ISSN: 2548-0723

SPOR BİLİMLERİ ARAŞTIRMALARI DERGİSİ
JOURNAL OF SPORT SCIENCES RESEARCH
JSSR

Cilt: 9; Sayı: 3, 2024 / Volume: 9; Issue: 3, 2024

SPOR BİLİMLERİ ARAŞTIRMALARI DERGİSİ | **JOURNAL OF SPORT SCIENCES RESEARCH**

2024, Cilt: 9, Sayı: 3 | 2024, Volume: 9, Issue: 3
Çevrimiçi Basım Tarihi: Ekim 2024 | Online Publishing Date: October 2024
ISSN: 2548-0723

Spor Bilimleri Araştırmaları Dergisi yılda 3 kez (Şubat, Haziran ve Ekim) yayımlanan hakemli süreli bir yayındır.
JSSR is published biannually (February, June, October)
https://dergipark.org.tr/tr/pub/jssr

Spor Bilimleri Araştırmaları Dergisi Adına Sahibi/Publisher
Baş Editör /Editor in Chief
Dr. Kadir YILDIZ

Editör Yardımcısı / Associate Editor
Dr. Ercan POLAT Yozgat Bozok Üniversitesi, Yozgat

BİLİM KURULU | SCIENTIFIC COMMITTEE

Dr. Abdelmalik SERBOUT	Djelfa University, ALGERIA
Dr. Adela BADAU	University of Medicine and Pharmacy of Tirgu Mures, ROMANIA
Dr. Ali AYCAN	Abant İzzet Baysal Üniversitesi, TÜRKİYE
Dr. Ali ÖZKAN	Yozgat Bozok Üniversitesi, TÜRKİYE
Dr. Angela MAGNANINI	University of Rome Foro Italico, ITALY
Dr. Ayad OMAR	Tripoli University, Sports and Health, LIBYA
Dr. Bahar ATEŞ ÇAKIR	Uşak Üniversitesi, TÜRKİYE
Dr. Balint GHEORGHE	"Vasile Alecsandri" University of Bacău, ROMANIA
Dr. Burak GÜRER	Gaziantep Üniversitesi, TÜRKİYE
Dr. Celina R. N. GONÇALVES	Polytechnic Institute of Bragança, PORTUGAL
Dr. Cenk TEMEL	Akdeniz Üniversitesi, TÜRKİYE
Dr. Ciocoiu Dana LUCICA	Dunarea de Jos University of Galati, ROMANIA
Dr. Dana BADAU	University of Medicine and Pharmacy of Tirgu Mures, ROMANIA
Dr. Defne ÖCAL KAPLAN	Kastamonu Üniversitesi, TÜRKİYE
Dr. Dilshad AHMED	University of Macau, CHINA
Dr. Dilşad ÇOKNAZ	Abant İzzet Baysal Üniversitesi, TÜRKİYE
Dr. Dimitris CHATZOPOULOS	Aristotle University of Thessaloniki, GREECE
Dr. Dusan MITIC	University of Belgrade, SERBIA
Dr. Elena YARMOLIUK	Borys Grinchenko Kyiv University, UKRAINE
Dr. Emanuele ISIDORI	University of Rome Foro Italico, ITALY
Dr. Erdil DURUKAN	Balıkesir Üniversitesi, TÜRKİYE
Dr. Eugeniu AGAPII	The State University of Physical Education and Sport, MOLDOVA
Dr. Ferman KONUKMAN	Qatar University, QATAR
Dr. Feyza Meryem KARA	Kırıkkale Üniversitesi, TÜRKİYE
Dr. Gazanfer DOĞU	İstanbul Aydın Üniversitesi, TÜRKİYE
Dr. Gheorghiu AURELIAN	Dunarea de Jos University of Galati, ROMANIA
Dr. Hamdi Alper GÜNGÖRMÜŞ	Alanya Alaaddin Keykubat Üniversitesi, TÜRKİYE
Dr. Hanifi ÜZÜM	Abant İzzet Baysal Üniversitesi, TÜRKİYE
Dr. Iconomescu T. MIHAELA	Dunarea de Jos University of Galati, ROMANIA
Dr. Iuliana BARNA	Dunarea de Jos University of Galati, ROMANIA
Dr. Ivan ANASTASOVSKI	University SS Cyril and Methodist, MACEDONIA
Dr. J.P VERMA	Lakshmibai National Institute of Physical Education Gwalior, INDIA
Dr. Javier Cachon ZAGALAZ	University of Jaén, SPAIN
Dr. Jerónimo GARCIA-FERNANDEZ	Universidad de Sevilla, SPAIN
Dr. Jerzy KOSIEWICZ	Josef Pilsudski University of Physical Education, POLAND
Dr. Kerem Yıldırım ŞİMŞEK	Eskişehir Teknik Üniversitesi, TÜRKİYE
Dr. Khaled EBADA	Faculty of Physical Education. Port Said University, EGYPT
Dr. Kim WONYOUNG	Wichita State University, USA
Dr. Lungu ECATERINA	State University, MOLDOVA
Dr. Malgorzata TOMECKA	Private Academy of Sport Education in Warsaw, POLAND
Dr. March KROTEE	North Carolina State University, USA
Dr. Maria Luisa ZAGALAZ SANCHEZ	University of Jaén, SPAIN
Dr. Mehmet GÜL	Cumhuriyet Üniversitesi, TÜRKİYE
Dr. Mehmet GÜLLÜ	İnönü Üniversitesi, TÜRKİYE
Dr. Michael LEITNER	California State University, USA
Dr. Murat TAŞ	Manisa Celal Bayar Üniversitesi, TÜRKİYE
Dr. Müberra ÇELEBİ	Düzce Üniversitesi, TÜRKİYE
Dr. Mücahit FİŞNE	Cumhuriyet Üniversitesi, TÜRKİYE
Dr. Nadhim Al-WATTAR	Mosul University, IRAQ
Dr. Nazmi SARITAŞ	Erciyes Üniversitesi, TÜRKİYE

Dr. Neofit ADRIANA	Dunarea de Jos University of Galati, ROMANIA
Dr. Nurten DİNÇ	Manisa Celal Bayar Üniversitesi, TÜRKİYE
Dr. Onoi MIHAIL	State University, MOLDOVA
Dr. Parvu CARMEN	Dunarea de Jos University of Galati, ROMANIA
Dr. Patrizia ZAGNOLI	Universita degli Studi di Frenze, ITALY
Dr. Petronal C. MOISESCU	Dunarea de Jos University of Galati, ROMANIA
Dr. Pınar GÜZEL GÜRBÜZ	Manisa Celal Bayar Üniversitesi, TÜRKİYE
Dr. Raed A.A. A AL-MASHHADI	University of Babylon, IRAQ
Dr. Sabri ÖZÇAKIR	Abant İzzet Baysal Üniversitesi, TÜRKİYE
Dr. Salahuddin KHAN	Gomal University Dera Ismail Khan Khyber Pakhtunkhwa PAKISTAN
Dr. Savu Vasile CATALIN	Dunarea de Jos University of Galati, ROMANIA
Dr. Selami ÖZSOY	Abant İzzet Baysal Üniversitesi, TÜRKİYE
Dr. Serkan HAZAR	Cumhuriyet Üniversitesi, TÜRKİYE
Dr. Settar KOÇAK	Lokman Hekim Üniversitesi, TÜRKİYE
Dr. Sevda ÇİFTÇİ	Sakarya Uygulamalı Bilimler Üniversitesi, TÜRKİYE
Dr. Sevim GÜLLÜ	İstanbul Üniversitesi-Cerrahpaşa, TÜRKİYE
Dr. Tatiana DOBRESCU	"Vasile Alecsandri" University of Bacău, ROMANIA
Dr. Tekin ÇOLAKOĞLU	Gazi Üniversitesi, TÜRKİYE
Dr. Tennur YERLİSU LAPA	Akdeniz Üniversitesi, TÜRKİYE
Dr. Uğur SÖNMEZOĞLU	Pamukkale Üniversitesi, TÜRKİYE
Dr. Varela NAHUEL	Universida de La Matanza, ARGENTINA
Dr. Viorica CALUGHER	The State University of Physical Education and Sport, MOLDOVA
Dr. Virginia Serrano GÓMEZ	Universida de Vigo, SPAIN
Dr. Yeşer EROĞLU	Düzce Üniversitesi, TÜRKİYE
Dr. Yrij DOLINNYJ	Donbas'ka Derzhavna Mashinobudivna Akademiya, UKRAINE
Dr. Zuhal YURTSIZOĞLU	Cumhuriyet Üniversitesi, TÜRKİYE

Spor Bilimleri Araştırmaları Dergisi

Amaç

Spor Bilimleri Araştırmaları Dergisi'nin temel amacı, Spor Bilimleri alanına ilişkin güncel gelişmeleri bütüncül ve kapsayıcı bir biçimde inceleyerek bu doğrultuda ortaya çıkan özgün makale ve derlemeleri hedef kitle ile paylaşmaktır.

Kapsam

Spor Bilimleri Araştırmaları Dergisi, 2016 yılında yayın hayatına başlamış olup yılda 3 kez yayımlanan Hakemli bir dergidir. Dergi Türkçe ve İngilizce yazılara yer vermektedir. Spor Bilimleri Araştırmaları Dergisi, Spor Bilimleri alanına ilişkin olarak; Beden Eğitimi ve Spor Öğretimi, Spor Yönetimi, Rekreasyon, Hareket ve Antrenman Bilimleri, Sporda Psiko-sosyal Alanlar ve Spor-Sağlık Bilimleri alanlarında kavramsal veya araştırmaya dayanan, sahasına katkı sağlayacağı düşünülen özgün araştırmaları ve derleme makaleleri yayımlamaktadır.

Dizinleme Bilgisi

- HW Wilson Education Fulltext Index
- ULAKBİM TrDizin
- EBSCO SPORTDiscuss Fulltext
- Central & Eastern European Academic Source Database Coverage List
- Index Copernicus Master List ISC Journal Master List
- Türkiye Atıf Dizini,
- SOBIAD
- The Open Ukrainian Citation Index (OUCI)
- CABI's Leisure Tourism Database,
- CABI's Leisure, Recreation and Tourism Abstracts,
- Türk Eğitim İndeksi
- Worldcat

Kütüphane Katalogları

Harvard Üniversitesi Kütüphanesi- Hollis
Stanford Üniversitesi Kütüphanesi

Journal of Sport Sciences Research

Aim

The main purpose of the Journal of Sport Sciences Research is to analyze the current developments in the field of Sport Sciences in a holistic and inclusive way and to share the original articles and reviews that emerged in this direction with the target audience.

Scope

Journal of Sports Sciences Research is a refereed journal that began its publication life in 2016 and is published 3 times a year. The journal welcomes articles in Turkish and English languages. Regarding the field of Sport Sciences, the Journal publishes conceptual or research-based original research and review articles in the fields of Physical Education and Sports Teaching, Sports Management, Recreation, Movement and Training Sciences, Psycho-social Fields in Sports and Sports-Health Sciences.

Indexing and Abstracting

- HW Wilson Education Fulltext Index
- ULAKBİM TrIndex
- EBSCO SPORTDiscuss Fulltext
- Central & Eastern European Academic Source Database Coverage List
- Index Copernicus Master List ISC Journal Master List
- Türkiye Citation Index,
- SOBIAD
- The Open Ukrainian Citation Index (OUCI)
- CABI's Leisure Tourism Database,
- CABI's Leisure, Recreation and Tourism Abstracts,
- Turkish Education Index
- Worldcat

Library Catalogues

Harvard University Library- Hollis
Stanford University Library

2024: 9(3) SAYI HAKEMLERİ / REVIEWERS FOR 2024: 9(3)

Dr. Aylin Özge PEKEL	Gazi Üniversitesi, Ankara
Dr. Ayşegül KUTLUK BOZKURT	Kırklareli Üniversitesi, Kırklareli
Dr. Caner ÇETİNKAYA	Dokuz Eylül Üniversitesi, İzmir
Dr. Esin ERGİN	Adnan Menderes Üniversitesi, Aydın
Dr. Figen KANBİR	Siirt Üniversitesi, Siirt
Dr. İsmail AKTAŞ	Van Yüzüncü Yıl Üniversitesi, Van
Dr. Javad KARIMI	Lorestan University, Iran
Dr. Jonathan ROTİCH	Kenyatta University, Kenya
Dr. Kazys MİLAŠİUS	Vytautas Magnus University, Kaunas, Lithuania
Dr. Kemal GÖRAL	Muğla Sıtkı Koçman Üniversitesi, Muğla
Dr. Min Jung KIM	McPherson College, Kansas, USA
Dr. Mustafa Ertan TABUK	Hitit Üniversitesi, ÇORUM
Dr. Myungwoo LEE	Southeast Missouri State University, Cape Girardeau, USA
Dr. Nebahat ELER	Gazi Üniversitesi, Ankara
Dr. Nurten DİNÇ	Manisa Celal Bayar Üniversitesi, Manisa
Dr. Romualdas MALİNAUSKAS	Lithuanian Sports University, Kaunas, Lithuania

İÇİNDEKİLER
CİLT: 9, SAYI: 3, EKİM 2024

CONTENTS
VOLUME: 9, ISSUE: 3, OCTOBER 2024

Spor Bilimleri Araştırmaları Dergisi
Journal of Sport Sciences Research
Vol: 9, Issue: 3, October 2024
E-ISSN: 2548-0723
URL: http://www.dergipark.org.tr/jssr

Athlete Identity and Satisfaction of Student-Athletes in Selected Universities in Kenya

Ishmael Kiprono KURUİ[1*], Francis Mundia MWANGI[2], Elijah Gitonga RINTAUGU[3], Agnes Wanjiku KAMAU[3]

[1]Directorate of Sports and Games, Kenyatta University, Nairobi, Kenya
[2]Department of Physical Education, Exercise and Sports Science, Kenyatta University, Nairobi, Kenya
[3]Department of Recreation and Sports Management, Kenyatta University, Nairobi, Kenya

Research Article
DOI: 10.25307/jssr.1471285
Received: 20.04.2024 Accepted:11.09.2024 Online Published: 31.10.2024

Abstract

Strong athlete identity and satisfaction with being an athlete are linked to better performance. This is because student-athletes are more motivated and feel a sense of belonging. However, research on how these factors connect with details like gender or competition level in student-athletes, especially in Kenya, is lacking. Using an analytical cross-sectional design and the Athletic Identity Measurement Scale-Plus (AIMS-Plus) and Athlete Satisfaction Questionnaire (ASQ), this study examined the relationship between athlete identity and satisfaction among university student-athletes in relation to gender, year of study, and level of competition. A total of 309 (52.4% males and 47.6% females) Kenyan university student-athletes participated in the study. Results revealed females had a slightly stronger athlete identity (4.00 ± 0.478) than male student-athletes (3.93 ± 0.503), but there was no significant correlation between gender and athlete identity. Similarly, females had higher athlete satisfaction (4.24 ± 0.443) than male student-athletes (4.09 ± 0.576), and the relationship between gender and athlete satisfaction was statistically significant (p =.017). Investigated demographic characteristics only explained (3.5%) variance in student-athlete identity (R2 adjusted =.035, F (4, 263) = 3.391, p =.010) and (3.2%) in athlete satisfaction (R2 adjusted =.032, F(4,263) = 3.210, p =.013). The study concluded that universities should provide enhanced training facilities, regular competition opportunities, and a supportive environment for athletes in low-level competitions. Future research could address athlete identity beyond demographics such as coach leadership, education goals, team task contribution, and variables that provide a more comprehensive understanding of athletic identity and satisfaction.

Keywords: Student-athlete Identity, Satisfaction, Gender, Competition levels

[*] **Corresponding Author:** Ishmael Kiprono Kurui, **E-mail:** kirui.ishmael@ku.ac.ke

INTRODUCTION

Athlete identity (AI) is a construct that is used to describe the extent to which an individual identifies with their athletic role. It refers to the degree to which an individual identifies with and relates to their role as an athlete (Parker et al., 2022), while Athlete Satisfaction (AS) refers to the level of contentment student-athletes have with their sporting ability and the sport (Davis et al., 2019). These are key variables for student-athletes because they affect student-athletes' motivation, social integration, sports performance, and academic performance (Edison et al., 2021). Athlete identity is described as the extent to which an individual identifies with their athletic role. Athlete identity is considered an important construct in sports psychology because it influences an athlete's sense of self-worth, which is developed from their self-reference and perception of other roles. Given its importance, evidence has shown that athlete identity is affected by a range of factors such as competition, training (Turkeli, 2020), and social demographic factors such as gender and academic level of student-athletes (Quinaud et al., 2020). However, most research on this construct focuses on its athlete identity and relationship with factors such as stress and burnout (Lee et al., 2017) and academics (Van Rens et al., 2019). The single-level interrogation by traditional studies on student-athletes suggests a simple test interpretation, which is a limitation to understanding its development and impact on student-athletes.

Athlete identity is a dynamic construct, making it susceptible to personal factors such as gender, academic level, type of sport, and level of competition (Quinaud et al., 2020). In another example, athlete identity has been established to correlate with the level of competition among student-athletes (Edison et al., 2021). The level of competition is viewed as an achievement or lack thereof.

Given the complexity of athlete identity, researchers have attempted to understand its impacts on student-athletes at the sub-component level of exclusivity, self-identity, positive affectivity, negative affectivity, and social identity. For example, Hilliard et al. (2017), when investigating the relationship between athlete identity and student-athletes' beliefs about rehabilitation, established that exclusivity (the extent to which athletes identify with their role) informed their behaviours and correlated with student levels of adherence to the program. Another study examining the athlete identity sub-component of social identity (the degree to which a person sees themselves occupying the role of an athlete) reported that social identity forms the foundation for developing sports groups, behaviours, and support systems for stress appraisal for student-athletes, which is key during their pursuit of sport and academic goals (Rees et al., 2015). However, different studies on this topic hardly investigate athlete identity at the sub-components level, and even the available one reports varying outcomes, suggesting careful interpretation and generalization of their findings due to the different methodologies and measures applied. In Kenya, this area is hardly investigated despite Rintaugu et al., (2020) establishing social identity as a key reason for male university student-athletes participating in college sports, yet Kenya is one of the hosts of prestigious university competitions in Africa, for example, the 10th All Africa University Games.

The athlete satisfaction component represents the level of contentment of student-athletes with their sport and athletic abilities (Davis et al., 2019). Evidence shows that athlete satisfaction is a valuable construct in sports performance and is influenced by a range of factors such as the quality of the relationship with the coach (Davis et al., 2019), the student-athlete's role and engagement in the team (Eys et al., 2007), and a sense of competence, autonomy, and relatedness (Banack et al., 2011). Some studies indicate that social demographic characteristics such as gender, year of study, and level of competition play some roles in student-athlete satisfaction. Foster and Huml (2019) argued that the academic year of student-athletes can influence their satisfaction through pathways such as performance progress, goal achievement, and group integration. Colbort, (2019) posits that potential conflict between academic progress and athlete goals may affect athlete satisfaction, especially among senior student-athletes. Competition level influences athlete satisfaction because of the perceptions associated with competing at different levels. For example, competing at a high level of competition may affect athlete satisfaction because student-athletes associate it with high achievement (Rhind et al., 2011; Unruh et al., 2005).

The reviewed studies demonstrate the importance of social demographic characteristics on student-athlete satisfaction (Colbort, 2019; Foster & Huml, 2019; Rhind et al., 2011; Unruh et al., 2005); however, they are often examined individually, and a few investigated how these factors affect student-athlete satisfaction simultaneously. Additionally, few researchers have investigated the impact of these social demographic characteristics on both athlete identity and athlete satisfaction at an in-depth level (sub-component levels of athlete identity and athlete satisfaction scales). In addition to the identified limitations in the existing literature, the preliminary review demonstrates little attention to university student-athlete identity and satisfaction in Kenya, yet their influence on sport performance has been reported in other works (Contreira et al., 2023; Edison et al., 2021; Foster & Huml, 2019; Martin & Fogarty, 2014). Available studies also reveal variation in methodological approach, for example, focusing on different measures leading to differences in outcomes, hence contextual gaps. In light of these findings, the study aimed to investigate the athlete identity and satisfaction of student-athletes at selected universities in Kenya. The main objective is to examine the relationship between athlete identity, satisfaction, and demographics (gender, year of study, and level of competition) of university student-athletes in selected Kenyan universities.

METHOD

Study Design

The study used a cross-sectional analytical study design targeting 2254 (1219 males and 1035 females) student-athletes competing in various university sports championships, e.g., East Africa University Sports Federation (EAUSF), Kenya Universities Sports Association (KUSA), and Kenya National Federation Leagues (KNFL). The championships included athletics, badminton, basketball, football, handball, hockey, netball, table tennis, tennis, volleyball, skating, rugby, lawn tennis, softball, and chess. The cross-sectional analytical approach was selected because it allowed the study to collect data from a group of student-athletes at a certain point in time while allowing multiple variables at the time of the data collection (Schmidt & Brown, 2019). Data was collected from 10 out of 47 counties in Kenya, namely Nairobi, Mombasa, Nakuru, Kiambu, Kisii, Siaya, Uasin-Gishu, Meru, Kilifi, and Embu. Selected counties are home to major universities with high sports participation in the Kenya University Sports Association Games.

Sampling

Using Yamane's (1967) formula, a sample size of 340 (184 males, 156 females) was established. A stratified random sampling was utilized where the type of sport was used as strata to guide the proportionate selection of student-athlete participants to be included in the sample. Stratification by type of sport ensured each sport in the championship was represented in the study sample.

Data Collection Instrumens

Data was collected using a self-report questionnaire, which was divided into three sections. Section A collected social demographic information on gender, type of sport, year of study, and level of competition. Section B sought to collect information examining athlete identity using the Athlete Identity Measurement Scale-Plus (AIMS-Plus). AIMS-Plus had 24 statements measured on a 5-point Likert scale (1 =I strongly disagree, 2 = disagree, 3 = neutral/agree nor disagree, 4 = agree, and 5 = strongly agree). The scoring entailed participants selecting by marking or putting a tick on the option (1–5) that represented their level of agreement on each statement that represents their view on how they perceive their importance in various aspects as an athlete. The score of each item was then totaled and converted back to the average (1–5). A score below 2.5 represented a weak athlete identity, while scores of 2.5 and above showed an average to strong athlete identity. The sub-components of AIMS-Plus were also examined. The five sub-components include self-identity (statements 1, 2, 7, 11, 13), positive affectivity (12, 14, 18, 21), negative affectivity (9, 10, 17, 22), social identity (4, 16, 19, 20, 23), and exclusivity (3, 5, 6, 8, 15, 24). Previous studies have reported high reliability of the AIMS-Plus, with Cronbach's alphas of 0.851 and 0.874 (Hagiwara & Isogai, 2013). In this study, the AIMS-Plus gave a Cronbach alpha score of 0.83.

Section C examined athlete satisfaction using the Athlete Satisfaction Questionnaire (ASQ). ASQ contained 25 items measured on a 5-point Likert scale (1-extremely dissatisfied, 2-moderately dissatisfied, 3-neutral, 4-moderately satisfied, 5- satisfied). Participants scored by marking or ticking the option (1-5) that best represented their satisfaction level on each of the

25 statements in this section. The scores on each statement were summed up and converted back to the average which ranged from (1-5). A score of below 2.5 reflected participant low athlete satisfaction while a score of 2.5 and above showed moderate to high athlete satisfaction. ASQ sub-components were also examined. The sub-scale included team task contributions, individual performance recognition, and the role of the coach, personal dedication, and team support affiliation. ASQ validity has been found sound to assess athlete satisfaction in previous studies (Jowett & Ntoumanis, 2004; Riemer & Chelladurai, 1998; Smith & Cushion, 2006). In the present study, ASQ yielded a high internal consistency with a score of 0.874 using a test-retest method. To enhance the robustness of the data collection instrument, it was reviewed by two senior lecturers in Exercise and Sport Science. Some of the recommended changes included converting the total scores back to the average to make it consistent with other studies. Reviewers also suggested including the sub-components of athlete identity and satisfaction to gather in-depth insight on the subject.

Ethical Approval

The study was conducted in line with the set protocols for studies involving human subjects. The study was approved by the Kenya National Commission of Science Technology and Innovation, the protocol number (NACOSTI/P/22/18075), and the University Ethics Review Committee (PKU/2511/11638).

