and Individual Sports

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Abstract

This research aims to determine the brand awareness, brand loyalty, brand functions, factors affecting brand loyalty and the preference criteria for product purchase (sports shoes) of secondary school students who do team and individual sports, and to determine whether these criteria make a difference according to the sports branches they play (team and individual). The sample of the study consists of a total of 250 students [n(male=185), n(female=65)], 150 of whom play team sports (football, volleyball, basketball, handball, folk dances) [n(male=118), n(female=32)] and 100 of whom play individual sports (taekwondo, kickboxing, badminton, fitness, wrestling, fencing) [n(male=67), n(female=33)], studying at high schools affiliated to the Konya Provincial Directorate of National Education in the first half of the 2019-2020 academic year. The mean age of the students participating in the research is 16.48±1.16, and the income level of their families is 2393.12 TL. It can be said that the income level of the families of the students participating in the research as of the period of application of the scales is at the level of the minimum wage. 34.8% (n=87) of the students participating in the research were in the 9th Grade, 27.2% (n=68) in the 10th Grade, 29.2% (n=73) in the 11th grade, and 8.8% (n=22) in the 12th grade. As data collection tools in the research, Brand Awareness Scale, Brand Loyalty Scale, Brand Functions Scale, Factors Affecting Brand Loyalty Scale, and Preference Criteria in Product Purchase Scale were used, which were translated into Turkish by Erdoğdu (2012) by making use of many studies in the literature and whose validity and reliability studies were conducted after language validity was ensured. As a result of the research, it was determined that the mean score of the students, who play team sports, from the related scales is higher than the students, who play individual sports. It was determined that the mean score of the students, who play team sports, from the Brand Awareness and Brand Loyalty Scale is significantly higher than the students who play individual sports, and it was also revealed that compared to the students playing individual sports, the mean scores of the students, who play team sports, from the "image function and social function" sub-dimensions of the Brand Functions Scale were significantly higher, that their mean scores from the "diversity/innovation seeking" sub-dimension of the Factors Affecting Brand Loyalty Scale were significantly higher, and that their mean scores from the "well-known brand/high image criterion, innovative/fashionable criterion, and social circle/friend criterion" sub-dimensions of the Scale of Preference Criteria for Product Purchase (Sports Shoes) were significantly higher.

Keywords: Sports Marketing, Brand Awareness, Brand Loyalty, Secondary Education Students, Team Sports, Individual Sports.

INTRODUCTION

The trademark (9), which means "a special name or sign that is used to identify a commercial good and to distinguish it from its like", is a concept aimed at giving an advantage to that product or service.

When the brand is consumed, it makes individuals and various social groups feel a sense of passion, and individuals or groups attribute a whole of meaning to that brand and that brand takes on the quality of value (10). The common point of almost all brand definitions, which are not very different from each other in the relevant literature, is customer perception (3).

Changes in the field of marketing, changes in the conditions in the markets in which businesses operate, cause an increase in the demands and needs of consumers and consumers expect an added value. Due to the aggravation of competition conditions and in order for the business to be in a sustainable position in this intense period, businesses aim to create a brand and expand it to reach the consumer. Businesses try to create a quality perception in the minds of consumers by giving a meaning to the product they offer, even if it is not visible (5). A bond is formed between the brand and the business. The purpose of the products offered by the brands is to affect the consumer emotionally and psychologically. The more people prefer the brand, the more it benefits the size of that brand (4). In addition to contributing to the satisfaction of tangible needs such as tangible-physical product features for consumers, brands also have important functions in terms of meeting their psychological side needs (3).

Brand functions are important to firms as they play a major role in consumers' response to brand-related marketing activities (6). In the related literature, the functions of the brand in terms of consumers have been handled differently by the researchers. In this study, the functions of the brand in terms of consumers were examined in three dimensions as image, marking/classic and social function.

The concept of brand awareness means not only the recognition of brands by name or image, but also the recognition of their perceptual images as brand identities (2). Brand awareness perceptions of young people begin in childhood. Creating brand awareness among young consumers, whose importance is increasing in terms of marketing, and the brand gaining a strong place in their memories play an important role in the long-term success of brands (2).

Brand loyalty, in its most basic sense, is the promise to repurchase a preferred product or service on a consistent basis in the future (7). According to another definition, brand loyalty is the intention perceived to maintain relationships with a particular brand and supported by various behaviors (8).

Brand loyalty in sports can be expressed as loyalty to a sports product, and it has a special importance for various sports organizations, especially for sports teams. According to Gladden and Funk (2001), there are two obvious reasons why brand loyalty is so important to sports teams. First, brand loyalty allows fans and indirectly the media to follow the team consistently, even when the team's performance is disrupted. The second is that brand loyalty enables possible product extensions different from the core product [Cited by Erdoğdu (3)]. Beech and Chadwick (2007) stated that brand loyalty is important and unique for sports teams due to the very low probability of loyalty passing to an rival team (1).