Data Collection Procedure

Once all authorizations were given, the sports and games offices in the targeted universities were informed through their representatives, and consent to participate in the study was obtained. Student-athlete participants were recruited through presentations and information sessions held during team meetings before training or competitions. The issue of confidentiality, rights of participants, and data privacy was discussed before issuing consent forms. Once individuals agreed to participate, a written consent was issued and once they signed a questionnaire was administered with the assistance of coaches and team captains. The questionnaire was returned immediately upon completion.

Statistical Analysis

Descriptive statistics of mean and standard deviation were used to determine the status of athlete identity and athlete satisfaction in relation to gender, year of study, and level of competition of responded university student-athletes. Inferential statistics and Pearson correlation were used to examine the relationship between athlete identity and satisfaction about student-athlete demographic characteristics (gender, year of study, and level of competition). Linear multiple regression was used to determine whether demographic characteristics had a significant influence on athlete identity and athlete satisfaction among selected Kenyan University student-athletes.

FINDINGS

Table 1 shows a summary of the results from athlete identity questionnaire including its sub-components by gender

Table 1. Correlation between athlete identity, subcomponents with gender of student-athletes

	Gender	Mean	Sd.	df	r	*p*
AIMS	Female	4.00	0.478	308	- 0.064	.264
	Male	3.93	0.503			
Self-identity	Female	4.26	0.507	308	-0.171	.003
	Male	4.04	0.707			
Positive affectivity	Female	4.37	0.518	308	-0.001	.991
	Male	4.37	0.607			
Negative affectivity	Female	4.15	0.671	308	-0.003	.955
	Male	4.14	0.711			
Social identity	Female	3.55	0.720	308	-0.002	.974
	Male	3.55	0.698			
Exclusivity	female	3.91	0.625	308	-0.078	.172
	male	3.81	0.668			

Results in Table 1 reveal that athlete identity of Kenya university student-athlete is good and almost similar between males (3.93 ± 0.503) and females (4.00 ± 0.478). It demonstrates that university student-athletes have high positive affectivity, females (4.37 ± 0.518) and males (4.37 ± 0.671) but low on social identity component, females (3.55 ± 0.720) and males (3.55 ± 0.698). Data in Table 1 also implies a weak, negative, and non-significant relationship between athlete identity (r (308) = -0.064, *p* = .264). Nonetheless, there is a significant association between self-identity and gender of student-athletes (r (308) = -0.171, *p* = .003)

Table 2. Correlation between athlete identity, subcomponents with year of study of student-athletes

	Year 1 (n = 89)		Year 2 (n = 87)		Year 3 (n = 69)		Year 4 (n = 62)		Year 5 (n = 1)		Year 6 (n = 1)				
Components	Mean	Sd.	Mean	Sd.	Mean	Sd.	Mean	Sd.	Mean	Sd.	Mean	Sd.	df	r	*p*
AIMS	3.98	0.494	3.89	0.474	4.00	0.525	3.97	0.474	4.16	-	4.72	-	308	0.034	.555
Self-identity	4.03	0.668	4.19	0.548	4.16	0.755	4.22	0.500	4.25	-	5.00	-	308	0.110	.054
Positive affectivity	4.38	0.579	4.35	0.656	4.41	0.514	4.35	0.469	4.25	-	5.00	-	308	0.009	.875
Negative affectivity	4.17	0.670	4.14	0.672	4.18	0.591	4.08	0.854	4.25	-	4.50	-	308	-0.026	.653
Social identity	3.68	0.661	3.405	0.728	3.57	0.801	3.51	0.604	4.00	-	4.20	-	308	-0.045	.428
Exclusivity	3.86	0.687	3.72	0.610	3.95	0.669	3.94	0.592	4.17	-	5.00	-	308	0.094	.100

The table above demonstrates that student-athletes had high and almost similar athlete identity across the academic year of study. However, social identity records the lowest among the five sub-components of athlete identity student-athletes regardless of their academic year of study, for example, first years (3.68 ± 0.661). Pearson correlation shows no significant relationship between athlete identity and student-athlete year of study.

Table 3. Correlation between athlete identity, subcomponents with level of competition of student-athletes

Components	EAU Games (n = 21)		KNF (n = 53)		KUSA (n = 170)		Inter-school (n = 24)				
	Mean	Sd.	Mean	Sd.	Mean	Sd.	Mean	Sd.	df	r	p
AIMS	3.96	0.472	4.16	0.546	3.91	0.488	3.78	0.503	266	-0.158	.010
Self-identity	4.11	0.535	4.40	0.642	4.08	0.646	3.98	0.629	266	-0.133	.030
Positive affectivity	4.23	0.734	4.55	0.561	4.35	0.569	4.25	0.612	266	-0.055	.374
Negative affectivity	4.25	0.647	4.26	0.681	4.09	0.715	4.02	0.714	266	-0.106	.083
Social identity	3.53	0.637	3.77	0.748	3.51	0.736	3.31	0.703	266	-0.118	.054
Exclusivity	3.93	0.636	4.07	0.689	3.80	0.636	3.63	0.683	266	-0.161	.008

Student-athletes competing at KNF have strong athlete identity (4.16 ± 0.546) while student-athletes competing at KUSA showed the lowest athlete identity (3.78 ± 0.503). Table 4 also reveals that social identity as the weakest among the five sub-components of athlete identity, for example, East African University Games (3.53 ± 0.637).

A linear multiple regression was performed to determine the influence of demographic characteristics (level of competition, year of study, gender) on student-athlete identity.

Table 4. Multiple regression summary for influence of level of competition, academic year of study, and gender on athletes identity

Predictors	B	*t*	*p*	95% CI
Highest level of competition	-.168	-2.561	0.011	[-.207, -.027]
Academic year of study	-.172	-2.019	.045	[-.152, -.002]
Gender	-.074	-1.212	.226	[-.198, .047]

Note: $R^2_{adjusted}$ = .035, (N= 309, p = .010), CI = confidence interval for β. significant levels at $p < .05$

From Table 5, only 3.5% (R^2 adjusted = .035) of the variance of athlete identity can be explained by demographic characteristics, level of competition, academic year of study, and gender. Collectively, included demographic characteristics in the model significantly influence athlete identity ($R^2_{adjusted}$ = .035, F (4, 263) = 3.391, p = .010). Table 5 further indicates that level of competition, academic year of study, and predicted athlete identity of student-athletes ($p < .05$).

Correlation between Athlete Satisfaction and Demographic Characteristics

Student-athlete satisfaction was investigated using a 25 items ASQ. Participants answered by marking on a 5-point Likert scale (1-5) where 1 represented extremely dissatisfied, 2 moderately dissatisfied, 3 neutral, 4 moderately satisfied, and 5 satisfied which corresponded with the participants satisfaction on various aspect assessed by the ASQ.

Table 5. Correlation between athlete satisfaction, subcomponents with gender of student-athletes

	Gender	Mean	Sd.	df	r	*p*
ASQ	Female	4.24	0.443	308	-0.135	.017
	Male	4.09	0.576			
Team task contribution support	Female	4.20	0.557	308	0.847	.000
	Male	4.04	0.776			
Individual performance recognition	Female	4.17	0.528	308	0.780	.000
	Male	4.02	0.644			
Role of coach	Female	4.10	0.648	308	0.764	.000
	Male	3.97	0.909			
Personal dedication	Female	4.01	0.532	308	0.761	.000
	Male	4.30	0.609			
Team support affiliation	Female	4.32	0.560	308	0.775	.000
	Male	4.17	0.743			

According to Table 6 student-athletes' participants have high athlete satisfaction with females showing higher athlete satisfaction (4.24 ± 0.443) compared to male student-athletes (4.09 ± 0.576). At sub-component level of ASQ scale, female student-athletes have high team support affiliation (4.32 ± 0.560) but demonstrates low personal dedication (4.01 ± 0.532). Contrarily, male student-athletes indicates high personal dedication (4.30 ± 0.609) but low on role of the

coach (3.97 ± 0.909). Pearson correlation revealed a weak positive correlation between athlete satisfaction and gender even at its sub-component level ($p < .001$).

Table 6. Correlation between athlete satisfaction, subcomponents with year of study of student-athletes

Components	Year 1 (n = 89)		Year 2 (n = 87)		Year 3 (n = 69)		Year 4 (n = 62)		Year 5 (n = 1)		Year 6 (n = 1)				
	Mean	Sd.	Mean	Sd.	Mean	Sd.	Mean	Sd.	Mean	Sd.	Mean	Sd.	Df	r	*p*
ASQ	4.23	0.521	4.10	0.557	4.18	0.539	4.14	0.449	3.99	-	4.75	-	308	-0.030	.600
Team task contribution	4.16	0.658	4.01	0.719	4.10	0.776	4.20	0.551	4.17	-	5.00	-	308	0.038	.507
Individual performance recognition	4.14	0.543	4.09	0.653	4.09	0.671	4.04	0.499	3.71	-	4.43	-	308	-0.055	.334
Role of coach	4.16	0.686	3.95	0.824	4.03	0.813	3.95	0.881	4.00	-	5.00	-	308	-0.065	.251
Personal dedication	4.33	0.610	4.36	0.570	4.32	0.608	4.38	0.499	3.75	-	5.00	-	308	0.021	.707
Team support affiliation	4.33	0.643	4.10	0.699	4.39	0.583	4.13	0.702	4.33	-	4.33		308	-0.047	.408

Student-athlete participants have high and almost similar athlete satisfaction across years of study, but first years show slightly higher athlete satisfaction (4.23 ± 0.521). Table 8 suggests that first year student-athlete have low individual performance recognition (4.14 ± 0.543), while subsequent years, second (3.95 ± 0.824), third (4.03 ± 0.813), and fourth years (3.95 ± 0.881) report low satisfaction with the role of the coach. Pearson correlation shows no significant relationship between athlete satisfaction with student-athletes year of study.

Table 7. Correlation between athlete satisfaction, subcomponents with level of competition of student-athletes

Components	EAU Games (n = 21)		KNF (n = 53)		KUSA (n = 170)		Inter-schools (n = 24)				
	Mean	Std.	Mean	Std.	Mean	Std.	Mean	Std.	df	r	*p*
ASQ	4.20	0.467	4.36	0.529	4.10	0.530	4.08	0.531	266	-0.138	.023
Team task contribution support	4.19	0.487	4.31	0.82	4.05	0.669	3.95	0.691	266	-0.133	.029
Individual performance recognition	4.10	0.434	4.37	0.521	4.01	0.608	4.02	0.596	266	-0.150	.014
Role of coach	4.01	0.736	4.11	1.05	4.01	0.748	3.93	0.626	266	-0.040	.518
Personal dedication	4.43	0.448	4.48	0.645	4.30	0.583	4.31	0.644	266	-0.096	.117
Team support affiliation	4.29	0.644	4.53	0.635	4.14	0.699	4.18	0.564	266	-0.143	.019

Table 7 indicates that student-athlete participants competing at interschool and college competitions had the lowest satisfaction level (4.08 ± 0.531). The low of coach has the lowest satisfaction in all levels of competition, for example, East African Games, (4.01 ± 0.736), Interschool/college (3.93 ± 0.626). There is a negative and a significant correlation between athlete satisfaction and student-athlete level of competition (r (266) = -0.138, $p = .023$). Team task contribution, individual performance recognition, and team support affiliation have a negative and significant relationship with the level of competition of student-athletes ($p < .05$).

A linear multiple regression was done to assess whether demographic characteristics (level of competition, year of study, gender) predicted athlete satisfaction of university student-athletes.

Table 8. Multiple Regression Summary for influence of level of competition, academic year of study, and gender on athlete satisfaction

Predictors	**β**	***T***	***P***	**95% CI**
Highest level of competition	-0.179	-2.727	0.007	[-.207, -.027]
Academic year of study	-0.088	-1.035	0.302	[-.152, -.002]
Gender	-0.155	-2.545	0.012	[-.198, .047]

Note. $R^2_{adjusted} = .032$, (N= 309, $p = .010$), CI = confidence interval for β.

Table 10 suggests that demographic characteristics (level of competition, academic year of study, gender) only explain a small variance of athlete satisfaction 3.2% (R^2 adjusted = .032).

Mutually, level of competition, academic year of study, and gender significantly predicted athlete satisfaction of student-athlete participants ($R^2_{adjusted}$ = .032, F (4, 263) = 3.210, p = .013). However, only level of competition and gender predicted athlete satisfaction (p = .007), and (p = .012) respectively.

DISCUSSION

The study sought to determine the relationship between athlete identity and satisfaction in relation to demographics such as gender, year of study, and level of competition among university student-athletes. These variables are considered very important in understanding the factors that contribute to athlete satisfaction and well-being. Athletes who have a strong athlete identity are more likely to be satisfied with their sports participation and overall well-being. Sports practitioners can use this information to create programs and interventions that support the development of strong athlete identities among their athletes. This has a bearing on coaches since it helps them develop more effective coaching strategies that promote athlete satisfaction and well-being, set realistic goals, and manage stress. Sports practitioners can use the findings of this study to identify athletes who may be at risk for burnout and to create a more positive and supportive athletic environment for them.

The findings on athlete identity suggested that male and female student-athletes possess strong athlete identity although female student-athletes had slightly higher athlete identity. The findings align with a study by López et al., (2015) that established female athletes had high athlete identity. However, these findings contradicted Şekeroğlu (2017) study which found males to possess high athlete identity, and a significant difference existed between male and female athletes unlike in this study where there was no significant relationship between gender and athlete identity. The difference in findings is suggested to arise from variations in the variable measured as well as the methodology applied (e.g., literature review- Şekeroğlu (2017) and cross-sectional study-present study) between the two studies. The finding implied a correlation between self-identity and gender (p=.003) where male student-athletes demonstrated relatively low on this construct (3.93 ± 0.503) (Table 1).

These findings infer that student-athletes view themselves as athlete vary and male student-athletes have a relatively weak self-identity. Overall, at the subcomponent level of athlete identity, the findings showed a similar trend where male and female student-athletes had high positive affectivity and low social identity. Despite the limited literature for comparison on these constructs, Knudsen et al., (2020) stressed the significance of positive affectivity in college sports as it reveals positive attitudes of students which they experience from their athletic identity. Positive affectivity influences the cheerfulness, enthusiasm, and pride of student-athletes (Waner, 2021). Based on the present study findings it can be suggested that both male and female student-athletes have a positive perception, satisfaction, and fulfillment drawn from being athletes. However, they have yet to see themselves as part of a team or university sports program as indicated by low social identity.

A negative and significant relationship between the level of competition and athlete identity was established (p =.010) among the student-athletes who responded, with athletes competing

at high-level competitions reporting high athlete identity. The finding suggested that competing in high-level competitions (e.g., Kenya National Federations, East Africa Games) was viewed as prestigious and consequently high athlete identity. Related findings were reported by Ahmadabadi et al., (2014) and Quinaud et al., (2020). At the sub-component level, a negative and significant relationship was established between self-identity ($p = 0.030$), exclusivity ($p = .008$), and level of competition. Regarding self-identity, results implied that student-athletes competing in low-level competitions (e.g., interschool games) were affected by dual-role conflict more than student-athletes competing at high levels. The findings also alluded that student-athletes competing in low-level competitions were less committed to their athlete role (exclusivity) compared to athletes competing in high levels.

Demographic characteristics (level of competition, year of study and gender) explained a small proportion (3.5%) of change in athlete identity of participated Kenya university student-athletes. Furthermore, student-athletes level of competition and year of study predicted athlete identity. Despite scarce empirical evidence for comparison, these results suggest there are other factors (not evaluated in this study) affecting athlete identity. Studies on athlete identity have shown that athlete identity is a dynamic construct and is susceptible to various factors among other athlete's skills, experience, confidence (Carless & Douglas, 2013) career prospects, and education (Quinaud et al., 2020). The findings imply that although investigated demographic factors have a role in the formation of student-athlete identity, its development is multifaceted and multiple factors play valuable roles in its formation.

The findings on athlete satisfaction by gender revealed female student-athlete satisfaction was somewhat higher than their male counterparts and the relationship was significant ($p = .017$). The findings were incongruent with Dorsch et al., (2009) and Harwood et al., (2000) that reported male athletes have high athlete satisfaction. However, differences in findings were ascribed to different measures involved, for example, Dorsch et al., (2009) investigated athlete satisfaction by examining the source of satisfaction whereas Harwood et al., (2000) assessed student-athlete satisfaction about competence. However, the findings of this study were consistent with a study by Smucker et al., (2010) which found that female student-athletes expressed higher levels of satisfaction particularly with their coach. At the sub-component level, the findings demonstrated a weak but significant relationship between genders on all the facets ($p < .05$).

It was established that female student-athletes support good team support affiliation but show low personal dedication. Contrarily, male student-athletes demonstrated high personal dedication but showed low satisfaction with the role of coach. The findings infer that participated female student-athlete satisfaction is due to good team support that informs solidarity, encouragement, and skill development. Good team support enhances athlete's self-esteem, confidence, and mental wellness which are valuable in promoting athlete satisfaction. The low personal dedication reported by participating female student-athletes suggests inadequate determination and drive in their role as athletes. Regarding male student-athletes, their athlete satisfaction is affected by the role of coach, but they show high enthusiasm (high score on personal dedication). It is therefore imperative for coaches to provide more support (psychological support, performance analysis, evaluation) to athletes besides skills

development to enhance athlete satisfaction (Banwell and Kerr, 2016). Coaches also need to pay attention to their relationship with athletes because it affects athletes' behaviors and subsequently performance.

The finding on athlete satisfaction and level of competition of student-athletes described that athlete satisfaction increased as the competition level was perceived prestigious, and the relationship was significant. Related findings were reported by Jones (2012) and Swindell et al., (2019). At the sub-component levels team task contribution support and individual performance returned a negative but significant relationship with the level of competition. From these findings it can be argued that participating university student-athletes competing at a perceived low level of competition (KUSA and interschool competitions) are affected more by team support, collaboration, and cohesion (team task contribution support) and incentives or recognition (individual performance recognition) than those competing at high level of competition such as (Kenya federations, East Africa University Games).

The influence of examined demographic characteristics was found to explain only a 3.2% change in student-athlete satisfaction and only level of competition ($p = .007$) and gender ($p = .012$) predicted athlete satisfaction of participating Kenya University student-athletes. Despite the limited literature available evidence on the subject indicates other variables such as goal achievement, team environment, and mental wellness can impact student-athlete satisfaction (Foster & Huml, 2019; Quinaud et al., 2020). Due to scarce literature in this area, these findings should be interpreted with caution.

Conclusions and Recommendations

Based on the findings of the study, it can be concluded that athlete identity is similar among male and female student-athletes. Male student-athletes tend to have a weaker self-identity. The study also concludes that student-athletes in low-level competitions possess a weaker sense of identity. Furthermore, the study revealed a gender-based athlete satisfaction difference, with female student-athletes reporting higher satisfaction. University sports departments and programs should work towards equitable treatment, offering access to training facilities and higher-level competitions for female athletes to counter existing social expectations. To build on these findings, future studies should delve into athlete identity beyond demographic factors. Exploring coach leadership, education goals, injuries, and other variables can provide a more comprehensive understanding of athletic identity and satisfaction and add to the limited literature, especially in Kenya.

Conflicts of Interest: The authors declare that they have no conflict of interest in relation to this manuscript.

Authors' Contribution: Study Design- IKK & FMM; Data Collection-IKK, Statistical Analysis and Manuscript Preparation-IKK, FMM, ERG & AWK. All authors read and approved of the final manuscript.

Ethical Approval
Ethics Committee: Kenyatta University Ethics Review Committee
Date/Protocol number: PKU/2511/11638

REFERENCES

Ahmadabadi, Z. N., Shojaei, M., & Daneshfar, A. (2014). The relationship between athletic identity and sports performance among national rowers during different seasons of competition. *Pedagogics, Psychology, Medical-Biological Problems of Physical Training and Sports, 18*(10), 62-66. https://doi.org/10.5281/zenodo.10492

Banack, H. R., Sabiston, C. M., & Bloom, G. A (2011). Coach autonomy support, basic need satisfaction, and intrinsic motivation of Paralympic athletes. *Research Quarterly for Exercise and Sport, 82*(4), 722–730. https://doi.org/10.1080/02701367.2011.10599809

Banwell, J., & Kerr, G. (2016). Coaches' perspectives on their roles in facilitating the personal development of student-athletes. *Canadian Journal of Higher Education*, *46*(1), 1-18. https://doi.org/10.47678/cjhe.v46i1.185109

Carless, D., & Douglas, K. (2013). "In the boat" but "selling myself short": Stories, narratives, and identity development in elite sport. *The Sport Psychologist*, *27*(1), 27-39. https://doi.org/10.1123/tsp.27.1.27

Contreira, A. R., Nascimento Junior, J. R. A. D., Caruzzo, N. M., Costa, L. C. A. D., Gaion, P. A., Melo, S. V. A., & Fiorese, L. (2019). Basic psychological needs and sports satisfaction among Brazilian athletes and coaches: The mediating role of the dyadic relationship. *Frontiers in Psychology*, *10*, Article 2543. https://doi.org/10.3389/fpsyg.2019.02543

Davis, L., Jowett, S., & Tafvelin, S. (2019). Communication strategies: The fuel for quality coach-athlete relationships and athlete satisfaction. *Frontiers in Psychology*, *10*, Article 2156. https://doi.org/10.3389/fpsyg.2019.02156

Dorsch, M., Schinke, S., & Schaal, K. (2009). Investigating athlete satisfaction by examining the source of satisfaction. *Journal of Sport Management*, *23*(2), 123-142.

Edison, B. R., Christino, M. A., & Rizzone, K. H. (2021). Athletic identity in youth athletes: A systematic review of the literature. *International Journal of Environmental Research and Public Health*, *18*(14), 7331. https://doi.org/10.3390/ijerph18147331

Eys, M. A., Loughead, T. M., & Hardy, J. (2007). Athlete leadership dispersion and satisfaction in interactive sport teams. *Psychology of Sport and Exercise*, *8*(3), 281-296. https://doi.org/10.1016/j.psychsport.2006.04.005

Foster, S. J. L., & Huml, M. R. (2019). The Relationship between athletic identity and academic major chosen by student-athletes. *International Journal of Exercise Science*, *10*(6), 915–925. https://doi.org/10.1016/0042-6989 (79)90045-2

Hagiwara, K., & Isogai, S. (2013). Athletic identity and social supports in relation to formation of sports commitment in Japanese male high school students. *Journal of Applied Sport Psychology*, *25*(2), 186-201. https://doi.org/10.5997/sposun.23.2_227

Harwood, C., Hardy, L., & Swain, A. (2000). Achievement goals in sport: A critique of conceptual and measurement issues. *Journal of Sport and Exercise Psychology*, *22*(3), 235-255. https://doi.org/10.1123/JSEP.22.3.235

Hilliard, R. C., Blom, L., Hankemeier, D., & Bolin, J. (2017). Exploring the relationship between athletic identity and beliefs about rehabilitation overadherence in college athletes. *Journal of Sport Rehabilitation*, *26*(3), 208-220. https://doi.org/10.1123/jsr.2015-0134

Jones, M. V. (2012). The mediating role of athlete satisfaction on the relationship between role dimensions and team commitment. *Journal of Sport & Exercise Psychology, 34*(1), 122-136.

Jowett, S., & Frost, T. (2007). Race/Ethnicity in the all-male coach-athlete relationship: Black footballers' narratives. *International Journal of Sport and Exercise Psychology*, *5*(3), 255-269. https://doi.org/10.1080/1612197X.2007.9671835

Jowett, S., & Ntoumanis, N. (2004). Coach-athlete relationship and burnout in sport: A review of the literature. *Journal of Applied Sport Psychology, 16*(2), 171-189.

Knudsen, J. V., Elkrog-Hansen, L. M., & Christiansen, L. B. (2020). Life skills through school sport: A participatory teacher development program. *Advances in Physical Education, 10*(03), 293–310. https://doi.org/10.4236/ape.2020.103024

Lee, K., Kang, S., & Kim, I. (2017). Relationships among stress, burnout, athletic identity, and athlete satisfaction in students at Korea's physical education high schools: Validating differences between pathways according to ego resilience. *Psychological Reports, 120*(4), 585-608. https://doi.org/10.1177/0033294117698465

López de Subijana, C., Barriopedro, M., & Sanz, I. (2015). Dual career motivation and identity on elite athletes. *Revista de Psicologia Del Deporte, 24*(1), 55–57.

Martin, L. A., Fogarty, G. J., & Albion, M. J. (2014). Changes in athletic identity and life satisfaction of elite athletes as a function of retirement status. *Journal of Applied Sport Psychology*, *26*(1), 96-110. https://doi.org/10.1080/10413200.2013.798371.

Quinaud, R. T., Gonçalves, C. E., Capranica, L., & Carvalho, H. M. (2020). Factors influencing student-athletes' identity: A multilevel regression and poststratification approach. *Perceptual and Motor Skills*, *127*(2), 432-447. https://doi.org/10.1177/0031512519899751

Rees, T., Alexander Haslam, S., Coffee, P., & Lavallee, D. (2015). A social identity approach to sport psychology: Principles, practice, and prospects. *Sports Medicine, 45*, 1083-1096. https://doi.org/10.1007/s40279-015-0345-4

Rhind, D., Jowett, S., & Lorimer, R. (2011). The impact of social support on student athletes' satisfaction in individual sports. *Journal for the Study of Sports and Athletes in Education*, *5*(1), 73-84. https://doi.org/10.1179/ssa.2011.5.1.73

Riemer, H. A., & Chelladurai, P. (1998). Development of the Athlete Satisfaction Questionnaire (ASO). *Journal of Sport & Exercise Psychology*, *20*(2), 127-156. https://doi.org/10.1123/JSEP.20.2.127

Rintaugu, E. G., Mwangi, F. M., Thangu, E. K., & Otieno, M. (2020). Relationship between participation motives and connection to soccer of male university players. *International Journal of Psychology and Counselling*, *12*(4), 152-158. https://doi.org/10.5897/IJPC2020.0618

Schmidt, N. A., & Brown, J. M. (2019). *Evidenced-based practice for nurses: Appraisal and application of research (4th Ed.).* Jones and Bartlett.

Şekeroğlu, M. Ö. (2017). Study of the concepts of athletic identity and continuous sport self-confidence in the light of various variables. *Journal of Education and Training Studies*, *5*(13), 44-51. https://doi.org/10.11114/jets.v5i13.2901

Smith, A. L., & Cushion, C. J. (2006). Coach leadership and athlete satisfaction in youth sport. *Journal of Sport & Exercise Psychology*, *28*(4), 569-589.

Smucker, B. E., Curtis, M. C., & Clevenger, T. A. (2010). Gender differences in collegiate athletes' satisfaction with coaches. *Journal of Sport Behavior, 33*(3), 308-325.

Swindell, H. W., Marcille, M. L., Trofa, D. P., Paulino, F. E., Desai, N. N., Lynch, T. S., ... & Popkin, C. A. (2019). An analysis of sports specialization in NCAA Division I collegiate athletics. *Orthopaedic journal of Sports Medicine*, *7*(1), 1-7. https://doi.org/10.1177/2325967118821179

Turkeli, A. (2020). An Examination of the athletic identities of High School Students. *Asian Journal of Education and Training*, *6*(3), 426-432.

Unruh, S., Unruh, N., Moorman, M., & Seshadri, S. (2005). Collegiate student-athletes' satisfaction with athletic trainers. *Journal of Athletic Training, 40*(1), 52-55.

van Rens, F. E., Ashley, R. A., & Steele, A. R. (2019). Well-being and performance in dual careers: The role of academic and athletic identities. *The Sport Psychologist*, *33*(1), 42-51. https://doi.org/10.1123/tsp.2018-0026

Yamane, T. (1967). *Statistics: An introductory analysis.* Harper and Row. 2nd Ed.

Spor Bilimleri Araştırmaları Dergisi
Journal of Sport Sciences Research
Vol: 9, Issue: 3, October 2024
E-ISSN: 2548-0723
URL: http://www.dergipark.org.tr/jssr

Gender-Specific Physiological Profiles and Performance Metrics in Young Elite Table Tennis Players*

Afaf Munther Dawood BILAL[1], Seyed Houtan SHAHIDI[1†]

[1]Faculty of Sports Sciences, Department of Sports Coaching, Istanbul Gedik University, Istanbul, Türkiye.

Research Article
Received: 17.07.2024 Accepted:25.09.2024 **DOI: 10.25307/jssr.1517758**
Online Published: 31.10.2024

Abstract

Table tennis requires a combination of anaerobic and aerobic energy systems, agility, short reaction times, and precise motor skills. The aim of this study is to investigate gender-specific physiological profiles and performance measures in young elite table tennis players. The objectives are to identify key physical and anthropometric attributes contributing to table tennis performance, compare these attributes between male and female athletes, and develop targeted training recommendations. The study involved sixteen players (8 males and 8 females) within the age range of 10 to 18 years who train regularly at Istanbul Pendik Sports Hall. Inclusion criteria required training at least three times per week and participating at championship levels. Anthropometric measurements were taken using a Seca 220R stadiometer and a Seca 710R weighing scale, with body fat percentage estimated via a Tanita scale. Performance tests included vertical jump height (Witty Microgate device), reaction times (custom device), and heart rates (Activio Sport System). Assessments were carried out between 4:00 PM and 6:00 PM. Male athletes had higher mean values in height (159.00 ± 13.29 cm), weight (50.00 ± 12.06 kg), and vertical jump height, whereas female athletes had better reaction times (1.17 ± 0.14 seconds). No statistically significant differences were found in body fat percentage and mean heart rate. t-Tests revealed that gender differences in most performance metrics were not statistically significant, but correlation analysis showed statistically significant relationships between various physical characteristics and performance outcomes ($p<0.05$). As a result, physical fitness and reaction time are crucial for table tennis performance. Tailored training programs should focus on these attributes to enhance performance in young elite players. Future studies should follow these metrics longitudinally to understand their impact on competitive success.

Keywords: Physical attributes, Anthropometric characteristics, Performance, Heart rate, Reaction time

*This Manuscript is derived from the Master's thesis titled "Investigation of the Anthropometric Characteristics and Heart Rates of Table Tennis Players" conducted by Afaf Munther Dawood BILAL under the Supervision of Dr. Seyed Houtan SHAHIDI.

†**Corresponding Author**: Seyed Houtan SHAHIDI, **E-mail:** houtan.shahidi@gedik.edu.tr

INTRODUCTION

Table tennis, a sport with a rich global presence, boasts over 300 million participants worldwide, including 40 million competitive players, making it one of the most popular racket sports (Chu, 2020). Over the past decade, the sport has undergone significant changes to its rules and equipment, including the introduction of plastic balls, an increased ball diameter, a 11-point scoring system, and time-outs. Collectively, these changes have increased its appeal and competitive dynamics (Faber et al., 2017).

Table tennis, characterised by its fast pace and high-intensity action, requires a combination of anaerobic and aerobic energy systems (Faber et al., 2021). Approximately 4% of the effort in a match relies on anaerobic pathways, while 96% relies on aerobic metabolism, with blood lactate concentrations rarely exceeding 2 mmol/L, highlighting the dominance of aerobic capacity (Kondrič et al., 2013). Despite the dominance of aerobic energy systems, the short-duration high-intensity actions necessitate significant alactic anaerobic endurance, with each critical action lasting around 3.5 seconds (Milioni et al., 2018). The sport requires players to react to ball speeds of up to 120 km/h, sometimes even 160 km/h, within a small playing table (Zhang et al., 2019). This requires exceptional agility, fast reaction times and precise motor coordination. Players must constantly analyze the game, react quickly, and execute techniques with precision, often within fractions of a second (Widodo & Nahimana, 2021).

The high-speed movements involve rapid accelerations and braking actions, combined with the execution of various techniques by the dominant arm (Huang et al., 2015). Table tennis players must develop a specific physical profile that includes speed, strength, endurance, and advanced perceptual and decision-making skills (Chen et al., 2016). Research has shown that playing table tennis improves hand-eye coordination, balance, cognitive function, and overall physical fitness, including cardiovascular health and flexibility (Yamasaki, 2022). These attributes are critical for maintaining peak performance and overall health across different age groups (Shahidi et al., 2020; Shahidi, et al., 2023). Extensive research into table tennis players' physical and cognitive attributes has identified several key performance indicators. Vertical jump height, hand grip strength, ergo spirometry measures commonly assess these attributes (Picabea et al., 2021). Studies have shown that male players typically exhibit higher values in vertical jump, handgrip strength, and maximum oxygen consumption values, and move laterally faster than female players. Conversely, female players often have superior reaction times on their dominant side (Gutiérrez-Betancur et al., 2022). Understanding the physical and anthropometric characteristics is crucial for individual performance (Eimuhi, 2019). A study conducted by Sperlich et al., 2011 revealed that physical and anthropometric characteristics contribute to table tennis performance, and is crucial for developing targeted training programs and talent identification protocols. This knowledge helps coaches and strength and conditioning professionals design effective training regimens that enhance players' strengths and address their weaknesses, ultimately improving overall performance and success in competitive settings (Basiri et al., 2020; Eimuhi et al., 2024).

Therefore, the primary aim of this study is to provide a comprehensive assessment of the physical and anthropometric characteristics of young elite table tennis players. Specifically, the study seeks to:

1. Identify key physical and anthropometric characteristics that contribute to table tennis performance.
2. Compare these attributes between male and female athletes to highlight gender-specific differences.
3. Based on the findings, develop targeted training recommendations to improve the performance of elite table tennis players.

This study hypothesizes that specific physical and anthropometric characteristics, such as vertical jump height, reaction time, and body composition, significantly influence table tennis performance. Furthermore, it is anticipated that these characteristics will differ between male and female athletes, reflecting distinct physical demands and training adaptations in elite table tennis.

METHOD

Study Design and Sampling

This study was designed with a quantitative research model. This study involved sixteen players (8 males and 8 females) young table tennis players between the ages of 10 and 18. Participants were randomly selected from those who regularly trained at Istanbul Pendik Sports Hall. This study involved young elite table tennis players aged 10 to 18 years (M = 13.80, SD = 2.66; height, 159.00 ± 13.29 cm; weight, 50.00 ± 12.06 kg; body fat percentage, 22.49 ± 5.71%; body fat mass, 11.28 ± 5.94 kg; Figure 1). Participants were randomly selected from those who regularly trained at the Istanbul Pendik Sports Hall. To be included in the study, athletes had to meet the following criteria: be aged 10 to 18 years, train at least three times per week, and have competed at championship levels, including Turkish, national, and international table tennis competitions. Athletes were excluded if they had any health issues that could impede regular training or if they could not provide informed consent.

Familiarization

Before the assessment day, the researchers communicated with each participant and explained the risks and benefits associated with their participation in the study. A written informed consent form was then given to all participants to ensure they understood the voluntary nature of their participation and their right to withdraw at any time during the study.

Anthropometric Assessments

Body height and weight measurements were obtained using precise instruments: the Seca 220R telescopic stadiometer (measuring range: 85-200 cm; precision: 1 mm) and Seca 710R weighing scale (capacity: 200 kg; precision: 50 g). Body fat percentage was estimated using the Tanita scale, where participants stood barefoot on the scale's footpads. The Tanita device

utilized bioelectrical impedance to estimate body fat percentage, with height, weight, and age inputted into the device. All measurements were taken in duplicate, and the average was recorded to ensure accuracy (Shahidi et al., 2023).

Data Collection

After the anthropometric measurements, the athletes performed a 10-minute warm-up. All research assessments and tests were meticulously conducted between 4:00 PM and 6:00 PM. Data collection took place from March 2024 to May 2024, with each session lasting approximately two hours per participant. Data was collected on various physical performance metrics, including anthropometric measurements, jump test results, reaction test results, and heart rate data during table tennis games. Participants were categorized by gender (male and female).

Jump Tests and Measurement Devices

The physical performance of the athletes was assessed using the following equipment and methods. The Witty Microgate Mat (Italy) was used to measure vertical jump height. Each athlete performed the jump test three times and the highest jump was recorded. Performed using the Witty Microgate device to measure vertical jump height. Each athlete was allowed three attempts, with the highest value recorded.

BlazePod Reaction Time Test:

Athletes stood one meter from a table equipped with four small devices (BlazePod™) to measure reaction times. These devices were connected to a smartphone via Bluetooth. The "Random" mode was selected from the app, and the BlazePod discs were placed at 20-cm intervals in a triangular configuration. During the test, participants assumed a quadrupedal position and touched the illuminated pods with their right and left hands respectively. The test began with a 'start' command and ended with a 'stop' command from the smartphone. Reaction times were recorded for each of the 20 stimuli, and the number of hits and average reaction time over 20 seconds were documented. The procedure measured athletes' response times to both visual and auditory stimuli. In addition to reaction time data, resting, training, and maximum heart rates were recorded. Following these measurements, athletes competed in matches, and their performance results were included in the analysis.

Heart Rate Monitoring

Heart rate data were collected for each subject during non-formal table tennis matches using heart rate monitors in the Activio Sport System (Activio AB, Stockholm, Sweden). The heart rate monitors recorded the heart rate in real-time as a percentage of the maximum heart rate (% of Max HR). This system recorded heart rates during rest, training, and maximum effort. After the match concluded, all the collected data was documented. Each subject was equipped with a heart rate monitor before the start of the match. The maximum heart rate for each subject was predetermined based on their profiles. The collected heart rate data were segmented into three domains based on % of Max HR: Moderate, 0-50% of Max HR Heavy, 50-75% of Max HR, and Severe: 75-100% of Max HR. The data were plotted to visualize the heart rate fluctuations

over time, with distinct colors representing the different intensity domains (Buchheit & Laursen, 2013).

Ethical Approval

Informed consent forms were obtained from the athletes' parents and coaches before participation. The study was conducted in accordance with ethical standards outlined in the Declaration of Helsinki and approved by the institutional ethics committee (Ethics Number: E-56365223-050.02.04-2023.137548.23).

Statistical Analysis

Power analysis was performed using the G*Power program to determine the number of participants required for the study. Based on the results obtained, the study included 16 participants. Central tendency and dispersion metrics were computed for all continuous variables. Independent samples t-Tests were conducted to compare performance metrics between genders, with 95% confidence intervals calculated for the mean differences. Pearson correlation coefficients were calculated to explore relationships between different performance metrics. All statistical analyses were conducted using SPSS Version 26 (IBM Corp., Armonk, NY, USA).

RESULTS

Table 1 presents the means, standard deviations (SD), and 95% confidence intervals (CI) for various physical performance metrics of table tennis athletes. The ± notation is used to denote the mean and standard deviation, while the 95% confidence intervals indicate the range within which the true mean of the population is expected to fall with 95% confidence.

Table 1. Descriptive statistics for physical and performance variables

Variable	*Mean ± SD*	*95% CI*
Age (years)	13.80 ± 2.66	11.90 to 15.70
Height (cm)	159.00 ± 13.29	149.49 to 168.51
Weight (kg)	50.00 ± 12.06	41.38 to 58.62
Body Fat (%)	22.49 ± 5.71	18.40 to 26.58
Body Fat (kg)	11.28 ± 5.94	7.03 to 15.53
Flight Time (s)	43.28 ± 135.53	-53.67 to 140.23
Contact Time (s)	3.03 ± 1.51	1.94 to 4.11
Power (W/kg)	12.52 ± 1.64	11.35 to 13.69
Average Reaction Time (s)	1.17 ± 0.14	1.07 to 1.27
Peak HR (bpm)	166.90 ± 16.60	155.02 to 178.78
Average HR (bpm)	123.60 ± 24.41	106.14 to 141.06

Note: HR = Heart Rate; CI = Confidence Interval.

Table 2. Descriptive statistics and statistical analysis for physical and performance variables

Variable	*Mean ± SD*	*95% CI*	*t-statistic*	*p-value*	*Mean Difference ± 95% CI*
Age (years)	13.80 ± 2.66	11.90 to 15.70	0.291	0.779	0.50 ± 3.96
Height (cm)	159.00 ± 13.29	149.49 to 168.51	0.291	0.779	2.50 ± 19.81
Weight (kg)	50.00 ± 12.06	41.38 to 58.62	0.374	0.719	2.92 ± 18.94
Body Fat (%)	22.49 ± 5.71	18.40 to 26.58	0.286	0.783	1.07 ± 8.61
Body Fat (kg)	11.28 ± 5.94	7.03 to 15.53	0.930	0.382	3.13 ± 7.77
Flight Time (s)	43.28 ± 135.53	-53.67 to 140.23	1.000	0.363	71.41 ± 164.92
Contact Time (s)	3.03 ± 1.51	1.94 to 4.11	0.209	0.841	0.18 ± 1.95
Power (W/kg)	12.52 ± 1.64	11.35 to 13.69	-0.050	0.962	-0.06 ± 2.83
Avg. Reaction Time (s)	1.17 ± 0.14	1.07 to 1.27	0.459	0.664	0.05 ± 0.23
Exertion	39.47 ± 19.69	25.39 to 53.56	-0.816	0.460	-11.97 ± 33.83
Peak HR (bpm)	166.90 ± 16.60	155.02 to 178.78	-1.377	0.217	-14.33 ± 23.66
Avg. HR (bpm)	123.60 ± 24.41	106.14 to 141.06	-0.782	0.475	-14.00 ± 41.29

Note: HR = Heart Rate; CI = Confidence Interval.

Table 2 presents a comparison of performance metrics between male and female table tennis athletes, including mean values, standard deviations, and t-test results for statistical significance (Figure 1). The analysis reveals no significant differences between genders in terms of anthropometric and physical performance metrics ($p > 0.05$).

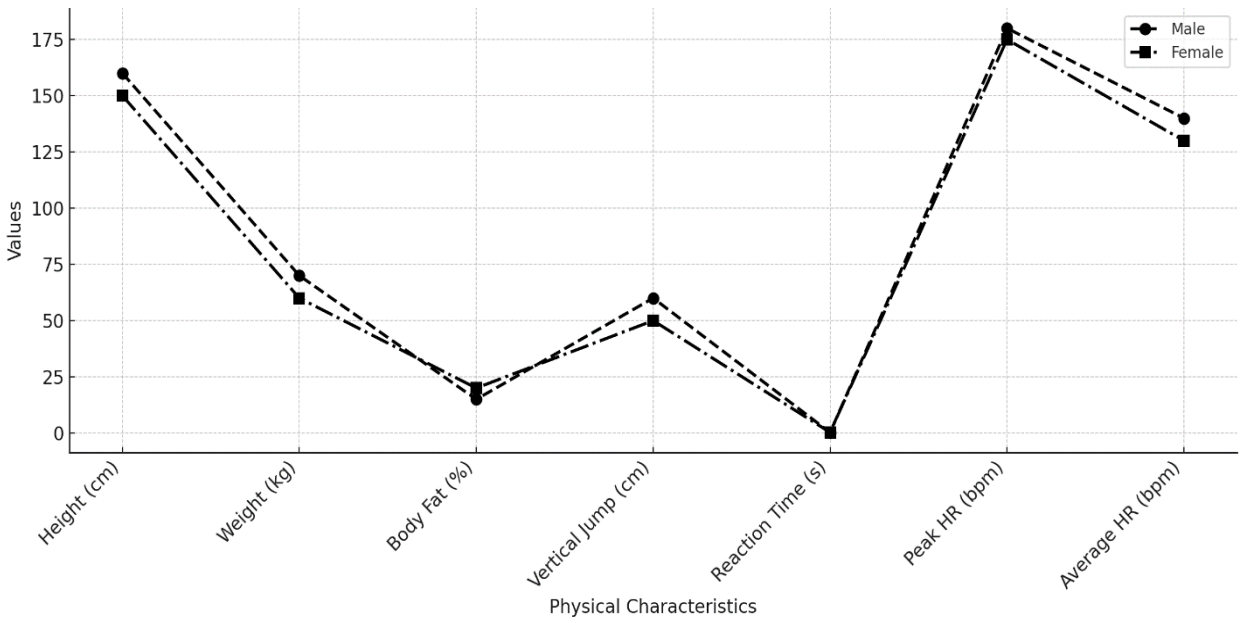

Figure 1. The physical performance characteristics of male and female athletes are presented here. The measurements include height, weight, body fat percentage, vertical jump height, reaction time, peak heart rate, and average heart rate.

Table 3. Comparison of performance metrics based on gender with t-test results

Performance Metric	*Male Mean ± SD*	*Female Mean ± SD*	*t-Test Result (p-value)*
Height (cm)	159.00 ± 13.29	156.50 ± 12.50	0.619
Weight (kg)	50.00 ± 12.06	47.08 ± 11.00	0.614
Body Fat (%)	22.49 ± 5.71	21.42 ± 5.20	0.714
Vertical Jump (cm)	43.28 ± 135.53	41.50 ± 130.00	0.977
Reaction Time (s)	1.17 ± 0.14	1.12 ± 0.12	0.539
Peak HR (bpm)	166.90 ± 16.60	164.00 ± 15.30	0.742
Average HR (bpm)	123.60 ± 24.41	121.45 ± 23.00	0.855

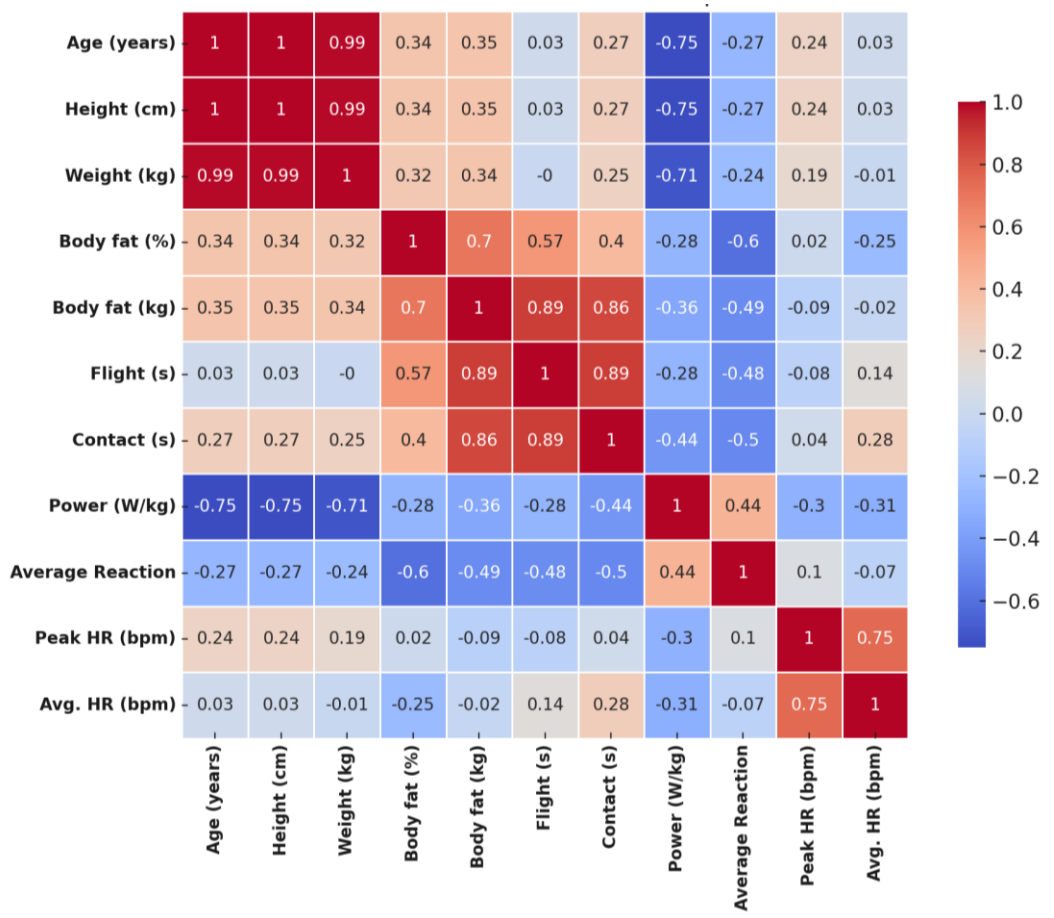

Figure 3. Correlation matrix

The correlation matrix reveals significant relationships between several performance metrics, providing insights into how different aspects of physical performance are interrelated (Figure 3). Age, Height, and Weight: There is a strong positive correlation between Age and Height (r = 1.00), as well as between Height and Weight (r = 0.99), indicating that as players grow older, they tend to be taller and heavier. Body Fat and Performance Metrics: Notably, Body Fat (kg) is strongly correlated with Flight Time (r = 0.89) and Contact Time (r = 0.86), suggesting that athletes with higher body fat tend to experience longer flight and contact times during

jumping activities. This could reflect the impact of body composition on explosive power performance. However, Body Fat Percentage shows a weaker correlation with most performance metrics. Power and Age: There is a significant negative correlation between Age and Power (W/kg) (r = -0.75), meaning that younger athletes tend to exhibit higher power-to-weight ratios compared to older ones. This may reflect a decline in relative power output with age in this specific sample. Reaction Time and Body Fat: Average Reaction Time is negatively correlated with Body Fat (%) (r = -0.60), suggesting that athletes with higher body fat percentages tend to have slower reaction times, which could impact performance in quick-response activities such as table tennis. Heart Rate: A moderate positive correlation exists between Peak Heart Rate and Average Heart Rate (r = 0.75), as expected. However, there is little to no correlation between Body Fat (%) and Peak Heart Rate (r = 0.02), indicating that heart rate responses to physical activity are largely independent of body fat composition in this sample.