As a result, the high interest of the young target audience, who will be the consumers of the future, towards the brands, giving importance to the brand in their purchases (especially in the products they use and perceive as high importance) and the conclusion by studies that brand habits acquired at an early age continue until adulthood (2) make it necessary to investigate the brand loyalty behaviors of young consumers and their determining/influencing factors.

In the light of this information, it was aimed to examine the brand awareness, brand loyalty, brand functions and the factors affecting the brand loyalty of secondary school students according to their level of playing team and individual sports.

MATERIALS AND METHODS

Population and Sample

The sample of the study consists of a total of 250 students [n(male=185), n(female=65)], 150 of whom play team sports (football, volleyball, basketball, handball, folk dances) [n(male=118), n(female=32)] and 100 of whom play individual sports (taekwondo, kickboxing, badminton, fitness, wrestling, fencing) [n(male=67), n(female=33)], studying at high schools affiliated to the Konya Provincial Directorate of National Education in the first half of the 2019-2020 academic year. The mean age of the students participating in the research is 16.48±1.16, and the income level of their families is 2393.12 TL. It can be said that the income level of the families of the

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Data Collection Tools

As data collection tools in the research, Brand Awareness Scale, Brand Loyalty Scale, Brand Functions Scale, Factors Affecting Brand Loyalty Scale, and Preference Criteria for Product Purchase Scale were used, which were translated into Turkish by Erdoğdu (2012) by making use of many studies in the literature and whose validity and reliability studies were conducted after language validity was ensured.

Brand Awareness Scale: is a scale, which is a five-point Likert type ("1=strongly disagree", "5=strongly agree"), and composed of 5 statements (for example, "I usually buy brands from famous companies", "well-known brands are best for me") and one dimension, and it was developed to determine the brand awareness of secondary school students in general without considering any product group.

Brand Loyalty Scale: is a scale, which is a five-point Likert type ("1=strongly disagree", "5=strongly agree"), and composed of 6 statements (For example, "all kinds of sneakers I own are from the same brand", "when my sneakers get old, I will buy the same brand of sneakers") and one dimension, and it was developed to determine the brand loyalty behaviors of secondary school students in sports shoes.

Brand Functions Scale: is a scale, which is a five-point Likert type ("1=strongly disagree", "5=strongly agree"), and composed of 14 statements [For example, "become cooler among my friends thanks to the "brand-name products" I use(image function)", "I think "brand" indicates which company produced the product(marking/classic function)", "I am usually interested in the same kinds of sports as my friends who use the same "brands"(social function)"] and 3 sub-dimensions [Image function(7th,8th,9th,10th,11th,14th Items), marking/classic function(1st,2nd,3rd,4th,6th Items), social function(5th,12th,13th Items)], and it was developed to determine the perceived brand functions of secondary school students without considering any product group.

Factors Affecting Brand Loyalty Scale: is a scale, which is a five-point Likert type ("1=strongly disagree", "5=strongly agree"), and composed of 13 statements [For example, "I'm so used to my current sneakers, I'm too lazy to try another brand(brand habit)", "if a new sneaker brand comes out, I will try that brand(diversity/innovation approach)", "I believe my current sneaker brand is the right choice(emotional commitment to the brand)", "I only buy the sneakers I like at the time of sale(sensitivity to price cuts and promotions)"] and 4 sub-dimensions [Brand habit(3rd,8th,9th,11th Items), diversity/innovation approach(2nd,4th,5th Items), emotional commitment to the brand(1st,10th,13th Items), sensitivity to price cuts and promotions(6th,7th,12th Items)], and it was developed to determine the factors affecting the brand loyalty of secondary school students in sports shoes.

Preference Criteria for Product Purchase Scale: is a scale, which is a five-point Likert type ("1=strongly disagree", "5=strongly agree"), and composed of 23 statements [For example, "It must be suitable for my foot health(Functionality Criterion)", "It must be a well-known brand(well-known brand/high image criterion)", "It must be fashionable among young people(innovative/fashionable criterion)", "it must be a shoe that my friends will also like(social circle/friend criterion)"] and 4 sub-dimensions [Functionality Criterion(3rd,4th,5th,6th,7th,10th,23rd Items), well-known brand/high image criterion(1st,2nd,12th,13th,17th,20th,21st,22nd Items), innovative/fashionable criterion(14th,15th,16th,18th,19th Items), social circle/friend criterion(8th,9th,11th Items)], and it was developed to determine the preference criteria of secondary school students in the purchase of sports shoes (3).

Analysis of the Data

During the analysis of the data, the frequency and percentage distributions describing the personal characteristics of the secondary school students constituting the sample of the study were determined in accordance with the purposes of the research. The arithmetic mean and standard deviation values of the answers given by the secondary school students, who play team and individual sports, to the scales were calculated and the direction of their distribution was determined.