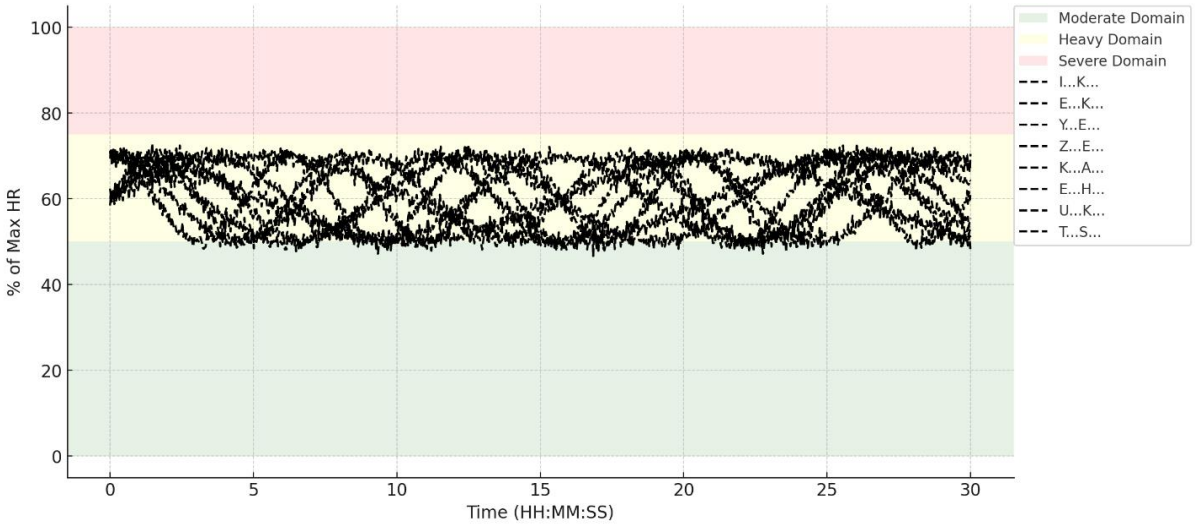

Figure 4. Heart rate data analysis

The heart rate (% of Max HR) data for each subject over the time of the study was plotted and analyzed. The data was divided into three domains based on % of Max HR: moderate (0-50%), heavy (50-75%), and severe (75-100%).

DISCUSSION

This study investigated various performance metrics among male and female table tennis athletes, including height, weight, body fat percentage, vertical jump, reaction time, peak heart rate (HR), and average HR. The results showed no statistically significant differences between male and female athletes in any of the metrics measured indicating similar physical and physiological capabilities. The average height and weight of male athletes were slightly higher than those of female athletes, which aligns with general anthropometric trends in sports. However, these differences were not statistically significant (p-values of 0.619 and 0.614, respectively). Previous studies also support these findings, suggesting that while males typically exhibit higher values in these metrics, the differences do not significantly affect performance outcomes in table tennis (Faber et al., 2012; Faber et al., 2021). The body fat percentages of male and female athletes were 22.49% and 21.42%, respectively, with no significant difference ($p = 0.714$). This aligns with findings that elite athletes maintain body fat percentages within a healthy range to optimize performance and agility (Shahidi, Yalçın, et al., 2023). Maintaining low body fat is crucial for maximizing power-to-weight ratio and agility, essential in high-speed sports like table tennis. Vertical jump heights averaged 43.28 cm for males and 41.50 cm for females, with no significant difference ($p = 0.977$). Vertical jump measures explosive leg power, crucial for quick lateral movements and powerful strokes in table tennis. The similarity in vertical jump performance between genders suggests comparable levels of explosive power, a critical factor for success in the sport (Shahidi et al., 2023a; Shahidi et al., 2023b; Shahidi et al., 2024).

Reaction times were 1.17 seconds for males and 1.12 seconds for females, with no significant difference ($p = 0.539$). Reaction time is vital in table tennis, requiring rapid responses to the opponent's shots. Comparable reaction times between genders indicate that both male and female athletes possess the necessary reflexes for high-level competition. This is consistent with studies showing that reaction time is a key determinant of performance in high-speed sports and is not significantly influenced by gender (Shahidi, 2024).

Peak and average HR were slightly higher in males (166.90 bpm peak, 123.60 bpm average) compared to females (164.00 bpm peak, 121.45 bpm average), but these differences were not statistically significant (p-values of 0.742 and 0.855, respectively). Cardiovascular efficiency, as indicated by HR metrics, is critical for sustaining high-intensity play. Similar HR metrics between genders suggest comparable cardiovascular capacities, supporting the notion that both male and female athletes can sustain the high-energy demands of table tennis (Katsikadelis et al., 2014). Recent studies have investigated gender differences in table tennis from various angles. A study on the chasse-step technique found significant gender differences in kinematics, suggesting that males had greater hip and knee flexion angles and joint stiffness in the knee, while females exhibited greater hip flexion and internal rotation moments during the forward swing phase (He et al., 2022; Wong et al., 2020). These biomechanical differences imply that training programs should be individualized to address specific needs and prevent injuries. Another study compared the body composition of table tennis players across different performance levels and genders, finding that international-level players had lower body fat

percentages and higher muscle mass compared to national-level players, regardless of gender (Pradas et al., 2021; Zagatto et al., 2016). This highlights the importance of optimizing body composition for peak performance in elite athletes. The majority of the heart rate readings were within the heavy domain (50-75% of Max HR), indicating that the subjects were engaged in moderately intense activity throughout the matches. This suggests that non-formal matches still provide a significant cardiovascular challenge. Periods where heart rates reached the severe domain (75-100% of Max HR) were observed, particularly during more intense rallies. This indicates moments of high exertion, likely corresponding to competitive points or aggressive play styles. The moderate domain (0-50% of Max HR) was less frequently observed, highlighting that the subjects maintained a higher level of effort even during non-formal play (Picabea et al., 2021; Pradas et al., 2021).

Practical Implications for Coaches and Athletes

The absence of significant differences in performance metrics between male and female athletes suggests that training programs should be designed based on individual needs rather than gender-based assumptions. Coaches should focus on developing skills, strength, and agility tailored to each athlete's unique strengths and weaknesses. Both male and female athletes should engage in comprehensive training regimens that include strength conditioning, agility drills, and cardiovascular workouts to enhance overall performance.

Limitations and Future Research

While this study provides valuable insights, it is limited by its sample size and the specific population studied. Future research should include larger, more diverse samples and consider additional factors such as training intensity, experience level, and psychological aspects of performance. Longitudinal studies could also provide a deeper understanding of how these metrics influence performance over time. In conclusion, this study demonstrates that male and female table tennis athletes exhibit comparable performance metrics across various physical and physiological parameters. These findings support the notion of gender equality in table tennis performance potential and underscore the importance of individualized training approaches. Further research is needed to explore additional factors influencing performance and to validate these findings in broader athlete populations.

Conflicts of Interest

The authors have no conflicts of interest to declare.

Authors' Contribution

Research Design: SHS, and AMDB; Data Collection: SHS, and AMDB; Statistical Analysis: SHS; Preparation of the Article: SHS.

Ethical Approval

The study was conducted in accordance with the ethical standards outlined in the Declaration of Helsinki and was approved by the Istanbul Gedik University Ethics Committee (Ethics Number: E-56365223-050.02.04-2023.137548.23).

REFERENCES

Basiri, F., Farsi, A., Abdoli, B., & Kavyani, M. (2020). The effect of visual and tennis training on perceptual-motor skill and learning of forehand drive in table tennis players. *Journal of Modern Rehabilitation*, *14*(1), 21-32. https://doi.org/10.32598/JMR.14.1.3

Buchheit, M., & Laursen, P. B. (2013). High-intensity interval training, solutions to the programming puzzle: Part I: Cardiopulmonary emphasis. *Sports Medicine*, *43*(5), 313-338. https://doi.org/10.1007/s40279-013-0029-x

Chu, T. L. A. (2020). Table tennis. In *Edit., J. Nauright, S. Zipp, Routledge Handbook of Global Sport* (pp. 238-246). Routledge. https://doi.org/10.4324/9781315714264

Eimuhi, K. E. (2019). Morpho-anthropometric profile of Igbabonelimhin acrobatic dancers of Esan community in Edo State, Nigeria. *Turkish Journal of Kinesiology, 5*(2), 76-82. https://doi.org/10.31459/turkjkin.560386

Eimuhi, K, E., Ovbiebo, M. C., & Okonigene, D. E. (2024). *Electrolyte changes following a 10-week calisthenic-circuit training among University of Benin student athletes*. 4th University of Benin Annual Research Day (UBARD) Book of Conference Proceedings, 4, 153-156.

Faber, I., Nijhuis-Van der Sanden, M., & Oosterveld, F. (2012). A first step to an evidence-based talent identification program in the Netherlands: A Research proposal. *International Journal of Table Tennis Sciences*, *7*(1), 15-18.

Faber, I. R., Elferink-Gemser, M. T., Oosterveld, F. G., Twisk, J. W., & Nijhuis-Van der Sanden, M. W. (2017). Can an early perceptuo-motor skills assessment predict future performance in youth table tennis players? An observational study (1998–2013). *Journal of Sports Sciences*, *35*(6), 593-601. https://doi.org/10.1080/02640414.2016.1180421

Faber, I. R., Koopmann, T., Büsch, D., & Schorer, J. (2021). Developing a tool to assess technical skills in talented youth table tennis players—a multi-method approach combining professional and scientific literature and coaches' perspectives. *Sports Medicine-open*, *7*(1), Article 42. https://doi.org/10.1186/s40798-021-00327-5

Gutiérrez-Betancur, J. F., Pradas de la Fuente, F., Toro-Román, V., de la Torre, A., Moreno-Azze, A., & Ortega-Zayas, M. Á. (2022). Analysis of specific physical fitness in high-level table tennis players—sex differences. *Int. J. Environ. Res. Public Health, 19,* Article 5119. https://doi.org/10.3390/ijerph19095119

He, Y., Fekete, G., Sun, D., Baker, J. S., Shao, S., & Gu, Y. (2022). Lower limb biomechanics during the topspin forehand in table tennis: A systemic review. *Bioengineering*, *9*(8), 336. http://doi.org/10.3390/bioengineering9080336

Katsikadelis, M., Pilianidis, T., Mantzouranis, N., Fatouros, I., & Agelousis, N. (2014). Heart rate variability of young Table Tennis players with the use of the Multiball training. *Biology of Exercise*, *10*(2), 25-35. http://doi.org/10.4127/jbe.2014.0076

Kondrič, M., Zagatto, A. M., & Sekulić, D. (2013). The physiological demands of table tennis: a review. *Journal of Sports Science & Medicine*, *12*(3), 362-370.

Milioni, F., Leite, J. V. d. M., Beneke, R., De Poli, R. A. B., Papoti, M., & Zagatto, A. M. (2018). Table tennis playing styles require specific energy systems demands. *PloS One*, *13*(7), Article e0199985. https://doi.org/10.1371/journal.pone.0199985

Picabea, J. M., Cámara, J., Nakamura, F. Y., & Yanci, J. (2021). Comparison of heart rate variability before and after a table tennis match. *Journal of Human Kinetics*, *77*(1), 107-115. https://doi.org/10.2478/hukin-2021-0015

Picabea, J. M., Cámara, J., & Yanci, J. (2021). Physical fitness profiling of national category table tennis players: Implication for health and performance. *International Journal of Environmental Research and Public Health*, *18*(17), Article 9362. https://doi.org/10.3390/ijerph18179362

Pradas, F., de la Torre, A., Castellar, C., & Toro-Román, V. (2021). Physiological profile, metabolic response and temporal structure in elite individual table tennis: Differences according to gender. *International Journal of Environmental Research and Public Health*, *18*(22), Article 11898. https://doi.org/10.3390/ijerph182211898.

Shahidi, S. H. (2024). Alt maksimum ve maksimum egzersiz testlerinde oksijen ve laktat kinetiği. İçinde S*por bilimleri alanında akademik araştırma ve değerlendirmeler-II* (Editör: Uluç, E. A. & Uluç, S.). s. 63-76. https://doi.org/10.58830/ozgur.pub452.c1930

Shahidi, S. H., Carlberg, B., & Kingsley, D. (2023a). Talent identification and development in youth sports: A Systematic review. *International Journal of Kinanthropometry*, *3*(1), 73-84. https://doi.org/10.34256/ijk2318

Shahidi, S. H., Coşkun, G., & E. Holway, F. (2023b). Investigation of oxygen uptake kinetics and anthropometric profiles in elite kickboxing athletes. *International Journal of Kinanthropometry, 3*(2), 1–8. https://doi.org/10.34256/ijk2321

Shahidi, S. H., Çetiner, A., Güneş, F., Esformes, J. I., & Karakaş, S. (2024). Maturation and bio-banding in youth soccer players: Insights from Turkish male academy across U-10 to U-15 age. *International Journal of Strength and Conditioning*, *4*(1), 1-18. https://doi.org/10.47206/ijsc.v4i1.302

Shahidi, S. H., Williams, J. S., & Hassani, F. (2020). Physical activity during COVID-19 quarantine. *Acta Paediatrica (Oslo, Norway: 1992)*, *109*(10), Article 2147. http://doi.org/10.1111/apa.15420

Shahidi, S. H., Yalçın, M., & Holway, F. E. (2023). Anthropometric and somatotype characteristics of top elite Turkish national jumpers. *International Journal of Kinanthropometry*, *3*(2), 45-55. https://doi.org/10.34256/ijk2326

Shahidi, S. H., Yilmaz, L., & Esformes, J. (2023). Effect of maturity status and relative age effect on anthropometrics and physical performance of soccer players aged 12 to 15 Years. *International Journal of Kinanthropometry*, *3*(1), 58-72. https://doi.org/10.34256/ijk2317

Sperlich, B., Koehler, K., Holmberg, H.-C., Zinner, C., & Mester, J. (2011). Table tennis: Cardiorespiratory and metabolic analysis of match and exercise in elite junior national players. *International Journal of Sports Physiology and Performance*, *6*(2), 234-242. http://doi.org/10.1123/ijspp.6.2.234.

Widodo, H., & Nahimana, S. (2021). Reaction time test innovation of table tennis performance: Aiken validity. *PalArch's Journal of Archaeology of Egypt/Egyptology*, *18*(4), 7103-7110.

Wong, D. W.-C., Lee, W. C.-C., & Lam, W.-K. (2020). Biomechanics of table tennis: A systematic scoping review of playing levels and maneuvers. *Applied Sciences*, *10*(15), 5203. https://doi.org/10.3390/app10155203

Yamasaki, T. (2022). Benefits of table tennis for brain health maintenance and prevention of dementia. *Encyclopedia*, *2*(3), 1577-1589. https://doi.org/10.3390/encyclopedia2030107

Zagatto, A. M., Milioni, F., Freitas, I. F., Arcangelo, S. A., & Padulo, J. (2016). Body composition of table tennis players: comparison between performance level and gender. *Sport Sciences for Health*, *12*, 49-54. http://doi.org/10.1007/s11332-015-0252-y

Spor Bilimleri Araştırmaları Dergisi
Journal of Sport Sciences Research
Vol: 9, Issue: 3, 2024
E-ISSN: 2548-0723
URL: http://www.dergipark.org.tr/jssr

Investigation of Superstitious Behavior Tendencies of Professional Football Players and Coaches*

Hasan Buğra EKİNCİ[1†], Ahmet Yavuz MALLI[1], Emrah SEÇER[1]

[1]Erzincan Binali Yıldırım University, Faculty of Sport Sciences, Erzincan.

Research Article
DOI: 10.25307/jssr.1432085
Received: 16.02.2024 Accepted:18.09.2024 Online Published: 31.10.2024

Abstract

This study aims to elucidate the superstitious behavior tendencies of professional football players and club coaches. The research group consists of 22 football players and 9 football coaches selected through the "Criterion Sampling" method. The research is considered as basic qualitative research. These are qualitative research studies in which data are collected through documents, interviews, or observation analyses. The research design employed in this study is phenomenology (phenomenological research design) which is a qualitative research design. In this research, "Superstitious Belief" has been selected as the phenomenon and the meanings attributed to this phenomenon by football players and coaches are attempted to be revealed. Semi-structured interview forms have been prepared to identify the superstitious behavior tendencies of players and coaches. In this context, open-ended questions are asked to the participants to determine their superstitious behavior tendencies. The data obtained have been analyzed using the content analysis method. According to the findings, the Superstitious Behavior Tendency comprises a theme, a sub-theme, and six categories. Under the sub-theme of superstitious behavior tendencies among professional football players and coaches are the categories of Clothing-Appearance, Lucky Objects, Pre-match Ritual, In-match Behavior, Team Ritual, Faith and Prayer. The opinions of players and coaches regarding the questions prepared for this theme are presented. Word clouds have been created illustrating prominent codes under the identified categories based on data obtained from interviews with participants. In conclusion, beyond effective preparation and training phases for performance enhancement, it is discerned that some superstitious behavior tendencies exist among players, contributing to elevating their motivation and self-confidence to higher levels.
Keywords: Athlete, Coach, Football, Superstition

Profesyonel Futbolcu ve Antrenörlerin Batıl Davranış Eğilimlerinin İncelenmesi

Öz

Araştırmada profesyonel olarak futbol oynayan sporcuların ve profesyonel futbol kulüp antrenörlerinin batıl davranış eğilimlerini ortaya koymak amaçlanmıştır. Araştırma grubunu "Ölçüt (kriter) Örnekleme" yöntemiyle seçilen 22 futbolcu ve 9 futbol antrenörü oluşturmaktadır. Araştırma temel nitel araştırma olarak ele alınmıştır. Bu araştırmalar doküman, görüşme ya da gözlem incelemesi ile verilerin toplandığı nitel araştırma şeklidir. Desen olarak ise nitel araştırma desenlerinden fenomenoloji (olgu bilim) kullanılmıştır. Bu çalışmada olgu olarak "Batıl İnanç" seçilmiş, futbolcu ve antrenörlerin bu olguya yönelik yüklediği anlamları ortaya çıkarmaya çalışılmıştır. Araştırmada futbolcu ve antrenörlerin batıl davranış eğilimlerini saptamaya yönelik yarı yapılandırılmış görüşme formları hazırlanmıştır. Bu kapsamda katılımcılara batıl davranış eğilimlerini belirlemeye yönelik açık uçlu sorular sorulmuştur. Elde edilen veriler içerik analizi yöntemiyle çözümlenmiştir. Bulgulara göre Batıl Davranış Eğilimi bir temadan, bir alt temadan ve altı kategoriden oluşmuştur; profesyonel futbolcuların ve antrenörlerin batıl davranış eğilimleri alt teması altında Giyim-görünüş, Uğurlu nesne, Müsabaka öncesi ritüel, Müsabaka esnası davranış, Takımca ritüel, İnanç ve dua kategorilerden oluşmaktadır. Bu tema için hazırlanmış sorular hakkında futbolcu ve antrenörlerin görüşleri yer almaktadır. Katılımcılarla yapılan görüşmelerden elde edilen verilere göre belirlenen kategoriler altında öne çıkan kodları gösteren kelime bulutları hazırlanmıştır. Sonuç olarak performans artırma noktasında iyi bir hazırlığın ve çalışma evresinin ötesinde sporcuların kendi motivasyonlarını ve özgüvenlerini daha üst noktalara taşıyacak bazı batıl davranış eğiliminde olduğu anlaşılmıştır.
Anahtar Kelimeler: Antrenör, Batıl inanç, Futbol, Sporcu

---

* This research was presented as an oral presentation at ERPA International Congress on Education in Balıkesir, September 8-10, 2023

† **Corresponding Author:** Hasan Buğra Ekinci, **E-mail**: hasan.ekinci@erzincan.edu.tr

INTRODUCTION

Over the years, people have built their lives on their beliefs. Sometimes people have come up with these beliefs themselves. The most common of these beliefs among people is superstition (Mutlu et al., 2016). Superstitious beliefs and behaviors are a psycho-social phenomenon that has occurred in all parts of the world throughout history, be it the most primitive tribe or the most modern society (Günay, 2002). The word superstitious is defined in the Turkish dictionary as follows: it is described as untrue and unjustified, rotten, baseless and unfounded. And in the dictionary of psychology, it is defined as "the belief that the flow of natural events can be changed by supernatural or magical powers such as prayer, magic, black magic, carrying objects believed to bring good luck, having amulets written, and summoning spirits" (Budak, 2005).

Superstition is based on a supernatural power. It represents an unseen belief that influences. That people perform certain behaviors at certain times causes them to usually continue to perform these behaviors because when they do not perform them, they provide negative motivation by leaving question marks in the human brain (Burger and Lynn, 2005). It undeniably affects the emotions of individuals with strong superstitions (Liu et al., 2023). People are superstitious for many reasons (Khaenamkhaew, 2023). While these reasons, which differ from person to person, significantly affect people's lives (Çam and Çelik, 2023), it is stated that they will lead to positive results in their emotional states and mental actions (Vyse, 2022.) For example, the "Labarum" symbol, one of the symbols of Christianity, is believed to have helped Emperor Constantine win the Battle of Milvian Bridge (Dönmez and Sivaz, 2024). Superstitious behaviors, which associate patterns between different situations without any rationale, take place in the lives of individuals through phenomena such as clothes, substances, etc. that are part of daily life (Jirásek, 2024). One of the areas where these superstitious behavioral tendencies are frequently encountered is the field of sports, which plays an important role in our lives (Wilson et al., 2013). Sports and its inherent uncertainty provide fertile ground for superstitious behavior (Galily et al., 2023).

In Womack's (1992) definition of superstition in sports, he explains: It is the situation in which the actions of the athletes are repetitive, formal, sequential, and different from technical performance in situations where they feel strong in control of luck and other external factors. The role of superstition in sports is not new, it dates back to the beginning of this century (Kaushik et al., 2023). Athletes have generally focused on superstitious tendencies in areas that they think relieve anxiety and help them achieve success (Kanbir, 2022). Athletes, especially in situations with high stress levels, resort to superstitious behaviors to ensure the control and stability of the result and situation (Barut et al., 2016). In addition, athletes exhibit these behaviors to improve their performance levels and increase their achievement (Cohn, 1990). It can be said that the motivation to win, fear of losing, worry, or anxiety lies at the basis of superstitions used in sports environments (Kavi and Karagün, 2020).

They exhibit behaviors that they believe bring them luck, such as using the same equipment before, during, or after the matches, and tying their shoelaces in the same way (Swedo, 2006). Some superstitions are also learned through conditioning (Skinner, 1948). They believe that

they will maintain their success if they repeat their in-match behaviors in which they have been successful (Womack, 1992). These behaviors are widely observed in football, which is one of the most interesting sports today. Gheorghe Hagi states that he cut the bottom of his socks before matches and that if he played a match without cutting it, the match would be bad (Galeano, 1997). Gary Lineker does not take any shots on goal during the warm-up so that his goals are not wasted while warming up for a match, and if he does not score in the first half in the matches he plays, he does not play with the same jersey in the second half (Sabah, 2010). Another example is that when Coach Ümit Kayıhan was training Göztepe, he did not take off his yellow-red scarf for the whole season and did not have it washed. Additionally, there are research results showing that some dates are auspicious (Denovan et al., 2024). In light of this information, the aim of the research is to reveal the superstitious behavior tendencies of professional football players and coaches in the football branch. After all, it has been observed that athletes often resort to superstitious behavior. In the research conducted by Kelley and Woolley (2017), they emphasized that there are results that support this situation, including the result that especially adults frequently use superstitious behaviors. When the literature on this subject is examined, there are many studies investigating the superstitious behavior tendencies of athletes (Vyse, 2022). However, there is limited research that includes coaches in superstitious behavior tendencies. When the literature is examined, it is seen that the number of studies on coaches in terms of superstitious behaviors is limited. In essence, Neil (1982) observes that not only athletes have their own superstitious behaviors, but also coaches, managers, and even spectators often exhibit superstitious behaviors related to sports. It is thought that the research, especially the coach aspect, will contribute to the literature and serve as an example for future research.

METHOD

Research Model

This research, which has been conducted to examine the superstitious tendencies of professional football players and coaches, is projected as basic qualitative research. These studies are qualitative research in which data are collected through documents, interviews, or observation analysis. In this design, what will be observed, which documents will be considered relevant, or which questions will be asked are related to the theoretical framework of the study (Merriam, 2013). Phenomenology, one of the qualitative research designs, was used as the design. The aim of phenomenology is to reveal people's experiences and perceptions of a phenomenon and the meanings they attribute to them (Yıldırım and Şimşek, 2018). In this study, “Superstition” is chosen as the phenomenon, and it is attempted to reveal the meanings attributed to this phenomenon by athletes and coaches. In the study, semi-structured interview forms have been prepared to identify the superstitious behavior tendencies of football players and coaches. In this context, open-ended questions have been asked to the participants to identify their superstitious behavior tendencies. Football players and coaches have been given code names and their opinions are conveyed directly. In order to create the code names, the football players are assigned the letter “F” accompanied with a number 1,2,3,4..., hence the

code names F-1, F-2, F-3 are formed. Similarly, coaches are assigned the letter "C" and a number 1, 2, 3, …, resulting in the code names C-1, C-2, C-3 for the coaches.

Research groups

The sample of the study consists of the players and coaches of the professional football club Anagold24 Erzincanspor, which competes in the Turkish Football Federation 2nd League during the 2023-2024 football season in Erzincan province. These participants were selected using the "Criterion Sampling" method. Criterion sampling is the formation of the sample from people, events, objects or situations with the qualifications identified about the problem (Büyüköztürk et al., 2021). The criterion is determined for football players in Erzincan province to have a professional football player license and for coaches to have a UEFA (Union of European Football Associations) coaching license in order to coach a professional team. When determining the sample, the most appropriate strategy is considered to be convenience sampling. Easily accessible or convenient sampling is based entirely on items that are available, quick and easy to reach. It is the most commonly used strategy in qualitative research (Patton, 2005). It is known that in most cases, researchers conducting qualitative research predict that the sample size they will use will not allow them to generalize, and they prefer situations that are easy to reach and not expensive to work with, without paying attention to how they are selected (Vogt et al., 2012).

Data Collection Tools

In the research, qualitative data have been obtained through interview questions. The data have been analyzed using by content analysis method. The objective of content analysis is to explain the collected data (Yıldırım and Şimşek, 2018).

Semi-Structured Interview Form

In this study, interviews were conducted with football players and coaches to examine their superstitious behavior tendencies. Interview questions were prepared to be used in the aforementioned interviews, paying attention to the fact that they are in the form of open-ended questions that can be easily understood by the participants, and that are focused on the aims of the study. While preparing the questions, care was taken not to give any guidance to the individual being interviewed, and also to ensure that the questions asked during the interview did not cover more questions at once (Patton, 2005). In addition to this, probing questions were prepared to be used in case the questions to be asked in the interview were not understood or perceived by the participants. A Semi-Structured Interview Form has been prepared to be used in interviews with professional football players and coaches by following the procedure below.

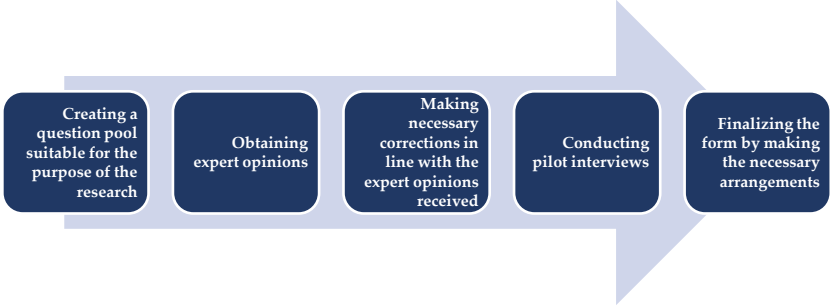

Figure 1. Interview form preparation steps

Ethical Approval

Before starting the research, approval of the Erzincan Binali Yıldırım University Human Research, Health, and Sports Sciences Ethics Committee dated January 31, 2023, and numbered 01/18 was obtained.

Collection of Data

The accuracy of qualitative findings and interpretations is very important in the research. Many qualitative studies use strategies such as data triangulation, participant confirmation, and expert review when determining the credibility or accuracy of findings (Creswell and Miller, 2000; Lincoln and Guba, 1985). In order to reveal the validity and reliability of the data in the study, the answers given to the interview questions by the football players and coaches participating in the study were documented in Word and the file was shared with the participants. The interviews were conducted face-to-face in the meeting room of Erzincanspor facilities and a voice recorder was used with the permission of the participants. The data obtained from football players and coaches are given as direct quotations in the findings section. In addition, the statements have been read separately by the researchers and the expert, and internal reliability has been tried to be obtained by creating codes, themes, and categories. Moreover, a voice recorder is used while asking the interview questions of the research, thus preventing data loss.

Analysis of Data

Content analysis of qualitative research data analyzed in four stages includes code naming the data, creating themes and categories, organizing themes and codes, describing and interpreting the findings (Yıldırım and Şimşek, 2018). Based on the data obtained from the interviews with football players and coaches, word clouds were created using the Wordart program for the prominent codes within the question categories asked.

FINDINGS

Under this heading, interviews were conducted by asking 6 open-ended questions to determine the superstitious behavior tendencies of the football players and coaches participating in the research. In the table given below, categories consisting of semi-structured questions, as well as themes and sub-themes obtained from these categories, have been created.

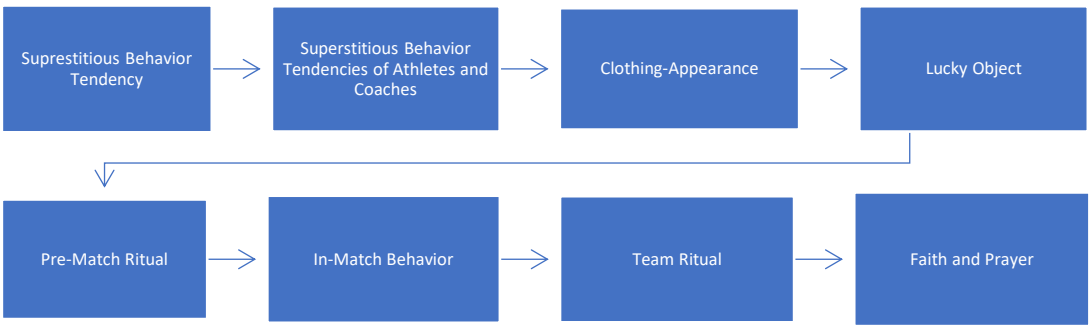

Figure 2. Superstitious behavior tendencies theme and categories

Superstitious Behavior Tendency

Superstitious Behavior Tendency consists of 1 theme, 1 sub-theme, and 6 categories, under the sub-theme of superstitious behavior tendencies of professional football players and coaches are the categories Clothing-appearance, Lucky object, Pre-match ritual, In-Match Behavior, Team ritual, Faith and prayer. The opinions of football players and coaches about the questions prepared for this theme are included.

Superstitious Behavior Tendencies of Football Players

Under this theme, six questions are asked to the football players. These are:

1. How do you relate clothing-appearance, and match performance?
2. Is there an object that you particularly carry with you in matches? Why?
3. Is there anything in particular you do when you take the field for the match that you believe will bring you luck? Why?
4. Do you have any special in-match behavior? Why?
5. Do you have any special behaviors that you perform as a team? Why?
6. What are your views on the impact of beliefs on performance?

Some of the football players who participated in the research review the relationship between clothing-appearance and match performance, one of the superstitious behavior tendencies, as follows.

> F-1 *"Clothing and appearance are definitely important for performance, for example, if I don't wear white cleats, my performance will decrease"*
>
> F-2 *"Clothing and appearance cannot reduce my performance. I don't believe that clothing such as shoes, jerseys, etc., has an impact on performance"*
>
> F-3 "*I don't think that clothing and appearance can bring luck, but I think that putting the jersey inside the shorts, etc. can affect in-match performance as it is more comfortable and ergonomic."*
>
> F-6 *"I partially have that thought. Having my hair neatly shaved and done improves my performance."*
>
> F-7 "*Although I do not think that appearance has an effect on performance, it is a fact that appearance gives people self-confidence, so football players with high self-confidence can give better performance. As a result, let's say it is partially effective*"
>
> F-8 *"Clothing and appearance have an impact on performance. First of all, psychologically it makes me feel confident and good, my jersey number is always the same, any other number will decrease my performance"*
>
> F-12 *"In terms of clothing and appearance, I have my uniform adjusted according to my size, I make sure that it looks very elaborate on me, the neater I look, the more motivated I am, so this has a positive effect on my performance."*

F-15 *"I wear my jersey over my shorts, so I feel more confident and more comfortable, which improves my performance. In this way, I can say that there is a positive relationship between clothing and appearance and match performance."*

F-16 *"I can't relate these two, I don't think so at all, so in my opinion, it has no effect on performance."*

Based on these views, we can say that most of the football players have received feedback such as self-confidence and motivation by paying attention to their clothing and appearance, and thus they think that they play a mediating role in their performance.

Figure 3. Word cloud showing the prominent codes under the clothing-appearance category, based on the data obtained from the interviews with the football players

Some of the football players who participated in the research commented on the question "Is there an object that you especially keep with you during matches?" as follows:

F-1 *"When going to the field for a match, I put chewing gum in the leggings and chew it during the match, I do it as a ritual"*

F-6 *"There is one object that I especially keep with me during a match, and it is my girlfriend's bracelet, this bracelet brings me luck"*

F-11 *"I wear an amulet on my arm and it is with me every match, which helps me feel better and when I feel good, my performance is at its highest level."*

F-12 *"I have a bracelet that I especially keep with me during matches, this bracelet brings me luck and makes me feel better"*

F-21 *"I have a bracelet as an object that makes me feel better and brings me luck"*

F-22 *"I wear an amulet because it makes me feel safer and stronger."*

Based on these views, we can say that football players attribute special meaning to some objects and believe that they bring good luck.

Figure 4. Word cloud showing the prominent codes under the lucky object category based on the data obtained from the interviews with football players

Some of the football players who participated in the research commented on the question "Is there anything in particular that you do while taking the field that you believe will bring you luck?" as follows:

> F-1 *"When I go out on the field for a match, I step on the grass with my right foot and hop twice. I believe it brings me good luck."*
>
> F-3 *"When I take the field for a match, I take my first step on the field, or rather on the grass, with my right foot and I think it brings me luck."*
>
> F-6 *"There are 2 things I especially do when I take the field for a match, the first is to pray and the second is to ask for my family's prayers and good luck wishes."*
>
> F-8 *"I would say praying, I always pray when I take the field for a match, it helps me."*
>
> F-11 *"I specifically listen to songs before a match, namely those of Serdar Ortaç, I do it as a ritual before every match, it helps me prepare myself well."*
>
> F-19 *"I do ablution when taking the field, it gives me strength, if I don't have ablution I don't go out to a match, I believe it affects me to that extent."*
>
> F-20 "When we take the field as a team, I go out one row behind the goalkeeper, that's my totem."

Based on these views, we can say that football players engage in various behaviors while taking the field for a match and that they believe that these behaviors will bring luck, that they will perform well, and that the team will win.

Figure 5. Word cloud showing the prominent codes under the pre-match ritual category based on the data obtained from the interviews with football players.

Some of the football players who participated in the research commented on the question "Do you have any special in-match behavior?" as follows:

> F-5 *"I take 3 steps back, especially in free throws with high potential to be goals, such as penalties and free kicks. I feel more comfortable that way, I think there is a higher chance of scoring a goal"*
>
> F-7 "*I say the basmala before I kick the ball. Maybe that's how I get motivated, it increases my percentage of hits or goals"*
>
> F-8 "There is a backward step on set pieces, I do the same on all set pieces, this increases the chances of scoring a goal"
>
> F-11 *"During matches, I move like the footballers I look up to, I take steps like them, I try to do their kicking technique, this way I think I am doing the right kick or movement, I act more focused."*
>
> F-17 *"When I take a penalty kick, I always stand as if I'm going to kick with the other foot and take my steps accordingly."*

Based on these views, it can be deduced that football players resort to some rituals about set pieces during a match and think that these behaviors are a source of motivation for them and affect the result positively.

Figure 6. Word cloud showing the prominent codes under the category of in-match behavior based on the data obtained from the interviews with football players

Some of the football players who participated in the research commented on the question "Do you have a special behavior as a team?" as follows:

> F-2 *"We try to be the side that chooses the goal in home games. I would call it the behavior we do as a team"*
>
> F-3 *"There are jerseys that the majority want and think that we win with them, and we usually prefer those jerseys as a team."*
>
> F-6 *"Before we take the field as a team, everyone clenches together by linking arms and makes a promise, and this brings us good luck."*

F-14 *"I don't know if I can say as a team, but team captains specifically choose some jerseys, after all, they do this on behalf of the team, there are jerseys that they believe bring them good luck"*

F-17 *"Before the match, we gather as a team, everyone links arms, we form a circle, the captain or anyone who wants to talk speaks, ignites the team, I can give this as an example."*

F-19 *"As a team, we try to fire each other up, in the locker room during the game warm-up, everyone speaks in a positive and motivating way, it's all about isolating ourselves from everything and focusing on the game"*

F-21 "As a team, we have a jersey totem. We prefer the jerseys we wear in the matches we win."

Based on these views, it can be understood that the football players accredit success to behaviors carried out as a team before a match that is won and to objects such as the jersey preferred in that match and that they express that the actions performed together before the match, such as clenching together and match speech, strengthen themselves.

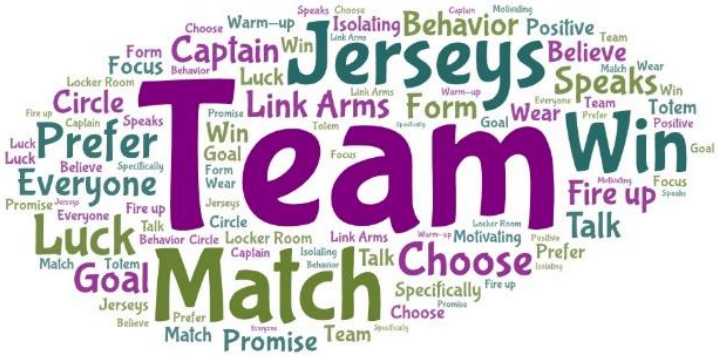

Figure 7. Word cloud showing the prominent codes under the team ritual category based on the data obtained from the interviews with football players

Some of the football players who participated in the research commented on the question "What are your views on the impact of beliefs on performance?" as follows:

F-6 *"Faith makes people peaceful and peaceful people are more dedicated to their work and struggle with more enthusiasm, in this respect, I think faith has a positive effect."*

F-7 *"I think that faith affects performance positively, I think that prayer reflects positively on the work done"*

F-10 *"Faith is a trait that makes people mentally strong. And, regardless of the sports branch, a strong mentality makes a person successful"*

F-11 *"Faith is very influential on performance. In my own case, the more I pray, the safer and stronger I feel, and this feeling is reflected in my performance"*

F-13 *"When I say belief, I don't think superstition has much effect, but spiritual faith is effective on performance and makes people feel good."*

F-21 *"Faith improves performance. I feel better and stronger when I pray"*

Based on these views, regarding the effect of beliefs on performance, it is understood that football players generally prefer rituals such as praying and think that spiritual feelings provide them with confidence and strength.

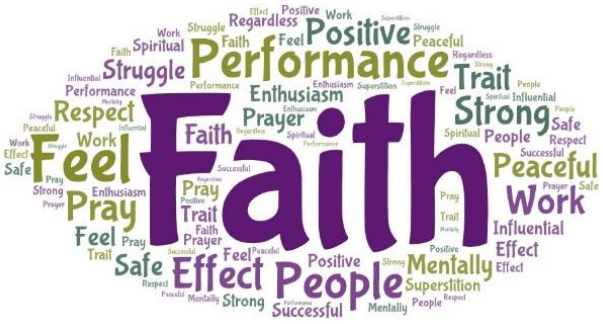

Figure 8. Word cloud showing the prominent codes under the category of faith and prayer according to the data obtained from the interviews with football players

Superstitious Behavior Tendencies of Coaches

Under this theme, six questions are asked to the coaches. These are;

1. How do you relate clothing-appearance, and match performance?
2. Is there an object that you particularly carry with you in matches? Why?
3. Is there anything in particular you do when you take the field for the match that you believe will bring you and your team luck? Why?
4. Do you have any special in-match behavior? Why?
5. Do you have any special behaviors that you perform as a team? Why?
6. What are your views on the impact of beliefs on performance?

Some of the coaches who participated in the research review the relationship between clothing-appearance and match performance, one of the superstitious behavior tendencies, as follows.

> C-1 *"There is nothing I pay particular attention to when it comes to clothing and appearance. On those days, just like an ordinary day, I open the closet in the morning and decide what to wear. I don't think it has any effect on the match, or to put it more accurately, on our own performance. However, in terms of influencing and putting pressure on the opponent, both my clothing-appearance and the team's clothing-appearance can affect the opponent and create psychological pressure."*

> C-3 *"In football, clothing is an additional source of motivation. If you ask why, even the quality of the camp tracksuits worn as a team and the jerseys worn in the match can negatively affect the opponent while increasing the self-confidence of the player"*

> C-5 *"I think clothing affects performance, I have my preferred clothes for matches, and there are things I wear for sure. The stronger and more self-confident a person feels the more energy they spread to the environment, which is important in terms of performance"*

> C-7 "I can't establish any relationship, maybe it can have an effect on the footballer, he may feel better, but for me, there is no such thing, I focus on the work, not the image."

According to these views, it is understood that some coaches state that clothing-appearance does not have an effect on performance, while others consider it as a source of motivation and a means of pressure against the opponent.

Figure 9. Word cloud showing the prominent codes under the clothing-appearance category based on the data obtained from the interviews with coaches

Some of the coaches who participated in the research commented on the question "Is there an object that you especially keep with you during matches?" as follows:

> C-2 *"I don't use an object specific to matches, I keep objects that I routinely use in my private life, such as a watch, for example, I don't use special jewellery or objects for a match other than that."*
>
> C-5 *"I keep a hat with me. This is my totem"*
>
> C-6 "I don't carry an object or anything else with me in matches for good luck, as I said before, I regard these things negatively."

According to these views, while some coaches take some objects with them in matches as totems, that is, as a tool to bring good luck, others state that they do not think that objects have an energy in the object-luck relationship.

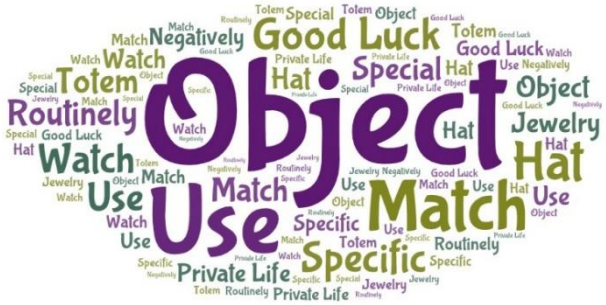

Figure 10. Word cloud showing the prominent codes under the lucky object category based on the data obtained from the interviews with the coaches

Some of the coaches who participated in the research commented on the question "Is there anything in particular that you do while taking the field that you believe will bring you and your team luck?" as follows:

C-1 *"I don't think there is anything that we specifically prefer doing when we go out to a match that will bring us luck, we perform normal routine behaviors, we make our match talk, we try to raise the ambition and motivation of the players and we go out to the match in this way"*

C-2 "*There is nothing that I believe will bring luck to our team when we take the field for a match. We are going with the normal flow that is in the nature of football, so let me say they are the necessary procedures to play the match, not for luck*"

C-4 "Before matches I pray and recite Surah al-Fatih. Actually, it's like we've worked hard and left the rest to God."

C-7"I can say that what I specifically do when I go out for a match is as follows: I am the last one to leave the locker room and go to the field. In fact, I do this not to be lucky, we beat the previous match like this, so we can win again, but I wait until the end to make the final checks and see that everything is working correctly."

According to these opinions, it is understood that the coaches do not go beyond the normal routine match preparation when going out to matches. It can be thought that some of them are motivated to compete by engaging in various acts of worship.

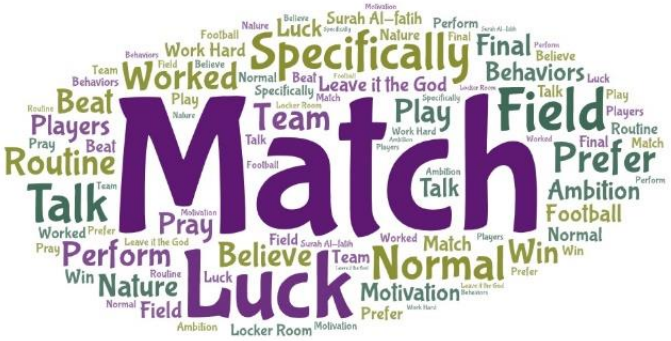

Figure 11. Word cloud showing the prominent codes under the pre-match ritual category based on the data obtained from the interviews with coaches

Some of the coaches who participated in the research commented on the question "Do you have any special in-match behavior?" as follows:

C-3*"I don't have any particular in-match behavior myself. I just try to make my players believe in the game, that's what I want during a match"*

C-6 *"I don't have any special in-match behavior either, I try to seize the game and to be completely focused on the match"*

C-7 *"I have some behaviors here, yes, for example, let me put it this way, if there is a situation such as a free kick or penalty, if we are using it, I open my hands and arms, if the rival is using it, I cross my arms, this is my totem"*

According to these perspectives, we can see that coaches generally do not prefer a special in-match behavior, but prefer to seize the game. Some coaches, on the other hand, are thought to prefer some physical movements that they believe will bring luck in kicks that may affect the result, such as penalties that may occur during a match.

Figure 12. Word cloud showing the prominent codes under the category of in-match behavior based on the data obtained from the interviews with the coaches

Some of the coaches who participated in the research commented on the question "Do you have any special behaviors that you perform as a team? Why?" as follows:

> C-3 *"As a team, there is no behavior carried out by the team that will include the coaches, but there are some behaviors that I observe among the players themselves"*
>
> C-5 *"As a team, we do not have anything related to luck or any lucky actions that we prefer either"*
>
> C-6 *"There is nothing that we as a team believe will bring us luck. As a team, our only right thing will be to work hard"*
>
> C-7 *"There is a behavior that we do as a team. Actually, there may be some people on the team who don't know this, but I call it a team behavior because we do it together. That is: if we stayed in a hotel and we won that match, I prefer to stay in that hotel again in the next match, if it's an away match, I take the team to the same hotel in the next season."*

Based on these views, it can be assumed that while some coaches do not prefer certain rituals as a team, others attach special meaning to matches that are won and try to imitate that match in the next games.

Figure 13. Word cloud showing the prominent codes under the team ritual category based on the data obtained from the interviews with coaches

Some of the coaches who participated in the research commented on the question "What are your views on the impact of beliefs on performance?" as follows:

> C-1 *"The only factor that affects performance is effort and sacrifice. Taking shelter behind superstitions, thinking that you will get high efficiency by doing them seems like a bit of an escape to me, at best it would have a placebo effect"*

> C-2 *"Beliefs have an absolute impact on performance. People do not hesitate to fight for what they believe in, to fight until the last drop of sweat, I can say that it is a kind of source of motivation"*
>
> C-4 *"Believing is half the success. Belief has a positive effect on focus and performance. It is a source of additional motivation for all performance athletes. As a result, it positively affects performance with mediators such as belief, motivation, focus, and feeling strong"*
>
> C-9 *"Beliefs can have an impact on performance in the form of prayer, make a person spiritually strong, provide a source of motivation"*

According to these views, coaches think that beliefs have an impact on performance. Accordingly, it is understood that they generally evaluate beliefs as a source of motivation and a mediating force to feel good.