Whether the data showed a normal distribution was examined with the Kolmogorov-Smirnov test,

and since the data showed normal distribution as a result of this examination, the comparison of the means of the students playing team and individual sports from the scales was tested with the parametric test (t-test). α=0.05 was chosen for the level of significance in the study.

RESULTS

Table 1. n, and SD Values of the Students who Play Team Sports and Individual Sports from the Scales of Brand Awareness, Brand Loyalty, Brand Functions, Factors Affecting Brand Loyalty and Preference Criteria for Product Purchase

		Students Playing Team Sports			Students Playing Individual Sports		
		n	$\overline{X}$	SD	n	$\overline{X}$	SD
Brand Awareness Scale		150	**3.36**	0.91	100	**3.07**	0.84
Brand Loyalty Scale		150	**3.30**	0.92	100	**3.06**	0.85
Brand Functions Scale	Image Function	150	**2.85**	1.11	100	**2.39**	1.00
	Marking/Classic Function	150	**3.55**	0.98	100	**3.47**	0.90
	Social Function	150	**2.84**	1.01	100	**2.57**	0.92
Factors Affecting Brand Loyalty Scale	Brand Habit	150	**2.96**	0.85	100	**2.91**	0.73
	Seeking Diversity/Innovation	150	**3.03**	0.84	100	**2.77**	0.84
	Emotional Commitment to the Brand	150	**3.52**	1.01	100	**3.41**	0.86
	Sensitivity to Price Cuts and Promotions	150	**2.99**	0.81	100	**3.00**	0.80
Preference Criteria for Product Purchase (Sports Shoes) Scale	Functionality Criterion	150	**3.94**	1.12	100	**3.89**	1.02
	Well-Known Brand/High Image Criterion	150	**3.39**	0.85	100	**3.00**	0.81
	Innovative/Fashionable Criterion	150	**3.51**	0.93	100	**3.14**	0.93
	Social Environment/Friend Criterion	150	**3.52**	0.96	100	**3.24**	0.89

It was determined that the mean scores of the answers given by the students playing team sports to the questions of Brand Awareness [⌀=3.36] and Brand Loyalty Scale [⌀=3.30] include the option "Doesn't matter", that their mean scores from the "marking/classic function" sub-dimension of the Brand Functions Scale include the option "Agree [⌀=3.55]" and their mean scores from the sub-dimensions of "image function [⌀=2.85] and social function [⌀=2.84]" include the option "Doesn't matter", that their mean scores from the "emotional commitment to the brand" sub-dimension of the Factors Affecting Brand Loyalty Scale include the option "Agree [⌀=3.52]" and their mean scores from the sub-dimensions of "brand habit [⌀=2.96], seeking diversity/innovation [⌀=3.03] and sensitivity to price cuts and promotion [⌀=2.99]" include the option "Doesn't matter", and that their mean scores from the sub-dimensions of "functionality criterion [⌀=3.94], innovative/fashionable criterion [⌀=3.51], and that their mean scores from the social circle/friend criterion sub-dimension of the Preference Criteria for Product Purchase (Sports Shoes) Scale include the option "Agree [⌀=3.52]" and their mean scores from the sub-dimension of "well-known brand/high image criterion [⌀=3.39]" include the option "Doesn't matter".

It was determined that the mean scores of the answers given by the students playing individual sports to the questions of the Brand Awareness [⌀=3,07] and Brand Loyalty Scale [⌀=3.06] includes the option "it doesn't matter", that their mean scores from the "marking/classic function" sub-dimension of the Brand Functions Scale include the option "Doesn't matter [⌀=3,47]", and their mean scores from the sub-dimensions of "image function [⌀=2.39] and social function [⌀=2.57]" include the option "Don't agree", that their mean scores from the "emotional commitment to the brand" sub-dimension of the Factors Affecting Brand Loyalty Scale include the option "Agree [⌀=3.41]" and their mean scores from the sub-dimensions of "brand habit [⌀=2.91], seeking diversity/innovation [⌀=2.77] and sensitivity to price cuts and promotion [⌀=3.00]" include the option "Doesn't matter", and that their mean scores from the functionality criterion sub-dimension of the Preference Criteria for Product Purchase (Sports

Shoes) Scale include the option "Agree" [◎=3.89]" and their mean scores from the sub-dimensions of "well-known brand/high image criterion [◎=3.00],

innovative/fashionable criterion [◎=3.14] and social circle/friend criterion [◎=3.24]" include the option "Doesn't matter".

Table 2. t Test Results of the Students who Play Team Sports and Individual Sports from the Scales of Brand Awareness, Brand Loyalty, Brand Functions, Factors Affecting Brand Loyalty and Preference Criteria for Product Purchase

		Sports Branch	n	$\overline{X}$	SS	t	P
Brand Awareness Scale		Team Sports	150	3.36	0.91	2.475	**0.014***
		Individual Sports	100	3.07	0.84		
Brand Loyalty Scale		Team Sports	150	3.30	0.92	2.076	**0.039***
		Individual Sports	100	3.06	0.85		
Brand Functions Scale	Image function	Team Sports	150	2.85	1.11	3.355	**0.001***
		Individual Sports	100	2.39	1.00		
	Marking/Classic Function	Team Sports	150	3.55	0.98	0.654	0.514
		Individual Sports	100	3.47	0.90		
	Social Function	Team Sports	150	2.84	1.01	2.177	**0.030***
		Individual Sports	100	2.57	0.92		
Factors Affecting Brand Loyalty Scale	Brand Habit	Team Sports	150	2.96	0.85	0.478	0.633
		Individual Sports	100	2.91	0.73		
	Seeking Diversity/Innovation	Team Sports	150	3.03	0.84	2.389	**0.018***
		Individual Sports	100	2.77	0.84		
	Emotional Commitment to the Brand	Team Sports	150	3.52	1.01	0.893	0.373
		Individual Sports	100	3.41	0.86		
	Sensitivity to Price Cuts and Promotions	Team Sports	150	2.99	0.81	-0.021	0.983
		Individual Sports	100	3.00	0.80		
Preference Criteria for Product Purchase (Sports Shoes) Scale	Functionality Criterion	Team Sports	150	3.94	1.12	0.343	0.732
		Individual Sports	100	3.89	1.02		
	Well-Known Brand/High Image Criterion	Team Sports	150	3.39	0.85	3.593	**0.000***
		Individual Sports	100	3.00	0.81		
	Innovative/Fashionable Criterion	Team Sports	150	3.51	0.93	3.075	**0.002***
		Individual Sports	100	3.14	0.93		
	Social Circle/Friend Criterion	Team Sports	150	3.52	0.96	2.259	**0.025***
		Individual Sports	100	3.24	0.89		

As can be seen in Table 2, mean scores of the students playing team sports from the Brand Awareness [t(248)=2.475; P<0.05] and Brand Loyalty Scale [t(248)= 2.076; P<0.05] was found to be significantly higher than the students playing individual sports, and it was also revealed that compared to the students playing individual sports, the mean scores of the students, who play team sports, from the "image function [t(248)=3,355; P<0,05] and social function [t(248)=2,177; P<0,05]" sub-dimensions of the Brand Functions Scale were significantly higher, that their mean scores from the "diversity/innovation seeking [t(248)=2,389; P<0,05]" sub-dimension of the Factors Affecting Brand Loyalty Scale were significantly higher, and that their mean scores from the "well-known brand/high image criterion [t(248)=3,593; P<0,05], innovative/fashionable criterion [t(248)=3,075; P<0,05], and social circle/friend criterion [t(248)=2,259; P<0,05]" sub-dimensions of the Scale of Preference Criteria for Product Purchase (Sports Shoes) were significantly higher.

DISCUSSION

In this study carried out to determine the brand awareness, brand loyalty, brand functions, factors affecting brand loyalty and the preference criteria for product purchase (sports shoe) of secondary school students who play team and individual sports, and to identify whether these criteria make a difference according to the sports branches they play (team and individual), the following results have been achieved:

The brand phenomenon has become an important value that empowers the product or

service in the global trade market. With globalization, the brand has gone beyond being a concept used only for a product or service. It is seen that the brand phenomenon is more closely related to tangible values. What we call a brand stands out as a material value. It is seen that there are many studies in the related literature to determine brand loyalty, brand functions, and variables that affect brand loyalty. Generally, the approach in these studies is to investigate whether brand loyalty, perceived brand functions, and the variables affecting brand loyalty make a significant difference according to the gender, age, and whether or not they do sports.

In this study, by adopting a different approach, it is aimed to determine whether the participants' status of playing team and individual sports affect their brand awareness, brand loyalty, brand functions, factors affecting brand loyalty and preference criteria in product purchase.

The party that generally benefits from the brand phenomenon is the sports clubs operating in team sports. As a matter of fact, successful sports clubs, which are among the actors of the global economy, have now become brands. Football clubs such as Real Madrid, Barcelona and Manchester United are sports clubs with fans from all over the world. Such strong sports clubs benefit from brand communication at a high level. To give an example, fans from all parts of the world strive to identify with such sports clubs by providing visibility with the jerseys of sports clubs. Sports clubs that stand out with their team sports can also strengthen their bonds with their fan bases at the other end of the world through social networks. In this process, it is seen that the sports clubs that collect the most income are the clubs that stand out in team sports. The fact that sports clubs that have been successful in the fields of football, basketball and volleyball in Turkey also come to the fore in being a brand, and that sports clubs that have been successful in the field of football, basketball and volleyball around the world show themselves as brands, can explain the relationship between the success of these clubs and being a brand (10).

In parallel with the explanations in the related literature, in the present study, it was determined that secondary school students' perceived brand functions, brand awareness levels in general, brand loyalty, variables affecting brand loyalty, and their perceptions of preference criteria in product purchase differed in favor of those who play team sports according to the variable of playing team and individual sports.