Figure 14. Word cloud showing the prominent codes under the category of belief and prayer based on the data obtained from the interviews with coaches

DISCUSSION AND RESULT

Based on the opinions of professional football players and coaches, this study attempts to evaluate the superstitious tendencies of individuals who play and coach football at the professional level. When the findings obtained from the interviews within the scope of the research are evaluated, it is observed that football players frequently show superstitious tendencies, football players pay attention to their clothing and appearance in matches and associate it with performance, and they believe that some objects bring good luck by keeping these objects with them while going out for a match, that they exhibit some behaviors while going out for a match and believe that these behaviors increase performance as a way of preparing for a match, they show some in-match superstitious tendencies, these behaviors are generally associated with the performance such as the stepping before hitting the ball; as a team, some behaviors are preferred such as clenching and firing up the team, and they emphasize that beliefs are an effective tool on performance. The key findings are discussed in detail in this part and recommendations are made to improve performance.

First, when it comes to clothing-appearance in matches, the opinions of football players are generally that looking physically good increases performance through motivation and self-

confidence. For example, F-12 states his opinion as follows: "In terms of clothing and appearance, I have my uniform adjusted according to my size, I make sure that it looks very elaborate on me, the neater I look, the more motivated I am, so this has a positive effect on my performance". Indeed, when the literature is examined, it is seen that clothing and appearance in football are related to superstitious behaviors (Ofori et al., 2013). In addition, it has been observed that Super League football players tend to show superstitious behaviors related to clothing-appearance and believe that these behaviors will bring them good luck and success (Kavi and Karagün, 2020).

In another research result, according to the opinions of the football players about an object to keep with them in a match, it is understood that the football players keep some objects with them in matches and assume that these objects bring them good luck. Accordingly, it is stated that some objects are attributed special meanings and that these objects strengthen them, and it is found that religious figures are the most preferred objects. F-11, for example, says, "I wear an amulet on my arm and it is with me every match, which helps me feel better and when I feel good, my performance is at its highest level." When the literature is examined, there are studies showing that athletes often use some objects in terms of objects that are considered auspicious. It has been revealed that objects considered auspicious for athletes are the most effective superstitions in increasing self-confidence, and prayer, pre-match rituals, and auspicious objects are the most commonly used superstitions among athletes (Ptacek, 2016).

When considered in terms of the behaviors that are specially done while taking the field for a match and believed to bring luck, the opinions of the football players participating in the research are mostly that some behaviors are preferred. Accordingly, it was concluded that the most preferred behaviors are those that increase concentration such as going on the field with the right foot and hopping, praying before the match, and listening to music. For example, F-1 expresses his opinion as follows: "When I go out on the field for a match, I step on the grass with my right foot and hop twice. I believe it brings me good luck." When the literature is examined, it is seen that athletes generally prefer certain behaviors before games and matches. As a matter of fact, Çakmak (2019) observes that professional football players in the 1st and 2nd League show a tendency towards superstitious behavior before matches and training. In another study, Eluère and Héas (2017) find in their study that volleyball players exhibit more superstitious behaviors before the game.

According to another research result, when considered in terms of specific in-match behavior, the opinions of the football players participating in the research are generally that certain behaviors are preferred. From this point of view, the most frequently preferred behaviors are related to the kicks made during a match, such as F-5 states "I take 3 steps back, especially in free throws with high potential to be goals, such as penalties and free kicks. I feel more comfortable that way, I think there is a higher chance of scoring a goal". It is thought that the preferred behaviors motivate the players to kick and increase the goal/hit percentage. As a matter of fact, F-8 expresses his opinion as follows: "There is a backward step on set pieces, I do the same on all set pieces, this increases the chances of scoring a goal". When the literature is examined, there are studies that athletes exhibit some behaviors that can be considered auspicious during a game/match. Çakmak (2019) finds in her research that professional football

players in the TFF 1st and 2nd League tend to be superstitious during matches and training. Additionally, Witkowska (2023) stated in her study that athletes who hold superstitious beliefs have more rituals compared to those who do not.

According to another result of the research, when considered in terms of a special behavior as a team, the opinions of the football players participating in the research are generally that there are some preferences as a team. Accordingly, the choice of jersey is also a reason for preference for the next match, especially if success has been achieved in the previous match. For example, F-3 states "There are jerseys that the majority want and think that we win with them, and we usually prefer those jerseys as a team". In addition to this, behaviors aimed at firing up the emotions of the moment by linking arms as a team before the match are also preferred. For example, F-6 states "Before we take the field as a team, everyone clenches together by linking arms and makes a promise, and this brings us good luck". When the literature is examined, there are studies showing that teams engage in some behaviors as a team, that is, in the aspect of team behaviors. Barut et al., (2016) find that superstitious behavior tendencies in basketball are mostly related to team behaviors.

According to the results of another research, when considered in terms of the belief-performance relationship, the opinions of the football players participating in the research are mostly that belief is effective on performance. Accordingly, it is understood that football players feel themselves stronger in general spiritual values and praying in particular and frequently resort to these behaviors. For instance, F-11 expresses his opinion as follows: "Faith is very influential on performance. In my own case, the more I pray, the safer and stronger I feel, and this feeling is reflected in my performance". When the literature is examined, it is found that praying has a positive effect on performance. Accordingly, Ofori et al., (2013) found in their research that the most effective superstition of football teams in Ghana is prayer. In another study, it is observed that the items in the category of praying are frequently marked in all sports branches (Barut, 2008). In addition, Kavi and Karagün (2020) find in their study that football players playing in the lower leagues tend to pray more than those playing in the upper leagues. In addition, Dömötör et al., (2016) state that prayer has a positive effect on performance and is a way that individuals often use to control their emotional state. Similarly, Karakullukçu (2023) revealed in her study that especially athletes have the habit of praying.

When the tendency towards superstitious behavior from the coach's point of view is examined, it is stated that clothing-appearance does not have an effect on performance, but it contains some elements that could put the opponent under pressure. For example, C-1 expresses his opinion as follows: "There is nothing I pay particular attention to when it comes to clothing and appearance. On those days, just like an ordinary day, I open the closet in the morning and decide what to wear. I don't think it has any effect on the match, or to put it more accurately, on our own performance. However, in terms of influencing and putting pressure on the opponent, both my clothing-appearance and the team's clothing-appearance can affect the opponent and create psychological pressure". In addition, they state that faith and prayer are sources of motivation and help them feel good. For example, C-2 comments "Beliefs have an absolute impact on performance. People do not hesitate to fight for what they believe in, to fight until the last drop of sweat, I can say that it is a kind of source of motivation". And in the

lucky object category, it is understood that the coaches generally do not show any superstitious tendencies; although, for example, C-6 states "I don't carry an object or anything else with me in matches for good luck, as I said before, I regard these things negatively" and C-2 adds "I don't use an object specific to matches, I keep objects that I routinely use in my private life, such as a watch, for example, I don't use special jewellery or objects for a match other than that", it has been observed that a small number of coaches, such as C-5 saying "I keep a hat with me. This is my totem", prefer lucky objects. In terms of the pre-match ritual category, it is found that coaches generally do not show a tendency towards superstition. For instance, C-1 expresses his views as follows: "I don't think there is anything that we specifically prefer doing when we go out to the match that will bring us luck, we perform normal routine behaviors, we make our match talk, we try to raise the ambition and motivation of the players and we go out to the match in this way". In the category of in-match behavior, while some coaches do not show any superstitious tendency, such as C-6 "I don't have any special in-match behavior either, I try to seize the game and to be completely focused on the match", some coaches are observed to engage in certain behaviors during matches. For example, C-7 states his opinion as the following: "I have some behaviors here, yes, for example, let me put it this way, if there is a situation such as a free kick or penalty, if we are using it, I open my hands and arms, if the rival is using it, I cross my arms, this is my totem". In the team ritual aspects, it is found that the coaches do not show a tendency towards superstitious behavior. Accordingly, the coaches emphasize the importance of hard work. For example, C-6 says "There is nothing that we as a team believe will bring us luck. As a team, our only right thing will be to work hard".

According to the available data, it is obvious that psychological skills contribute positively to sportive performance. Athletes and coaches will gain added value if they use these skills in the most accurate way for their own benefit and approach them more consciously. However, in the literature, it is noticeable that mental training is insufficient in training planning. Woolley et al., (2024) state that individuals are aware of the effects of superstitions on human behavior and that the underlying reason for this situation may arise from psychological factors. Indeed, Sulu (2022) states that although coaches approve psychological skills in sports performance, they do not do any work for the development of these skills.

Superstitious behavior is characterized by ritualized and repetitive actions, often associated with uncontrollable factors such as luck, which can influence performance. In contrast, competition preparation should be seen as a concept distinct from superstitions or ritual behaviors, as it involves consciously planned and effort-driven pre-competition strategies that athletes employ to prepare for competition (Bae et al., 2024).

As a result, it is clear that beyond a good preparation and training phase with respect to performance enhancement, athletes prefer some behaviors that will increase their motivation and self-confidence. In order to achieve performance from them by increasing the performance of the group of athletes to a higher level and to reduce their anxiety levels, they can be helped to gain some behaviors that can be considered auspicious. In addition, it is important to conduct experimental and mixed methods research in order to better understand the value of

superstitious behavior. In this way, it is envisaged that the issue will be examined in depth and more concrete results will be revealed.

One of the limitations of this study is that it focuses only on athlete and coach behaviors within the football branch. In order to make generalizations about sports, interviews with athletes and coaches in different sports branches, and even other stakeholders of sports, such as referees, managers and fans, can reveal the effect of superstitious behavioral tendencies on sports performance.

Conflicts of Interest: There is no financial or personal conflict of interest within the scope of the research.

Authors' Contribution: Research Design-HBE, Data Collection- HBE; AYM, statistical analysis- HBE; ES Preparation of the article, HBE; AYM; ES.

Ethical Approval
Ethics Committee: Erzincan Binali Yıldırım University Health and Sports Sciences Ethics Committee
Date/Protocol number: 31.01.2023, 01/18

REFERENCES

Bae, J., Sim, Y., Seo, E., Seo, G., & Nam, Y. (2024). Multidimensional assessment of preparation for sport competition (mapsc): Psychometric properties and initial validation among Korean student-athletes in combat sport. *Measurement in Physical Education and Exercise Science*, 1-17. https://doi.org/10.1080/1091367X.2024.2365213

Barut, A. İ. (2008). *Sporda batıl davranış ve öz yeterlik ilişkisi*. Yüksek lisans tezi, Mersin Üniversitesi, Sağlık Bilimleri Enstitüsü, Mersin.

Barut, A. İ., Toros, T., & Kaçay, Z. (2016). Sporda batıl davranış kullanım sıklıklarının incelenmesi. *Journal of Human Sciences, 13*(3), 6220-6227. https://doi.org/10.14687/jhs.v13i3.4333

Budak, S. (2005). Psikoloji sözlüğü. İçinde Campbell, W. K., & Miller, J. D. (2011) (Eds.), *The handbook of narcissism and narcissistic personality disorder: Theoretical approaches, empirical findings, and treatments*. Bilim ve Sanat Yayınları.

Burger, J. M., & Lynn, A. L. (2005). Superstitious behavior among American and Japanese professional baseball players. *Basic and Applied Social Psychology, 27,* 71–76. https://doi.org/10.1207/s15324834basp2701_7

Büyüköztürk, Ş., Kılıç Çakmak, E., Akgün, Ö., Karadeniz, Ş., & Demirel, F. (2021). *Eğitimde bilimsel araştırma yöntemleri.* Pegem Akademi.

Cohn, P. J. (1990). Preperformance routines in sport: Theoretical support and practical applications. *The Sport Psychologist, 4*(3), 301-312. https://doi.org/10.1123/tsp.4.3.301

Creswell, J. W., & Miller, D. L. (2000). Determining validity in qualitative inquiry. *Theory Into Practice, 39*(3), 124-130. https://doi.org/10.1207/s15430421tip3903_2

Çakmak, R. F. (2019). *Profesyonel futbolcularda antrenman, müsabaka öncesi veya sırasındaki inanç, batıl inanç ve farklı davranış eğilimlerinin incelenmesi*. Yüksek lisans tezi, Afyon Kocatepe Üniversitesi, Sağlık Bilimleri Enstitüsü, Afyon.

Çam., O., & Çelik, C. (2023) Turizm ve batıl inançlar. *Kafdağı, 8*(1), 113-151. https://doi.org/10.51469/kafdağı.1191072

Denovan, A., Dagnall, N., & Drinkwater, K. G. (2024). The paranormal health beliefs scale: An evaluation using cognitive interviewing. *Frontiers in Psychology, 15*, 1306372 https://doi.org/10.3389/fpsyg.2024.1306372

Dömötör, Z., Ruíz-Barquín, R., & Szabo, A. (2016). Superstitious behavior in sport: A literature review. *Scandinavian Journal of Psychology, 57*(4), 368-382. https://doi.org/10.1111/sjop.12301

Dönmez, E., & Sivaz, B. A. (2024). The excellent symbol in sports: Pierre de Coubertin's Rings. *Spor Bilimleri Araştırmaları Dergisi, 9*(1), 116-131. https://doi.org/10.25307/jssr.1316038

Eluère, M., & Héas, S. (2017). Superstitions, cultures et sports, entre croyances et rationalisations. Le cas exploratoire d'une équipe féminine professionnelle de volleyball en France. *Les Cahiers Internationaux De Psychologie Sociale, 1*(113), 25-55

Galeano, E. (1997). *Gölgede ve güneşte futbol*, Çev: Önalp, E., & Necati Kutlu, M. Can Yayınları.

Galily, Y., Tamir, I., Pack, S., & Spaaij, R. (2023). Spectator sport and fan behavior: A prologue. *Frontiers in Psychology, 14,* Article 1111080. https://doi.org/10.3389/fpsyg.2023.1111080

Günay, M. (2002). *Hurafeler ve batıl inançlar*. Sevgi Yayınları.

Jirásek, I. (2024). 'The hand of God': hierophany and transcendence through sport. *Journal of the Philosophy of Sport, 51*(1) 1-28. https://doi.org/10.1080/00948705.2024.2309345

Kavi, O., & Karagün, E. (2020). Profesyonel futbolcuların; takıntı, batıl inanç ve düşünce kontrollerinin incelenmesi: İstanbul anadolu yakası kulüpleri örneği. *Electronic Turkish Studies, 15*(7), 2973-2992. https://dx.doi.org/10.7827/TurkishStudies.45975

Kanbir, F. (2022). Milli sporcuların batıl inanç eğilimlerinin sosyolojik açıdan değerlendirilmesi. *Kesit Akademi Dergisi, 8*(31), 52-70. https://doi.org/10.29228/kesit.62562

Karakullukçu, A. (2023). Lisansli sporcularin batil inanç ve davranişlarinin çeşitli değişkenlere göre incelenmesi (Kırıkkale ili örneği). *Beden Eğitimi Spor Sağlık ve Efor Dergisi (BESSED), 2*(Ek Sayı), 70-78

Kaushik, N., Gaur, N., & Chaudhary, G. (2023). Level of superstition among male and female sportsperson. *Journal of Sports Science and Nutrition, 4*(1), 108-111. https://doi.org/10.33545/27077012.2023.v4.i1b.157

Kelley, K., & Woolley, J. D. (2017). *Navigating a random world: Locus of control as a predictor of children's superstitious belief*. Cognitive Development Society Biennial Meeting, Portland, OR.

Khaenamkhaew, D. (2023). The community sports and superstitions. *Journal of Modern Learning Development, 8*(2), 439-446.

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Sage Publications.

Liu, J., Yin, J., Li, Z., He, W., & Luo, J. (2023) *The effect of superstitious omens on emotions without influencing risk decision-making amid uncertainty among Chinese university students*. SSRN 4489350.

Merriam, S. B. (2013). *Nitel araştırma.* (Çev. Turan, S.). Nobel Yayınları.

Mutlu, T. O., Öntürk, Y., Zorba, E., Karafil, A. Y., Yıldız, M., & Kartal, R. (2016). Tenis sporu ile uğraşan üniversite öğrencilerinin bazı batıl inanç ve davranışlarının incelenmesi. *Batman Üniversitesi Yaşam Bilimleri Dergisi, 6*(1), 317-330

Neil, G. I. (1982). Demystifying sport superstition. *International Review of Sport Sociology, 17*(1), 99-124. https://doi.org/10.1177/101269028201700108

Ofori, P. K., Biddle, S., & Lavallee, D. (2013). The role of superstition among professional footballers in Ghana. *Athletic Insight, 14*(2), 117-127.

Patton, M. Q. (2005). *Qualitative research.* John Wiley And Sons Ltd.

Ptacek, T. J. (2016). *The relationship between superstition and confidence in sport*. Doctoral dissertation, The University of North Dakota.

Sabah. (2010, March 12). *Sporcuların batıl inançları*. https://www.sabah.com.tr/galeri/spor/sporcularin_batil_inanclari/32

Skinner, B. F. (1948). 'Superstition'in the pigeon. *Journal of Experimental Psychology, 38*(2), 168. https://doi.org/10.1037/h0055873

Sulu, B. (2022). Psikolojik becerilerin sportif performansa etkisinin antrenör gözünden değerlendirilmesi. *Spor Bilimleri Araştırmaları Dergisi, 7*(2), 345-357. https://doi.org/10.25307/jssr.1091142

Swedo, S. (2006). *The neurobiology and treatment of obsessive – compulsive- disorder*. *Neurobiology of mental illness*. D. S. Charney. Oxford Uni. Press.

Wilson, S. M., Grieve, F. G., Ostrowski, S., Mienaltowski, A., & Cyr, C. (2013). Roles of team identification and game outcome in sport fan superstitious behaviors. *Journal of Sport Behavior, 36*(4), 417-429

Womack M. (1992). Why athletes need ritual: A study of magic among professional athletes. In Hoffman, S. (Eds.), *Sport and Religion (pp.191-202).* Human Kinetics.

Woolley, J. D., Baca, P. A., & Kelley, K. A. (2024). Development of a naïve theory of superstition. *Journal of Cognition and Development, 25*(1), 27-45. https://doi.org/10.1080/15248372.2023.2256871

Witkowska, J. (2023). Ritual in sport–an empirical study of table tennis players. *Acta Universitatis Lodziensis. Folia Sociologica*, (86), 43-59. http://dx.doi.org/10.18778/0208-600X.86.03

Vogt, W. P., Gardner, D. C., & Haeffele, L. M. (2012). *When to use what research design*. Guilford Press.

Vyse, S. A. (2022). *The uses of delusion: Why it's not always rational to be rational*. Oxford University Press. https://doi.org/10.1093/oso/9780190079857.001.0001.

Yıldırım, A., & Şimşek, H. (2018). *Sosyal bilimlerde nitel arastırma yöntemleri*. Seckin Yayıncılık.

Spor Bilimleri Araştırmaları Dergisi
Journal of Sport Sciences Research
Vol: 9, Issue: 3, 2024
E-ISSN: 2548-0723
URL: http://www.dergipark.org.tr/jssr

Analysis of the Relationships between Residents' Perceived Social Impacts of a Publicly Subsidized Multipurpose Facility and Behavioral Intentions

Wonyoung KIM[1*], Namhun LIM[2], Yong-Chae RHEE[3]

[1]Wichita State University, Wichita, USA
[2]Elizabeth City State University, Elizabeth City, USA
[3]Virginia Commonwealth University, Richmond, USA

Research Article
DOI: 10.25307/jssr.1550357
Received: 16.09.2024 Accepted: 04.10.2024 Online Published: 31.10.2024

Abstract

Despite challenging economic conditions, municipalities have justified the utilization of public subsidies to build or renovate multipurpose sports facilities due to the lack of modern features and the aging of existing facilities. To secure public support for the utilization of public subsidies, promises are often made about the transformative potential of events and teams for the community. The current study aims to examine the relationship between residents' perceived social impact and their behavioral intentions regarding a newly developed multipurpose sports facility. The survey instrument was administered to assess residents' perceived social impacts related to the multipurpose sports facility as well as their behavioral attributes. The findings revealed that perceived social impacts such as community development and economic benefits significantly influenced the attendance of future sports and entertainment events as well as word-of-mouth on sports and entertainment events. Respondents' level of involvement and attendance in sports and entertainment events were significant predictors of positive behavioral intentions and word-of-mouth. Lastly, certain demographic variables indicated significant relationships with behavioral attributes. This study highlights the importance of understanding residents' perceived social impact concerning their behavioral attributes. The findings can be used by policymakers and administrators to plan and execute the facility development using public subsidies, aiming to reduce social conflicts and enhance social cohesion among residents.
Keywords: Perceived social impact, Sport facility development, Public subsidy

[*] **Corresponding Author:** Wonyoung Kim, Wichita State University, USA,
E-mail: wonyoung.kim@wichita.edu

INTRODUCTION

Over the years, there has been a significant influx of the development of sports facilities including arenas, stadiums, and multipurpose sports facilities in the United States (Smith & McCormick, 2024). Despite challenging economic conditions due to interest rate hikes and historic inflation in the United States, local and state governments continue to invest heavily in the construction of new and renovated sports facilities, with approximately $5.8 billion expected to be spent to complete them in 2024 for professional and college sports (Broughton, 2024). Smaller, mid-sized cities have embraced the trend of developing new facilities to attract professional sports organizations such as Minor League Baseball teams by using new downtown facility developments (Buckman & Pemberton, 2023). Local and national governments believe that the development of sports facilities ranging from regional sports and recreation facilities to large-scale sports and multipurpose facilities could produce critical benefits to residents and other stakeholders including enhancing residents' well-being, civic pride, the image of the community and residents, social cohesion, opportunities for entertainment and leisure activities while driving economic developments to the hosting communities (Kim et al., 2015). In other words, sports facility developments garner multi-dimensional benefits such as social, psychological, and economic values to the community and its stakeholders.

A crucial driver behind new facility developments is the aging of facilities that were built before the 2000s due to the lack of modern amenities and accommodations to meet the current demand of tenants, media, fans, and visitors. As a result of a higher demand for new or renovated sports facilities, over 280 stadium and arena projects are expected to be completed by 2025 in the U.S. which is capped with a record high of $31.4 billion in cost (Smith & McCormick, 2024). Moreover, the development of sports facilities often requires not only the facility developments to meet the needs of tenants and spectators but also the integration of mixed-use districts around sports facilities including housing, entertainment venues, and retail options for generating incremental revenue for owners or tenants of the facilities.

Nevertheless, flourishing facility developments come with a price of significant financial investment (Dehring et al., 2007). The development of multipurpose sports facilities has been sourced in various methods such as public financing (e.g., increased tax rates, selling public bonds, special taxes, etc.), private financing (e.g., mutual funds, personal funds, etc.), and mixed financing (Greenberg, 2004). Many multipurpose sports facilities built in the U.S. have used substantial public subsidies such as sales taxes, sin taxes, real estate investment trusts, and other forms of taxes to financially support new or renovated venues through debts which intensifies acrimony among the public (Santo & Mildner, 2010). Regional and national governments acknowledged that the development of new multipurpose sports facilities would bring a wide range of tangible and intangible benefits (e.g., income generation, increasing job opportunities, enhancing the image of the community, etc.) to residents and communities (Baade & Matheson; 2011; Ritchie & Aitken, 1985). However, most of the communities have experienced social conflicts among stakeholders including residents, politicians, and media due

to the substantial financial burden on the governments and residents. Rather than creating significant benefits including economic and social impacts to stakeholders, various research indicates that the financial burden of public subsidies outweighs the positive impacts (Kim et al., 2015).

To secure public support for the utilization of public subsidies, promises are often made about the transformative potential of events and teams for the community (Sparvero et al., 2015). Administrators of multipurpose sports facility developments have experienced significant contests in utilizing public subsidies because of numerous negative impacts including economic costs, social conflicts, and security concerns. Residents who support public subsidies expect to obtain not only significant economic benefits but also positive social impacts (Feng & Humphreys, 2008; Siegfried &Zimbalist, 2000). On the other hand, residents who do not support public subsidies claim that the social legacy and economic benefits may not compensate for the excessive spending on developing multipurpose sports facilities (Santo, 2005). Hence, governments and administrators need to diminish potential social conflicts among stakeholders by executing effective public relations strategies (Dehring et al., 2007; Kaplanidou & Karadakis, 2010). This involves disseminating more information on expected social impacts such as enhancing civic pride, economic benefits, infrastructure development, and many other tangible and intangible impacts resulting from the development of multipurpose sports facilities to generate more support from the general public toward facility development using public subsidies.