In other words, it was determined that secondary school students who do team sports have higher approaches *"they usually buy the brands of famous companies, the best ones are well-known brands, they would prefer to buy an expensive branded product instead of buying an unbranded cheap product, all kinds of sports shoes they have are from the same brand, they can recommend the sports shoe brand to everyone around them, there is no way that they will give up their sports shoe brand, when their sports shoes get old, they will buy the same brand of sports shoes again, they feel cooler among their friends thanks to the branded products they use, they have a different place in the eyes of their friends, they get on well with their friends who use the same brand, they are generally interested in the same type of sports branches with their friends who use the same brands, They listen to the same kind of music, they follow the same fashion in clothing, they pay attention to the fact that it is a well-known brand and a brand that they have known for a long time, they should be excited when they wear the shoes, it should have a high image, it should be fashionable among young people, it should be a brand that suits them and their friends will like, etc."* than secondary school students who do individual sports.

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Relationship Between Soccer-Specific Skills and Skill-Related Fitness in Adolescent Soccer Players

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Abstract

The purpose of this study was to examine the relationship between soccer-specific skills and skill-related fitness in adolescent football players. Thirty male soccer players (age: 15.86 ± 0.69 years; football experience 7.10 ± 1.70 years) were recruited from a soccer team. Soccer players performed both soccer-specific skill tests and skill-related fitness tests. Soccer-specific skill tests included the Loughborough soccer passing test, Yeagley soccer test, Mor–Christian general soccer ability skill test, and the skill-related fitness tests consisted of the alternate-hand wall-toss test, countermovement jump test, sport-specific core muscle strength and stability plank test, pro-agility test, 20-m sprint test, and lower-quarter Y balance test. Pearson product-moment correlation analyses revealed a moderately positive correlation among the Mor–Christian general soccer ability skill test score (dribbling), pro-agility test score ($r = 0.44$, $p = 0.01$), and 20-m sprint time ($r = 0.43$, $p = 0.01$). There were no correlations among other variables for both the soccer-specific skill tests and skill-related fitness tests. Based on the findings of the study, we conclude that dribbling drills in soccer should be supported by agility and sprint exercises to increase dribbling speed by soccer trainers and soccer players.

Key words: Motor fitness, Dribbling, Passing, Ball control, Team-based ball players

INTRODUCTION

In recent years, soccer games have become extremely popular because of their explosive, short intermittent activities that can change game scores suddenly, such as changes in direction, sprinting, jumping, and kicking the ball (28). Another factor that explains why soccer is so popular worldwide is that it is stochastic, acyclical, and intermittent with uniqueness through its variability and unpredictability (4). A player's success in soccer depends on a complex multidimensional performance that is influenced by technical, tactical, physical, anthropometric, and mental factors (15).

Physical fitness may be the most important determinant of sports performance (14). Physical fitness is defined as the capacity to perform daily activities with vitality and sharpness, without undue fatigue, while appreciating the recreation time interests and facing unpredicted emergencies (25). Physical fitness components are classified as health- and skill-related fitness (14). Body composition, cardiorespiratory fitness, muscular strength, muscular endurance, and flexibility comprise health-related fitness, whereas skill-related fitness consists of speed, agility, power, balance, coordination, and reaction times (9,14).

Some researchers have argued that morphological and physical characteristics and tactical and technical skills successfully discriminate soccer players by competitive level, position, and talent identification (3,9). Kokstejn et al. (16) concluded that the lack of a direct relationship between skill-related fitness and specific technical skills, such as speed dribbling, in prepubescent soccer players. Aslan & Ersöz (2) also reported that there is no correlation between skill-related fitness and soccer-specific skills in amateur soccer players 19–30 years of age.

During the last two decades, technical and tactical skills and physical fitness have been frequently explored and identified as key determinants of young players' game performance, serving as discriminants between elite, subelite, and non-elite youth soccer players (11,15,16, 19,24), but contradictory results (2,3,9,15,16) make it difficult for soccer coaches and other sports-related individuals (e.g., talent agents, sports club managers) to apply the results involving the relationship between skill-related fitness and skill-related fitness research. Therefore, the purpose of this study was to examine the relationship between soccer-specific skills and skill-related fitness in adolescent football players. We hypothesized that there is a significant negative or positive relationship between soccer-specific skills and skill-related fitness.

MATERIAL & METHODS

Procedures

Soccer-specific skill tests and skill-related fitness tests were led on two consecutive days by the same researcher at the same time of day (5.30–7.30 PM). Body mass and height were measured on the first test day, as well as results on the alternate-hand wall-toss test, lower-quarter Y balance test, 20-m sprint test, pro-agility test, countermovement jump test, and core muscle strength and stability plank test. On the second day, players performed the Loughborough soccer passing test (LSPT), Yeagley soccer test, and Mor–Christian general soccer ability skill test. Each test session initiated with a warm-up consisting of 5 min of jogging and 5 min of dynamic stretching exercises. Each test was performed twice with 90-s intervals, and statistical analyses were performed to determine the best score. A 3-min rest period was offered to the players between the tests.