According to Mathieson and Wall (1982, p. 137), social impact is defined as "…the changes of quality of life of residents of tourist destination" based on hosting tourism events. Perceived social impact is a critical result that stakeholders could experience after hosting the event as a result of their interpretations of event outcomes (Chalip, 2006). The concept of social impact and perceived social impact have been utilized by various research contexts such as sports teams, events, and facility developments (Howard & Crompton, 2004; Inoue & Havard, 2014), entertainment events (Delamare, 2001); mega-sport events (Kim & Walker, 2012; Wu et al., 2023), and international sports events (Balduck et al., 2011; Bull & Lovell, 2007; Kim et al., 2015). Both social impacts and perceived social impacts can differ significantly among stakeholders based on socio-demographic characteristics, political preferences, level of involvement, length of residency, or the level of identification with the community (Inoue & Havard, 2014; Kim et al., 2015; Kim & Petrick, 2005). Stakeholders (e.g., residents, fans, etc.) who perceive social impacts from a sports event indicate substantial positive impact, which express support and interest in getting involved with the event. Numerous studies have explored the perceived social impacts of hosting sports events and found that positive social impacts positively influence planning prospective events and facility developments (e.g., Balduck et al., 2011; Inoue & Havard, 2014; Kim et al., 2015).

To better understand both social impacts and perceived social impacts the current study adopts social exchange theory as the theoretical framework. Social exchange theory encompasses psychological and sociological perspectives that provide a rigorous framework for

understanding social stability and change through stakeholder exchanges (Ap, 1990). Particularly, social exchange theory allows for "... the examination of large-scale social issues employing the investigation of small-scale social situations" (Stolte, Fine, & Cook, 2001, p. 388), stakeholders would shape their perceptions toward hosting events and infrastructure developments from the expected value exchange before an exchange occurring (Cropanzano & Mitchell, 2005; Kim et al., 2006). Social exchange theory suggests that the interaction by stakeholders results from the exchange process of both tangible and intangible benefits. Based on the social exchange theory, people engage in the exchange process by seeking rewards and avoiding punishment as the anticipated positive outcomes (Bandura, 1977; Cropanzano & Mitchell, 2005). Numerous research in tourism, sport management, and hospitality management have investigated stakeholders' perceived impacts from hosting sport tourism events and related facility developments using social exchange theory (Gursoy et al., 2002; Kim et al., 2006; Kim & Petrick, 2005).

The utilization of perceived social impact based on social exchange theory is appropriate for this study to examine the relationship between perceived social impact and behavioral attributes of residents. Residents of publicly subsidized multipurpose sports facilities can assess the expected outcomes after not only experiencing the facility and events but also even not physically experiencing the facilities from the facility development and hosting events as a form of perceived social impact (Crompton, 2004). If residents are satisfied with the perceived benefits from the event and facility developments, they will possess positive perceptions and supportive behaviors toward prospective event and facility developments (Ap, 1990; Kim et al., 2006; Kim & Petrick, 2005). For instance, administrators of the 2012 London Olympic Games executed numerous social leveraging public relations strategies focused on informing positive social impacts such as enhanced well-being of the local community to facilitate positive attitudes toward hosting the event and facility developments (Burrows, 2017; Testa et al., 2023). If residents experienced unsatisfied post-event exchanges, residents might not support prospective event hosting and facility developments. Conversely, if residents perceived benefits from the event, they might provide positive support (Delamer, 2001; Fredline & Faulkner, 2002; Kim & Petrick, 2005). Hence, it is important to investigate the perceived social impacts of residents toward hosting sports events and developing multipurpose sports facilities for prospective developments while minimizing potential social conflicts.

Based on the proceeding commentary, the purpose of this study is two-fold: (1) to explore the residents' perceived social impacts on the development of a publicly subsidized multipurpose sports facility, and (2) to analyze relationships among perceived social impacts, word-of-mouth, and behavioral intentions by residents toward the publicly subsidized multipurpose sports facility. This study is vital for administrators of sports events and facilities as well as government personnel as the findings would provide valuable insights into understanding residents' attitudes towards developing new publicly funded facilities, their expected outcomes, and related behavioral intentions.

METHOD

Study Design

The current study used a quantitative research design and a questionnaire to assess the perceived social impacts that residents of a mid-major city in the Central U.S. resulting from the development of a publicly subsidized multipurpose sport facility. The data collection was conducted in 2022 through a partnership with practitioners and the assistance of the authors. Participants were selected via convenience sampling and verified whether they knew the newly developed multipurpose sports facility in the city. After the confirmation, they were asked to complete a self-administered survey assessing their perceived social impacts of the facility and associated behavioral intentions. In 2016, the city initiated a recruitment proposal to bring a minor league professional baseball team to revitalize the downtown through a multipurpose sports facility development (Swaim, 2022). To afford the financial resources to build a new facility, the city secured a state sales tax and revenue bond and established a tax incremental finance district where they could add a new stadium, baseball museum, aerial improvements, and related infrastructure developments (e.g., built a bridge over the river).

Based on the support from the regional government to utilize the public subsidy, a sales tax-based bond for $42.12 million, which would be repaid by generated revenue from the project over 20 years, the multipurpose sports facility was built in 2020 (Kelly & Rengers, 2023). Due to the COVID-19 Pandemic, the inaugural season was canceled in 2020, but various events were hosted including minor league professional baseball games, collegiate and high school football games, and various entertainment and community events. However, there was a lower attendance than projected in the first two years of operations which generates serious concerns for taxpayers because if the annual payment of the bond cannot be made, the city will have to cover the shortfall by utilizing local sales tax.

Participants

This study analyzed the perceived social impacts of a publicly subsidized multipurpose facility using survey data collected from 307 residents of a metropolitan area in the Central U.S. Participants were selected through convenience sampling to represent a diverse demographic background, including 54.72% males and 45.28% females, with ages ranging from 18 to over 60 years. The sample was predominantly Caucasian (77.52%), with additional representation from Hispanic (7.49%), Asian Pacific Islander (5.54%), and African American (5.21%) groups. Most participants had a college education or higher, and various income levels were represented.

Table 1. Socio-demographic characteristics of the respondents (N = 307)

Variables		***N***	**%**
Age	18-20	42	13.7
	21-30	117	38.1
	31-40	49	16.0
	41-50	49	16.0
	51-60	32	10.4
	61 or older	18	5.9
Gender	Male	168	54.7
	Female	139	45.3
Ethnicity	African American	16	5.2
	American Indian	2	0.7
	Asian Pacific Islander	17	5.5
	Caucasian	238	77.5
	Hispanic	23	7.5
	Other	6	2.0
	Two or more races	5	1.6
Household Income	Below $20,000	87	28.3
	$20,000-$39,999	40	13.0
	$40,000-$59,999	57	18.6
	$60,000-$79,999	40	13.0
	$80,000-$99,999	38	12.4
	$100,000 or above	45	14.7
Education	High school graduate	73	23.8
	Associate degree	25	8.1
	In college	97	31.6
	College graduate	86	28.0
	Advanced degree	26	8.5
Length of Residency	Less than 1 year	39	12.7
	1-3 years	46	15.0
	3-5 years	34	11.1
	5-10 years	30	9.8
	10 years or longer	158	51.5

Ethical Approval

Data were obtained from the practitioner partners as secondary data without any indications of confidential information of the participants. The authors had permission to utilize the data for the scholarly manuscript.

Data Collection Tools

The current study aims to examine the relationship between residents' perceived social impacts and their behavioral intentions regarding a newly developed multipurpose sports facility. The survey instrument was designed to assess residents' perceptions of the perceived social impacts related to the multipurpose sports facility. It included several scales adapted from the Modified Perceived Social Impact Scale (Kim et al., 2015) consisting of 23 items under six factors. Each item was rated on a 1-7 Likert scale (1 = Strongly Disagree, 7 = Strongly Agree), with higher scores indicating stronger agreement or higher levels of the measured construct. The scales included:

- Community Development: This scale consisted of 5 items measuring the perceived benefits of community enhancement and image improvement, such as increased opportunities to promote the city. The internal consistency for this scale was α = .764.
- Community Pride: Comprising 4 items, this scale assessed the sense of pride residents felt about their community due to the facility, with a reliability of α = .830.
- Economic Benefits: This scale measured perceived economic advantages brought by the facility using 4 items, such as boosting local business trade, with a reliability of α = .801.
- Economic Costs: Including 3 items, this scale captured residents' concerns about financial burdens, such as excessive spending on new infrastructure, with an internal consistency of α = .811.
- Traffic Problems: This scale measured perceived issues related to traffic caused by the facility using 3 items, such as increased road closures, and had a reliability of α = .830.
- Security Risks: Consisting of 4 items, this scale assessed residents' perceptions of safety concerns, such as increased risks of terrorism, with α = .897.
- Level of Involvement (Bennett et al., 2009): This scale, consisting of 4 items, evaluated the degree of residents' engagement with the facility, such as frequency of attending events, and showed high reliability with α = .901.
- Word-of-Mouth: Measured using 3 items, such as recommending others to attend sports events, entertainment events, and community events, assessed the extent to which residents would recommend the facility to others, with α = .913.
- Behavioral Intentions: Measured using 3 items, this scale assesses the intention of attending various events (e.g., sports, entertainment, or community events) in the future, with α = .853.

Lastly, demographic variables including age, gender, ethnicity, household income, education, marital status, and length of residency were added to gather descriptive information on the participants.

Data Preparation

Data were imported and processed using SAS software, with key variables renamed for clarity and consistency. Ordinal and nominal variables were re-coded into numeric formats to facilitate statistical analysis. For example, income levels were re-coded from categorical labels (e.g., 'Below $20,000' to '$100,000 or above') into a numeric ordinal scale ranging from 1 to 6, reflecting increasing income. Similarly, residency duration categories were recoded to reflect increasing length, with values from 1 ('Less than 1 year') to 5 ('10 years or longer'). Gender, originally labeled as 'Male' and 'Female', was recoded into binary numeric values (0 for 'Female', 1 for 'Male'). Age ranges were also simplified into a binary format, distinguishing younger (ages 18-30, coded as 1) from older groups (ages 31 and above, coded as 0). Additionally, event attendance variables—specifically attendance at sports (*ASE*), entertainment (*AEE*), and community events (*ACE*)—were coded as binary variables where 'Yes' responses were coded as 1 and 'No' responses as 0. This binary coding was used to capture the influence of prior event attendance on behavioral intentions and word-of-mouth outcomes.

For the scales measuring perceptions (e.g., Community Development, Community Pride), average scores were calculated by taking the mean of item responses within each scale. These average scores were used as independent variables in the analysis to represent overall perceptions in each domain, allowing for a more concise and comprehensive measure of each construct. This approach ensured that the variables were appropriately prepared for statistical techniques requiring numeric inputs, facilitating a more accurate and meaningful analysis of the data.

Analysis of Data

Based on the collected data, multiple statistical analyses were conducted. First, Cronbach's alpha values and validity tests were performed to verify the internal consistency and applicability of the questionnaire. Second, descriptive and frequency statistics were executed to understand the residents' perceived social impacts from developing the new multipurpose sports facility and related behavioral intentions. Finally, the Generalized Linear Models (GLM) were utilized to examine the relationships between perceived social impacts and various demographic factors on behavioral intentions and word-of-mouth outcomes. The independent variables included Community Development (*CD*), Community Pride (*CP*), Economic Benefits (*EB*), Economic Costs (*EC*), Traffic Problems (*TP*), Security Risks (*SR*), Level of Involvement (*LI*), and event attendance types (*ASE*, *AEE*, & *ACE*). Demographic covariates such as income (*Income*), residency duration (*Residency*), gender (*Gender*), and age (*Age*) were also included.

The GLM was specified as follows for each dependent variable (Y):

$$Y_i = \beta_0 + \beta_1 CD + \beta_2 CP + \beta_3 EB + \beta_4 EC + \beta_5 TP + \beta_6 SR + \beta_7 LI + \beta_8 ASE + \beta_9 AEE + \beta_{10} ACE + \beta_{11} Income + \beta_{12} Residency + \beta_{13} Gender + \beta_{14} Age + \epsilon_i$$

In this model, Y_i represents each dependent variable, including behavioral intentions for sports events (*BIS*), entertainment events (*BIE*), and community events (*BIC*), as well as word-of-mouth outcomes (*WM1*, *WM2*, & *WM3*). The β coefficients represent the weights of each independent variable in predicting the dependent variable, and ϵ_i is the error term. Model fit was assessed using R^2 values, which indicate the proportion of variance in the dependent variables explained by the model. Statistical significance was evaluated with a threshold of $p < .05$.

FINDINGS

Descriptive Statistics

Descriptive statistics for the survey variables are presented in Table 2. Community Development items had mean scores ranging from 4.78 to 5.41, indicating moderate to high agreement with positive impacts. Economic Benefits were consistently rated high, with means between 5.11 and 5.43, whereas Economic Costs and Security Risks were rated lower, reflecting some concerns among residents.

Table 2. Descriptive statistics of dependent and independent variables (N = 307)

Variable	N	Mean	SD
BIS	307	5.60	1.50
BIE	307	5.37	1.68
BIC	307	4.86	1.61
WM1	307	5.03	1.63
WM2	307	5.16	1.47
WM3	307	5.27	1.47
CD	307	5.05	0.81
CP	307	4.75	1.01
EB	307	5.23	0.90
EC	307	4.05	1.23
TP	307	4.87	1.16
SR	307	3.09	1.41
LI	307	3.94	1.59
ASE	307	0.68	0.47
AEE	307	0.64	0.48
ACE	307	0.21	0.41
Income	307	3.12	1.79
Residency	307	0.61	0.49
Gender	307	0.55	0.50
Age	307	0.52	0.50

Generalized Linear Models

The Generalized Linear Models (GLM) assessed the impact of perceived social impacts and demographic factors on behavioral intentions to attend sports, entertainment, and community events, as well as word-of-mouth behaviors.

Behavioral Intentions: Sports, Entertainment, and Community Events

- **Sports Intentions**: Significant predictors included Community Development (β = .38, p < .05), Economic Benefits (β = .21, p < .05), and Level of Involvement (β = .14, p < .05). Notably, prior attendance at sports events (*ASE*; β = 1.11, p < .001) showed a strong positive effect on the intention to attend future sports events, highlighting that previous sports participation is a key driver for sports attendance intentions. This strong relationship was particularly pronounced compared to its influence on other event

types, such as entertainment and community events, where the impact was less significant. Income (β = .11, p < .05) was also significant, indicating that higher income levels were associated with increased sports attendance intentions. Age (β = .46, p < .05) indicated that younger individuals (coded as 1) had higher intentions to attend sports events compared to older individuals (coded as 0).

- **Entertainment Intentions**: For entertainment intentions, Economic Benefits (β = .26, p < .05) and Level of Involvement (β = .15, p < .05) were significant predictors. Attendance at entertainment events (*AEE*; β = 1.34, p < .001) was a strong predictor, whereas prior attendance at sports events did not exhibit a significant influence, underscoring the specificity of prior experiences on related event types. Income (β = .13, p < .05) played a significant role, and Age (β = .53, p < .05) again suggested that younger individuals were more inclined towards attending entertainment events.
- **Community Intentions**: Level of Involvement (β = .13, p < .05) was a significant predictor of intentions to attend community events. Attendance at community events (*ACE*; p > .05) showed a positive trend but was not statistically significant. Importantly, prior sports participation had a minimal impact on community event intentions, highlighting the event-specific nature of previous participation influences. Income (β = .16, p < .05) was significant, while Age (β = .47, p < .05) showed that younger individuals were more likely to attend community events.

Table 3. Generalized linear model results for behavioral intentions (BI)

Independent Variable	Sports Events (β)	Entertainment Events (β)	Community Events (β)
Intercept	1.02	.81	.91
Community Development (CD)	.38 *	.23	.26
Community Pride (CP)	-.02	.00	.10
Economic Benefits (EB)	.21 *	.26 *	.18
Economic Costs (EC)	.00	-.06	-.11
Traffic Problems (TP)	-.16 *	-.02	-.06
Security Risks (SR)	.01	.05	.07
Level of Involvement (LI)	.14 *	.15 *	.13 *
Sports Attendance (ASE)	1.11 **	.07	.01
Entertainment Attendance (AEE)	.54 **	1.34 **	.75 **
Community Attendance (ACE)	-.11	-.26	.38
Income	.11 *	.13 *	.16 *
Residency	.04	.03	-.03
Gender	.01	-.04	.00
Age	.46 *	.53 *	.47 *
R^2	.383	.410	.378

Note: *p< .05 and **p<.001

Word-of-Mouth

- **WM1 (Positive recommendations of sports events)**: Significant predictors were Community Development (β = .47, p < .05), Level of Involvement (β = .25, p < .001),

and prior attendance at sports (*ASE*; β = .76, p < .001) and entertainment events (*AEE*; β = .61, p < .001). Income (β = .12, p < .05) significantly influenced word-of-mouth, WM1, indicating that higher-income individuals were more likely to engage in positive word-of-mouth. Age did not show a significant effect in this model (p > .05), suggesting no strong influence of age on positive word-of-mouth for sports events.

- **WM2 (Positive recommendations of entertainment events)**: Community Development (β = .28, p < .05), Community Pride (β = .20, p < .05), and Level of Involvement (β = .22, p < .001) were significant predictors. Attendance at entertainment events (*AEE*; β = .54, p < .001) also played a significant role, and prior attendance at sports events (*ASE*; β = .64, p < .05) was found to have a significant positive effect, indicating its substantial influence on word-of-mouth for entertainment contexts as well. Additionally, Traffic Problems (*TP*; β = -.12, p < .05) showed a significant negative effect, suggesting that perceived traffic issues reduce the likelihood of positive word-of-mouth sharing.
- **WM3 (Positive recommendations of community events)**: Significant effects were found for Community Development (β = .29, p < .05), Level of Involvement (β = .20, p < .001), and prior attendance at sports (*ASE*; β = .64, p < .001) and entertainment events (*AEE*; β = .43, p < .05). Income (p > .05) was not significant in this model, and Age (p > .05) did not show a significant effect, indicating no strong influence of age on the likelihood to recommend the facility.

Table 4. Generalized linear model results for word-of-mouth (WM)

Independent Variable	WM 1 (β)	WM 2 (β)	WM 3 (β)
Intercept	-.16	1.42 *	1.28 *
Community Development (CD)	.47 **	.28 *	.29 *
Community Pride (CP)	.11	.20 *	.15
Economic Benefits (EB)	.06	.04	.11
Economic Costs (EC)	.03	-.04	-.05
Traffic Problems (TP)	-.11	-.15 *	-.14 *
Security Risks (SR)	-.01	.00	.08
Level of Involvement (LI)	.25 **	.22 **	.20 **
Sports Attendance (ASE)	.76 **	.55 **	.64 **
Entertainment Attendance (AEE)	.61 **	.54 **	.43 *
Community Attendance (ACE)	-.53 *	.20	.19
Income	.12 *	.07	.03
Residency	.03	.03	.04
Gender	-.07	-.22	-.19
Age	.30	.39 *	.30 *
R^2	.383	.410	.378

Note: *p<.05 and **p<.001

Overall, the results highlight that perceived social impacts, particularly Community Development and Level of Involvement, play significant roles in shaping behavioral intentions and word-of-mouth. Income emerged as a significant factor in predicting engagement across

various contexts, particularly in sports and entertainment. Effects were generally more positive among younger generations, particularly in word-of-mouth outcomes, suggesting that younger individuals were more supportive and likely to recommend the facility. Additionally, the influence of prior sports participation was notably stronger for sports event intentions, underscoring the event-specific nature of prior experience effects.

DISCUSSION and CONCLUSION

The current study addresses the demand for assessing the perceived impacts of the development of multipurpose sports facilities using public subsidies. Developing a multipurpose sports facility through the utilization of public subsidies produces both positive and negative perceived social impacts on residents who reside in the region where the public subsidy is utilized to build the multipurpose sports facility (Seifried & Clopton, 2013; Siegfried & Zumbalist, 2000). Over the decades, regional and national governments have routinely subsidized multipurpose sports facilities based on the primary argument that building new facilities would produce economic benefits for the community and its residents. Despite some studies indicating evidence of multipurpose sports facilities generating public goods for the community, a majority of studies argued that there was a limited level of tangible and intangible impacts on the community (Matheson, 2019; Wallstem et al., 2018). However, public subsidies could still be justified by providing a great deal of understanding of significant intangible impacts derived from the development of new multipurpose sports facilities to the community.

The respondents of this study express positive attitudes toward the positive social impacts such as community development and economic benefits compared to negative social impacts (e.g., traffic problems and economic costs) along with positive intentions to share information about sports, entertainment, and community events as well as intention to attend future sports and entertainment events. Public subsidies are frequently utilized for the development of new multipurpose sports facilities based on the argument that the development by utilizing public subsidies would fuel both economic and social benefits in the community (Agha, 2013; Bradbury et al., 2022). However, according to Matheson (2019), sports facilities do not generate significant economic activities and social goods although they could generate critical neighborhood effects for residents such as enhancing the quality of life and social cohesion even those who are not sports fans. For instance, 60% of voters in Oklahoma City in the U.S. approved $120 million of public subsidies to renovate the downtown arena in the hope of luring an NBA franchise. Based on the public relations strategies by the administrators of Oklahoma City and the State of Oklahoma that emphasized elevating public acceptance of the utilization of public subsidies for becoming a "big-league city" and "put Oklahoma City on the map" garnered more long-term support among residents those who did not support the public subsidies (Merrefield, 2024). Thus, it is crucial to cultivate social cohesion on expected social impacts among residents that potential social impacts from the facility developments could serve as an amenity that can improve the quality of residents' lives even those who do not support the utilization of public subsidies (Groothuis & Rotthoff, 2016).

The findings on the relationship among perceived social impacts, the level of involvement, and intention to consume prospective events indicate that prior attendance at sports events triggers a strong positive effect on future attendance in sports events. In addition, perceived social impacts such as community development and economic benefits showed a significant effect on increasing the intention to attend future sports events. Interestingly, perceived traffic problems negatively influenced attending future sports events. In addition, perceived economic benefits and previous attendance at entertainment events were strong predictors of attending entertainment events in the future. Lastly, attendance at community events was the only key driver of intention to attend future community events. The results highlight the event-specific nature of previous participation influences on behavioral intentions for prospective events while residents' perceptions of community development and economic benefits derived from publicly subsidized multipurpose sports facility development significantly increase the intention to attend future sports events and entertainment events.

The analysis of the relationships among perceived social impacts, level of involvement, and word-of-mouth revealed somewhat different results compared to behavioral intentions to consume prospective events. First, respondents revealed that community development, level of involvement as a mediating variable, and previous attendance at sports and community events positively influence sharing positive word-of-mouth about consuming sports and entertainment events. On the other hand, respondents' word-of-mouth for entertainment events was significantly influenced by perceived social impacts such as community development and community pride, level of involvement, and previous attendance at sports and entertainment events in a positive manner. It is worth noting that community pride only significantly increases word-of-mouth for entertainment events although it was not an important predictor of any other word-of-mouth and behavioral intentions. In addition, the concern about traffic issues negatively influences word-of-mouth for recommending entertainment events which indicates that respondents might possess negative experiences relating to parking, traffic congestion, and road closures. Interestingly, the level of involvement in various events demonstrates a mediating role in developing positive influences on word-of-mouth of all types of events at the multipurpose sports facility.

This result is well-fitted with the previous literature focusing on the assessment of social impacts using the contingent valuation method which collects residents' opinions on what they prefer to sacrifice the financial commitments to build the multipurpose sports facility (Bradbury et al., 2024). The estimated outcomes such as social impacts and excitement of enhancing quality of life are extended to the broader population regardless of their preference for public subsidies when residents gain both social and psychological benefits from the development of facilities. For example, the previous study revealed that communities with more unified growth coalitions, building like-minded politicians, business leaders, and most importantly residents who share an ideology and social network, are more efficiently approving public subsidies for the facility development (Delaney & Eckstein, 2003). Thus, the community should assess all prospective proposals through referendums with voter preferences and careful

consideration of all relevant foreseeable issues so that residents can make informed decisions while mitigating consistent public sentiment against such concerns on financial burdens.