Study population

Thirty male soccer players were recruited for the study from the youth system of the xxxx football team, which competes in the Turkish Regional Amateur League. This study was conducted in accordance with the ethical standards of the Declaration of Helsinki and was approved by the xxxxxxxx University Ethics Committee (2020.171.07.04). The players and their parents received a verbal explanation of the experimental design and signed an informed consent form before participating in this study. The inclusion criteria were as follows: a) soccer experience of at least 5 years, b) playing soccer in the youth system, c) participation in soccer training regularly, and d) being free from any musculoskeletal injuries or cardiovascular and neurological disorders. Players who did not participate in team soccer training for more than 3 months for any reason were excluded from the study. Players were informed that they should avoid heavy training or exercise, taking sedatives, and using supplements before the tests. The players were also instructed to continue their normal food consumption, fluid intake, and sleep patterns.

Measurements

Body mass was measured using a digital balance scale with a foot-to-foot bioelectrical impedance system (Tanita, BC 545 N). Height was measured using a calibrated portable stadiometer (Mesilife 13539).

Skill-related fitness tests

Alternate-hand wall-toss test: The alternate-hand wall-toss test is used to measure coordination, in which the subject throws a ball from one hand using an underarm action against the wall at a certain distance from the wall and attempts to catch the ball with the opposite hand. The total number of repetitive actions was recorded for 30 s. In this study, the distances were set to 2.0 and 1.2 m, which formed the basis for division into two groups. First, the ball was thrown with the right hand and caught with the left hand, and the ball was then thrown with the left hand and caught with the right hand; this was recorded as a single action (7)

Lower-quarter Y balance test: The dynamic balance of the players was evaluated using the Y-balance test via Functional Movement Systems (Lynchburg, VA, USA). All participants performed the test without wearing their shoes. They were permitted two practice trials before recording the

true measurements corresponding to their dominant leg. Leg length was measured from the inferior tip of the anterior superior iliac spine to the distal end of the medial malleolus (17). The lower-quarter Y balance test was used to examine the maximum reach of the lower extremity of the dominant leg in the anterior, posteromedial, and posterolateral directions while the participant maintained a unilateral stance with the opposite leg centered on a platform. According to the standardized protocol, a trial was considered invalid if the participant (i) failed to maintain a unilateral stance; (ii) landed on the reaching foot; (iii) failed to return to the starting position, such as by removing the hands from the hips; or (iv) pushed or kicked the indicator to increase distance. Three trials were repeated for each direction, and the examiner recorded the maximum reach score (17). The normalized composite score was calculated by summing the maximum reach in each of the 3 directions, and then dividing this value by 3 times the leg length for that side. The leg length was standardized to the right leg and measured from the inferior tip of the anterior superior iliac spine to the distal end of the medial malleolus (6).

Twenty-meter sprint test: The subjects performed a 20-m sprint, and the time was recorded using a photocell gate (Newtest Powertimer 300-series, Oy, Finland). The test initiated with the subject in a standing position and with the front foot placed 0.2 m from the first photocell gate (10).

Pro-agility test: The test initiated with the subject in a neutral stance. Thereafter, the subject was instructed to sprint to either the dominant or non-dominant side first and to touch a cone that was placed 5 m away from the starting point. Subsequently, they were asked to run to the opposite side, touch the farthest cone at 10 m, and perform a 5-m sprint toward the finish line (10). The time was recorded using photocell gates (Newtest Powertimer 300-series, Oy, Finland).

Countermovement jump test: The countermovement jump height was measured using a Myotest Pro system accelerometer (Myotest SA, Switzerland). After recording the body mass of the players using the device, the device was attached to the belt and fixed vertically. The subjects were instructed to reach the maximum jump height when they perceived the acoustic signal sounds. The participants maintained their hands on their hips before and during the jump, with their legs maintained straight during the flight phase of the jump (8). The players were instructed to be approximately equal to 90 °at the knee joint for each jump condition (22).

Sport-specific core muscle strength and stability plank test

The sport-specific core muscle strength and stability plank test, covering a period of 180 s, was used to observe the core strength and core stability development of the athletes. The time between test initiation and until the athlete became tired and/or disrupted his/her posture was recorded in seconds (23).

Soccer-specific skill tests

All soccer-specific tests were performed with ball number 5. The soccer ball used in professional leagues and the FIFA World Cup is referred to as "size 5" (5). During the soccer-specific skill tests, the timed trials were recorded using a stopwatch (Casio, HS-80TW-1DF)

LSPT

The LSPT is a reliable and valid test used to assess the multifaceted aspects of soccer skills including passing, dribbling, ball control, and decision making (18). In the present study, the LSPT was used to evaluate the players' passing skills, and the test was performed in compliance with the study of McDermott, Burnett & Robertson (20). In the LSPT, a total of 16 passes were completed. These included 8 short passes to red and white targets 3.5 m away from the passing zone and 8 slightly longer passes to green and blue targets 4 m away from the passing zone, and 4 pieces of colored cards (0.3 × 0.6 m) were taped to the centers of standard gymnasium benches as targets. Furthermore, an aluminum strip (0.1 × 0.15 m) was taped vertically to the center of the target to provide audible reinforcement of a successful pass. The order of these passes was randomly generated into four passing orders. The next color to be hit was called out by one of the examiners as soon as the ball had been released for the previous pass. The time taken to complete the test was recorded using a stopwatch. Timing was initiated from the moment the participant moved the ball into the passing zone and completed when the ball on the final pass made contact with the target area. During the test, penalties and successful passes were recorded.

Yeagley soccer test

The Yeagley soccer test is used to evaluate players' ball control skills. The test initiates with a

command, and players attempt to control the ball with the feet, head, knees, shoulders, and chest for 30 s. The number of juggles within 30 s was recorded for the statistical analyses. If the players attempted to use a hand or arm to control the ball, a one-point penalty was imposed (29).

Mor–Christian General Soccer Ability Skill Test

The Mor–Christian general soccer ability skill test is generally used to evaluate players' passing, dribbling, and shooting skills (21). In the present study, the test was used to evaluate the players' dribbling skills. In the test, 12 cones were arranged in a circle with a radius of 18 m with a distance of 4.5 m between each cone. The start line was marked 1 m away from the circle perpendicularly (21). With a start command, the players dribbled the ball between the cones as quickly as possible. The test was performed twice, clockwise and counterclockwise. The best score was used for the statistical analyses.

Statistical analysis

Statistical analyses of the data in the study were performed using SPSS 18.0. In the analysis of the data, descriptive statistics (including the mean, standard deviation, median, min–max value, rate, and frequency) were used to define the characteristics of the research group; these are expressed in tables. To determine whether the study data were normally distributed, the kurtosis and skewness values were examined. These values were between -1.5 and +1.5; the data showed a normal distribution, and the values outside these measures did not show a normal distribution (30). All data showed a normal distribution, and in this study, Pearson product-moment rank correlation coefficient analysis was conducted to determine the relationships between variables. P values <0.05 were considered statistically significant.

RESULTS

The descriptive characteristics of the players are presented in Table 1. Skill-related fitness characteristics and soccer-specific skills of the players are presented in Tables 2–3, respectively. The relationships between skill-related fitness characteristics and soccer-specific skills of the players are presented in Table 4.

Table 1. Descriptive characteristics of the players

Variables	Minimum	Maximum	Mean	SD
Age (year)	14.60	17.50	15.86	0.69
Sport experience (year)	5.00	10.00	7.63	1.44
Soccer experience (year)	4.00	10.00	7.10	1.70
Height (cm)	158.70	196.00	173.06	8.10
Body mass (kg)	43.00	90.00	64.80	9.68
BMI (kg/m^2)	17.20	25.20	21.59	1.99

BMI: body mass index, SD: standard deviation

Table 2. Skill-related fitness characteristics of the players

Variables	Minimum	Maximum	Mean	SD
Coordination (n)	15.00	28.00	21.86	3.08
CMJ height (cm)	32.50	47.90	39.12	4.47
Sport-specific core muscle strength and stability plank test (s)	54.00	180.00	118.13	34.51
Agility (s)	4.52	5.58	5.07	0.23
Speed (s)	2.79	3.35	3.04	0.14
Dominant leg reach (cm)	58.70	105.10	74.85	10.31
Nondominant leg reach (cm)	57.30	100.70	73.69	9.76

CMJ: countermovement jump, n: repetition, SD: standard deviation

Table 3. Soccer-specific skills of the players

Variables	Minimum	Maximum	Mean	SD
Pass accuracy (n)	38.70	84.00	56.64	13.35
Pass score in time (s)	6.00	14.00	10.63	2.18
Ball control (n)	39.00	94.00	68.06	14.77
Dribbling speed (s)	12.78	17.83	15.24	1.26

n: repetition, SD: standard deviation

Table 4. Relationship between skill-related fitness characteristics and soccer-specific skills of the players

Variables		Coordination (n)	CMJ height (cm)	Core muscle strength and stability test (s)	Agility (s)	Speed (s)	Dominant leg reach (cm)	Nondominant leg reach (cm)
Succesfull pass (n)	r	-0.09	-0.19	-0.34	0.23	0.21	-0.18	-0.03
	p	0.62	0.31	0.06	0.21	0.25	0.32	0.87
Pass score (s)	r	-0.00	0.15	-0.01	-0.04	-0.13	0.10	0.02
	p	0.96	0.40	0.93	0.81	0.48	0.56	0.88
Ball control (n)	r	0.08	-0.05	0.18	-0.36	-0.16	0.06	-0.12
	p	0.66	0.76	0.33	0.05	0.37	0.73	0.50
Dribbling speed (s)	r	-0.25	-0.08	-0.31	0.44*	0.43*	-0.14	0.07
	p	0.18	0.66	0.09	0.01	0.01	0.43	0.68

p<0.05*, CMJ: countermovement jump, n: repetition

As shown in Table 4, there were moderate positive relationships among dribbling speed, agility, and speed variables of the players (r = 0.44 and 0.43; p < 0.05, respectively).

DISCUSSION

This study aimed to examine the relationship between soccer-specific skills and skill-related fitness in adolescent football players. The main finding of this study is that agility and speed are moderately positively correlated with dribbling speed. Based on this result, the hypothesis of the study (that there is a significant negative or positive relationship between soccer-specific skills and skill-related fitness) was partially verified.

Passing, dribbling, ball control, kicking, and shooting are basic soccer techniques (15,16,25). These basic soccer-specific skills might be affected by several factors, such as age, maturity, body composition, power, muscle strength, muscle endurance, and balance (3,25,31,32)

Singh et al. (25) reported a strong association among physical, technical, conditional, and tactical components in soccer. Kokstejn & Musalek (16) found a strong relationship between fundamental motor skills (running, broad jumping, leaping, hopping, galloping, and sliding) and game-specific motor skills (dribbling and shooting) in adolescent Czech football players. Vänttinen et al. (31) also reported that passing accuracy is associated with the 10-m sprint (r = 0.71, p < 0.05), countermovement jump performance (r = - 0.62, p < 0.05), and eye–hand–foot coordination (r = 0.63, p < 0.05) in adolescent soccer players.

In a study conducted by Aktuğ, İri & Çelenk (1) of 337 male soccer players aged 6–14 years, soccer-specific skill test results (Deutscher motor test, Mor–Christian general soccer ability test) were positively or negatively correlated to the results of the 20-m sprint test, horizontal obstacle jump test, flexibility test, broad jump test, balance test, 6-min running test, push-up test, and trunk flexion test. Similar to our study, Aktuğ et al. (1) reported a positive correlation between the 20-m sprint performance and dribbling skills.

In another study that aimed to understand the kind of sprint (20-m linear sprint vs. change-of-direction sprint and Illinoist agility test) associated with the Mor–Christian dribbling performance test (12), the change-of-direction sprint test and Illionis agility test performances were positively and moderately correlated with the Mor–Christian dribbling test score; however, the positive correlation between the 20-m linear sprint time and Mor–Christian dribbling test score was insignificant and small.

In our study, the correlation between the non-linear sprint (agility), linear sprint (20-m sprint), and dribbling performance differed, although in the study by İslam & Kundu (12), non-linear test scores (change-of-direction sprint and Illinoist agility test)

positively and moderately correlated with the Mor–Christian dribbling performance test performance; however, the 20-m linear sprint time exhibited a statistically non-significant positive small correlation with the Mor–Christian dribbling performance test. Meanwhile, in our study, both the pro-agility test time and 20-m linear sprint time were moderately positively correlated with the dribbling speed.

Some researchers have reported correlations between skill-related fitness and soccer-specific skills as in the aforementioned studies, but Kokstejn et al. (15) argued that the direct correlation between physical fitness (shuttle run 4 m × 10 m, standing broad jump and 20-m progressive shuttle run) and speed dribbling (short dribbling test) is not significant. Singh & Singh (26) also reported an insignificant relationship between soccer-specific skills assessed based on the SAI soccer skill test, agility, and explosive strength in junior soccer players. Kadagadakai & Pradhan (13) reported no correlation between the grip strength; flexibility; sit-ups; Harvard step test performance; and soccer skill tests, such as dribbling, lofted-passing, shooting, short-passing, and juggling, in 41 diploma college soccer players. Kadagadakai & Pradhan (13) found only a significant negative moderate correlation between the body mass index and dribbling, with the BMI being significantly (borderline) positively correlated with juggling.

As it is understood, there are studies that have demonstrated that there are no relationships between skill-related fitness and soccer-specific skills, even though these comprise fewer studies than studies that have demonstrated positive or negative relationships between skill-related fitness and soccer-specific skills at a meaningful level. These contradictory results might be caused by age, status (professional or amateur), playing positions, biological maturation, and anthropometric characteristics of soccer players (9,15,16,31).

This study had two limitations. First, we performed all soccer-specific tests using ball number 5. This ball size may not have been suitable for the players recruited for this study. Second, because all soccer players were recruited from a single soccer club, the sample size of the study was relatively small.

CONCLUSIONS

In conclusion, based on the findings and considering some limitations, the present study showed that dribbling drills in soccer should be supported by agility and sprint exercises to increase dribbling speed by soccer trainers and soccer players. Talent identification and discrimination of soccer players by competitive level and position are important for nations to represent their countries optimally in international sports competitions. Therefore, further studies are needed to clarify whether skill-related fitness affects skill-related soccer-specific skills. In addition, conducting similar studies with larger sample sizes may lead to different results in the field of exercise science.

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