Lastly, concerning the demographic variables on the behavioral intentions, respondents who were younger ages with higher income levels had higher intentions to attend sports, entertainment, and community events in the future. In contrast, demographic variables were not significant predictors of word-of-mouth across all types of events. According to Waitt (2003), perceived social impacts and related behaviors could be different by socio-demographic characteristics. Therefore, the results herein could be generalized to other populations concerning the behavioral intentions toward publicly subsidized multipurpose sports facilities. This result is very interesting that younger generations may favor access to entratin their leisure activities through various sports and entertainment events at the multipurpose sports facility that was funded by public subsidies. It indicates that nonpecuniary social impacts from quality-of-life improvements, enhanced welfare, and the improvement of community image image from the development of multipurpose sports facilities could effectively lessen the lack of economic justifications for the burden of public financings as commonly observed from existing studies (Buckman & Pemberton, 2023). Indeed, it is very common for younger residents to list entertainment and things to do as the most important factor in deciding whether they relocate or live in certain cities (Merrefield, 2024). It is commonly argued that the energetic and vigorous atmosphere in the downtown by developing first-class sports facilities generates unique and valuable intangible benefits for the community (Agha & Coates, 2014; Kim et al., 2015). Therefore, local governments should develop effective informational strategies to offer a full understanding of the expected benefits of having multipurpose sports facilities in the region through disseminating persuasive messages to older and lower-income residents who might be sensitive to the financial concerns of the publicly subsidized facilities.

Limitations and Future Research Suggestions

This paper addresses the importance of understanding residents' perceived social impacts concerning their behavioral attributes; however, the study is not without its limitations. First, respondents in this study demonstrated a moderate level of perceived social impact toward the newly developed multipurpose sports facility. This might hinder a full understanding of the perceived social impacts derived from the development of the facility. Second, the modified Perceived Social Impact Scale was adopted from the study of assessing the intangible impacts of hosting a large-scale sports event; thus, the applicability of the scale and the fit with the current context may be limited.

In terms of future research suggestions, the current study identifies a wide-open door for policymakers and administrators to pay closer attention to analyzing residents' attitudes focusing on preference toward public subsidies and demographic characteristics. As Wallstem et al. (2018) indicate there has been a critical absence of a comprehensive analysis of social impacts and significant limitations on the strategic engagement strategies to facilitate the understanding of social impacts derived from the facility developments and hosting various

events to the local community. Therefore, more studies need to be conducted to develop a valid measurement tool for assessing the intangible impacts of multipurpose sports facility developments to mitigate misreading of expected intangible impacts such as social impacts among the residents. In addition, it would be valuable to assess a variety of contexts such as large, middle, and small-size facilities as well as different main tenants for those facilities (e.g., professional football, basketball, baseball, etc) to provide managerial insight for administrators and policymakers based on a comprehensive understanding of residents' affirmative attitudes.

Conflicts of Interest: There is no conflict of interest on the part of the authors in this study.

Authors' Contribution: All authors have contributed substantial and intellectual contributions to the literature review, data analysis, and interpretation of findings for the manuscript's completion. All authors read and approved the final manuscript.

Ethical Approval: The current study was exempt from obtaining ethical approval from the Internal Review Board of Wichita State University as the secondary data were obtained and used for the study.

Acknowledgment: This study was supported by Dr. Homun JUN and the International Collaborative Research Grant at Mokpo National University in Muan-gun, South Korea.

REFERENCES

Agha, N. (2013). The Economic impact of stadia and teams: The case of minor league baseball. *Journal of Sports Economics, 14*(3), 227-252. http://dx.doi.org/10.1177/1527002511422939

Agha, N., & Coates, D. (2014). A compensating differential approach to valuing the social benefit of minor league baseball. *Contemporary Economic Policy, 33*(2), 285-299. https://doi.org/10.1111/coep.12080

Aitken, C. E. (1985). Olympulse II: Evolving resident attitudes toward the 1988 Olympic Winter Games. *Journal of Travel Research, 23*(1), 28-33.

Ap, J. (1990). Residents' perceptions research on the social impacts of tourism. *Annals of Tourism Research, 17*(4), 610-616. https://doi.org/10.1016/0160-7383(90)90032-M

Balduck, A., Maes, M., & Buelens, M. (2011). The social impact of the Tour de France: Comparisons of residents' pre- and post-event perceptions. *European Sport Management Quarterly, 11*(2), 91-113. https://doi.org/10.1080/16184742.2011.559134

Bennett, G., Ferreira, Lee, J., & Polite, F. (2009). The role of involvement in sports and sport spectatorship in sponsors' brand use: The case of Mountain Dew and action sports sponsorship. *Sport Marketing Quarterly, 18*(1), 14-24.

Bradbury, J. C., Coates, D., & Humprey, B. R. (2024). Public policy toward professional sports stadium: A review. *Journal of Policy Analysis and Management, 43*(3), 899-937. https://doi.org/10.1002/pam.22534

Bradbury, J. C., Coates, D., & Humprey, B. R. (2022). The impact of professional sports franchises and venues on local economies: A comprehensive survey. *Journal of Economic Surveys, 37*(4), 1389-1431. https://dx.doi.org/10.2139/ssrn.4022547

Broughton, D. (2024). Three-year skid ends as spending on projects completed in 2024 climbs to $5.8 billion. Retrieved from https://www.sportsbusinessjournal.com/Articles/2024/01/29/facilities-spending.

Buckman, S., & Pemberton, A. (2023). Suicide squeeze: How minor league cities chase economic development with big-league stadium schemes. *Journal of Urban Affairs, 45*(8), 1452-1468. https://doi.org/10.1080/07352166.2021.1943420

Bull, C., & Lovell, J. (2007). The impact of hosting major sporting events on local residents: An analysis of the views and perceptions of Canterbury residents in relation to the Tour de France 2007. *Journal of Sport and Tourism, 12*(3-4), 229-248. https://doi.org/10.1080/14775080701736973

Burrows, T. (2017). Legacy, what legacy? Five years on the London Olympic Park battle still rages. Retrieved from: https://www.theguardian.com/cities/2017/jul/27/london-olympic-park-success-five-years-depends.

Chalip, L. (2006). Towards social leverage of sport events. *Journal of Sport and Tourism, 11*(2), 109-127. https://doi.org/10.1080/14775080601155126

Crompton, J. L. (2004). Beyond economic impact: An alternative rationale for the public subsidy of major league sports facilities. *Journal of Sport Management, 18*(1), 40-58. https://doi.org/10.1123/jsm.18.1.40

Cropanzano, R., & Mitchell, M. (2005). Social exchange theory: An interdisciplinary review. *Journal of Management, 31*(6), 874-900. https://doi.org/10.1177/0149206305279602

Dehring, C. A., Depken, C.A., & Ward, M. R. (2007). The impact of stadium announcements on residential property values: Evidence from a natural experiment in Dallas-Fort Worth. *Contemporary Economic Policy, 25*(4), 627-638. https://doi.org/10.1111/j.1465-7287.2007.00077.x

Delaney, K. J., & Eckstein, R. (2003). *Public dollars, private stadiums: The battle over building sports stadiums*. Rutgers University Press

Feng, X., & Humphreys, B. R. (2008). Assessing the economic impact of sports facilities on residential property values: A spatial hedonic approach. *International Association of Sports Economists Working Paper, 19* (0812), 188-210.

Greenberg, M. J. (2004). Sport facility financing and development trends in the United States. *Marquette Sports Law Review, 15*(1), 93-173.

Groothuis, P. A., & Rotthoff, K. W. (2016). The economic impact and civic pride effects of sports teams and mega-events: Do the public and the professionals agree? *Economic Affairs, 36*(1), 21-32. https://doi.org/10.1111/ecaf.12156

Howard, D. R., & Crompton, J. L. (2004). *Financing sport*, (2nd Ed). Fitness Information Technology.

Humphreys, D. R. (2018). Should the construction of new professional sports facilities be subsidized? *Journal of Policy Analysis and Management, 38*(1), 264-270. https://doi.org/10.1002/pam.22099

Inoue, Y., & Havard, C. (2014). Determinants and consequences of the perceived social impact of a sport event. *Journal of Sport Management, 28*(3), 294-310. https://doi.org/10.1123/jsm.2013-0136

Kelly, M., & Rengers, C. (2023). Should Wichitans care when ballpark development starts? If you pay taxes, then yes. Retrieved from https://www.kansas.com/news/politics-government/article278616494.html.

Kim, H., Gursoy, D., & Lee, S. (2006). The impact of the 2002 World Cup on South Korea: comparisons of pre- and post-games. *Tourism Management, 27*(1), 86-96. https://doi.org/10.1016/j.tourman.2004.07.010

Kim, S. S., & Petrick, J. F. (2005). Residents' perception on impacts of the FIFA 2002 World Cup: The case of Seoul as a host city. *Tourism Management, 26*(1), 25-38. https://doi.org/10.1016/j.tourman.2003.09.013

Kim, W., Jun, H., Walker, M., & Drane, D. (2015). Evaluating the perceived social impacts of hosting large-scale sport tourism events: Scale development and validation. *Tourism Management, 48*(2015), 21-32. https://doi.org/10.1016/j.tourman.2014.10.015

Kim, W., & Walker, M. (2012). Measuring the social impacts associated with Super Bowl XLIII: Preliminary development of a psychic income scale. *Sport Management Review, 15*(1), 91-108. https://doi.org/10.1016/j.smr.2011.05.007

Matheson, V. (2019). Is there a case for subsidizing sports stadiums? *Journal of Policy Analysis and Management, 38*(1), 271-277. https://doi.org/10.1002/pam

Mathieson, A., & Wall, G. (1982). *Tourism economic, physical and social impacts*. Longman Group Limited.

Merrefield, C. (2024). Public funding for sports stadiums: A primer and research roundup. Retrieved from: https://journalistsresource.org/economics/sports-stadium-public-financing/

Santo, C. (2005). The economic impact of sports stadiums: Recasting the analysis in context. *Journal of Urban Affairs, 27*(2), 177-191.

Santo, C., & Mildner, G. (2010). *Sport and public policy: Social, political, and economic perspectives*. Human Kinetics.

Seifried, C., & Clopton, A. (2013). An alternative view of public subsidy and sport facilities through social anchor theory. *City, Culture and Society, 4*(1),49-55. https://doi.org/10.1016/j.ccs.2013.01.001

Siegfried, J., & Zumbalist, A. (2000). The economics of sports facilities and their communities. *Journal of Economic Perspectives, 14*(3), 95-114. https://doi.org/10.1257/jep.14.3.95

Smith, C., & McCormick, B. (2024). Worth the cost. Retrieved from https://www.sportsbusinessjournal.com/Articles/2024/01/29/facilities.

Sparvero, E. S., Warner, S., & Tingle, J. K. (2015). RuxTex: A community landmark run out of business. *Sport Management Review, 19*(3), 343-351. https://doi.org/10.1016/j.smr.2015.10.003

Swaim, C. (2022). Wichita City Council Oks millions more in public money for Riverfront Stadium district. Retrieved from https://www.kansas.com/news/politics-government/article260550382.html.

Testa, L., Parra-Camacho, D., Gomez-Tafalla, A. M., Garcia-Pascual, F., & Duclos-Bastias, D. (2023). Local impact of a sports centre: Effects on future intentions. *Sustainability, 15*(6), 5550. https://doi.org/10.3390/su15065550

Waitt, G. (2003). Social impacts of the Sydney Olympics. *Annals of Tourism Research, 30*(1), 194-215. https://doi.org/10.1016/S0160-7383(02)00050-6

Wallstem, M., Loannides, D., Petterson, R. (2018). Evaluating the social impacts of events: in search of unified indicators for effective policymaking. *Journal of Policy Research in Tourism, Leisure and Events, 12*(2), 122-141. http://dx.doi.org/10.1080/19407963.2018.1515214

Wu, J., Orr, M., Inoue, Y., & Chang, Y. (2023). Drivers of the perceived social impact of the Super Bowl: mediation and moderation analyses. *International Journal of Sports Marketing and Sponsorship, 24*(5), 837-852. https://doi.org/10.1108/IJSMS-12-2022-0208

Spor Bilimleri Araştırmaları Dergisi
Journal of Sport Sciences Research
Vol: 9, Issue: 3, 2024
E-ISSN: 2548-0723
URL: http://www.dergipark.org.tr/jssr

Home-Based HIFT Altered Quality of Life and Health Related Fitness Parameters in Women

Alp Aslan UYSAL[1*], Selda BEREKET YÜCEL[1]
[1] Marmara University, Faculty of Sport Sciences, Istanbul.

Research Article
DOI: 10.25307/jssr.1531096
Received: 09.08.2024 Accepted: 10.10.2024 Online Published: 31.10.2024

Abstract

The effects of high intensity functional training (HIFT) on health related components of fitness and quality of life were studied in the gym environment, but there has not been any study on examining the effects of HIFT by using bodyweight exercises at home environment on health related components of fitness and quality of life in women. The goal of this research is to examine the effects of home-based bodyweight HIFT on health related components of physical fitness and quality of life in women. Twenty-one recreationally active female participants (age 26.3 ± 3.7 years) were included in the study. After completing the pretest, participants applied HIFT at home with bodyweight exercises three times a week for a duration of eight weeks. Cardiovascular endurance, muscular strength, muscular endurance, flexibility, body composition and quality of life assessments were carried out in both pretest and posttest applications. Significant differences were observed between the pretest and posttest results of cardiovascular endurance ($p=0.042$), muscular strength ($p<0.001$), muscular endurance ($p<0.001$) and flexibility ($p=0.001$) parameters. No significant difference was observed between the pretest and posttest results of body composition analysis. Significant improvement ($p=0.045$) was found on the quality of life scale. Home-based bodyweight HIFT altered quality of life in recreationally active women and enhanced health related components of fitness, which could prevent the increase of health-related risk factors caused by inactivity.
Keywords: Health related fitness, HIFT, Home based training, Bodyweight exercises, Quality of life

[*] **Corresponding Author:** Alp Aslan Uysal, **E-mail:** alpaslan-89@hotmail.com

INTRODUCTION

Effects of inactivity on health related components of fitness and their correlation with cardiovascular risk elements have found to be detrimental (Narici et al., 2020; Perrone et al., 2021). According to the study of Mulder and others (2015), only 5 days of inactivity caused an 8-9% decrease in quadriceps muscle strength, and 6% atrophy occurred following 10 days of inactivity (Narici et al., 2020). Saltin and colleagues (1968), who had important studies on human physiology, revealed that after 20 days of inactivity, the maximum oxygen consumption of young and healthy individuals decreased by 28% and stroke volume decreased by an average of 11%. When the maximum oxygen consumption, which is one of the most important parameters of health, decreased by one MET (3.5 ml/kg/min), the prevalence of cardiovascular diseases increased by 18% and mortality by 15% (Kodama et al., 2009). Conversely, each MET increase in maximum oxygen consumption resulted in decrease of 11.6%, 16.1%, and 14.0% in all-cause deaths, cardiovascular disease-related deaths, and cancer-related deaths, respectively (Imboden et al., 2018). World Health Organization (2020) recommended engaging in at least 150 minutes of moderate intensity exercise per week, 75 minutes of vigorous exercise per week or a combination of both and stated that the recommendation could also be applied at home environment.

Health-related components of fitness, which include cardiovascular endurance, muscular endurance, muscular strength, flexibility and body composition (Caspersen et al., 1985), were all found to be positively related with quality of life. In the study conducted by Ogwumike et al. (2011), a significant increase in participants' quality of life was observed following 12 weeks of cardiovascular endurance training. Shoup et al., (1997) investigated the impact of body composition on quality of life and found that individuals with a healthy weight had higher health-related quality of life scores compared to those who were underweight or overweight. In addition, Porciúncula-Frenzel et al., (2013) discovered that women of normal weight scored higher in the physical health section of the World Health Organization Quality of Life Scale compared to overweight women. Cunningham et al., (1993) revealed that muscular strength, muscular endurance, and flexibility levels were positively correlated with quality of life, particularly among the older adults.

Time constraints and the lack of time to go to the gym are major factors that prevent the majority of the population from engaging in physical activity (Hollingsworth et al., 2020). Home-based bodyweight functional exercises are suitable alternatives for individuals who cannot go to the gym for various reasons (McDermott, 2017). While free weights and machines are commonly emphasized in resistance training, Sperlich et al., (2017) have revealed that effective resistance training can also be achieved using only bodyweight; exercises performed with bodyweight by applying a high-intensity circuit training model, have been found to enhance both cardiovascular endurance and functional strength.

High intensity functional training (HIFT) involves multi-joint exercises performed at high intensity that might or might not include rest periods between exercises (Feito et al., 2018). When bodyweight resistance training is performed by using the HIFT method, it takes less time than traditional resistance training and can be done in any environment since it requires no

equipment, making it more suitable for individuals who are unable to go to the gym due to time constraints (Haddock et al., 2016). According to the literature (Feito et al., 2018; Heinrich et al., 2015), conventional aerobic exercises do not provide adequate strength development, while conventional strength exercises do not provide sufficient cardiovascular benefits; HIFT aims to develop both of these components at the same training session in optimal time with circuit training model applied at high intensity.

In the literature, the effects of HIFT on health related fitness components and quality of life were studied in the gym environment (Sperlich et al., 2017), but there has not been any study on examining the effects of HIFT by using bodyweight exercises at home environment on health related components of fitness and quality of life. This study aimed to investigate the effects of home-based bodyweight HIFT on health related fitness components and quality of life in recreationally active women.

METHOD

Research Model

This study employed an experimental, non-randomized one group pretest-posttest design. Participants of the study were selected by convenience sampling method. The decision to employ convenience sampling was influenced by the limited availability of recruiting participants. Given that participants recruited for this study were personal fitness clients of the researcher, and considering the limited number of clients available during the intervention period, a control group was not incorporated into the study.

Research Group

Participants were members of a fitness club in Istanbul, Turkey. 21 recreationally active female participants between the ages of 18-35 were included in the current study (26.3 ± 3.7 years, 57.7 ± 4.6 kg). Participants did not have any cardiovascular or neuromuscular health problems and declared that they have doctor's approval for exercising at high intensity. Participants were informed about the study's content, and written consent was obtained from each individual.

Ethical Approval

Ethics Committee of the School of Medicine, Marmara University approved this study. The research was carried out in compliance the Declaration of Helsinki.

Study Design

The design of the study is shown in Figure 1.

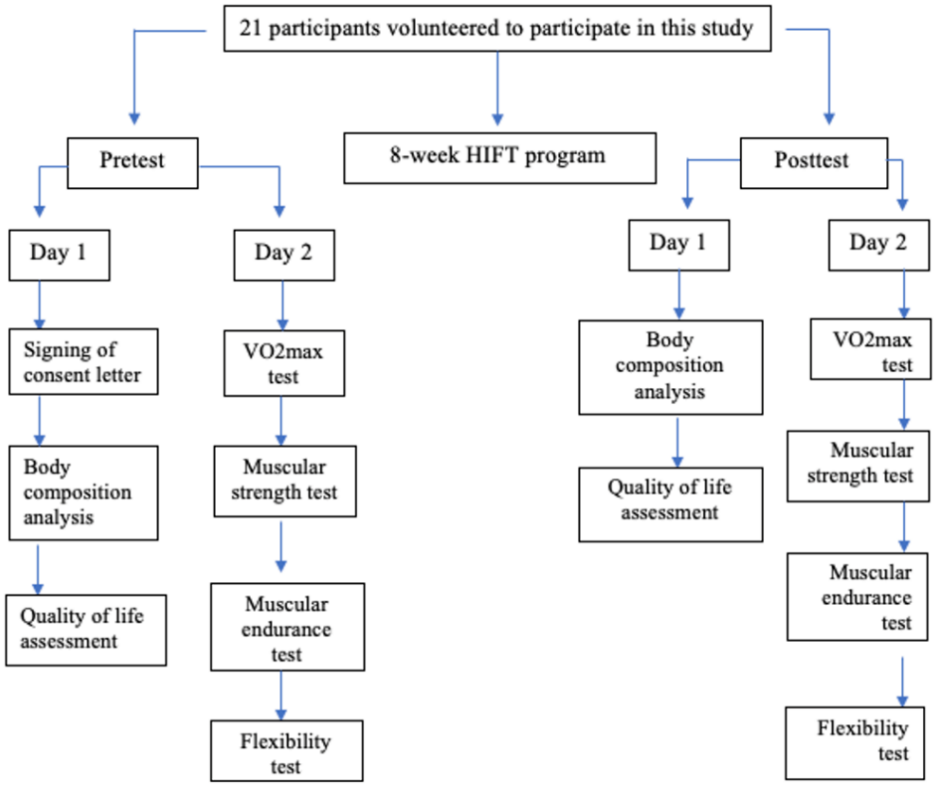

Figure 1. Design flowchart

Following the pretests and the implementation of the 8-week workout routine, posttests were conducted to evaluate the changes in body composition, cardiovascular endurance, muscular strength, muscular endurance, flexibility, and quality of life.

Body Composition Analysis

Body composition values of the participants were analyzed by using bioelectric impedance analysis (Tanita BC-418, Japan). Height information was entered into the device after measuring the height of the participants with a stadiometer. Participants did not consume food or drink for four hours, did not perform any activity that may cause dehydration for 12 hours, did not drink alcohol or caffeine for 12 hours before the tests (Ritchie et al., 2005).

Cardiovascular Endurance Test

Cardiovascular endurance test was applied to the participants by using Rockport Walk Test on treadmill in order to calculate VO2max values indirectly. After a 10 minute standard warm-up, participants were instructed to walk for 1.6 km on treadmill as fast as possible and VO2max values were calculated indirectly by Rockport formula (Kline et al., 1987).

Muscular Strength Test

Muscular strength test was applied to the participants by indirectly measuring their one repetition maximum weight (RM) in chest press and leg press exercises; 6RM was measured to calculate 1RM indirectly to minimize the risk of injury during pretest and posttest applications. First, participants performed six repetitions with their estimated 10RM on chest press machine and gradually increased the load until they reached 6RM; three minutes of rest was given between each attempt. 6RM is approximately 85% of 1RM (Morales & Sabonya), so participants' 1RM is calculated indirectly by dividing their 6RM to 0.85. The same procedures

were applied on the leg press exercise. Muscular strength score of each participant was recorded as the average 1RM of chest press and leg press exercises: [(Chest Press 1RM+ Leg Press 1RM) / 2].

Muscular Endurance Test

Muscular endurance test was conducted as participants performed maximum number of repetitions on chest press and leg press machines by using 40% of their calculated 1RM for each exercise (American College of Sports Medicine, 2009). Muscular endurance score of each participant was evaluated as the average number of repetitions performed on chest press and leg press exercises: [(Chest Press Maximum Repetitions + Leg Press Maximum Repetitions) / 2].

Flexibility Test

Flexibility test was applied to the participants by using sit and reach test. Participants reached forward as far as possible on sit and reach box by using both hands without bending their knees; flexibility score was recorded at the farthest point of two attempts (Crotti et al., 2018).

Quality of Life Assessment

Quality of life assessment of the participants was carried out by using World Health Organization Quality of Life Scale (WHOQOL-BREF). In this scale, which had 26 questions in total, physical, psychological, social and environmental domains were scored as four different parameters and the participants' quality of life score were determined by the average score of these domains (World Health Organization, 1998).

Eight-Week HIFT Program

Eight-week home-based bodyweight HIFT program was constructed for the participants. Three training sessions were completed each week for eight weeks with a minimum of 48 hours between workouts. Each participant completed their training sessions individually at home environment, filled out training log during each workout, recorded heart rate data by using heart rate monitor and sent training information to the researcher online after each workout. Training data for each participant had been tracked by the researcher and saved for further analysis. The training program has been prepared by the researchers according to the basic principles of HIFT (Feito et al., 2018), details of the eight-week HIFT program are as follows:

- Warm-up circuit included 30 repetitions of jumping jacks, 20 seconds of plank, 10 repetitions of squats, and five repetitions of burpees. Three sets were performed for each circuit without a defined rest period between sets.
- Each training set included one minute of squat jumps, one minute of alternate reverse lunges, one minute of burpees, one minute of sit-ups, and one minute of back extensions. A total of six sets were performed without a defined rest period between sets (30 minutes in total).
- Cool-down section included static stretching exercises for the upper and lower extremities.

Participants were already familiarized with the correct form of the exercises that are in the eight-week HIFT program because they had already been recreationally active; nevertheless, correct

form of each exercise in the training program was shown to the participants prior to the training period. Instructions given to the participants for training sessions are as follows:

The rest period between sets are not defined due to the characteristics of HIFT, the transition between exercises should be done as fast as possible. In case of reaching exhaustion before completing the set in any exercise, the minimum possible amount of time should be used to rest, then the participants must continue their effort in order to finish the highest number of repetitions achievable in the remaining time. The goal of each workout is to do more total repetitions than the previous workout which is recorded in the training log. Rating of perceived exertion (RPE) and heart rate data must be written by the participants on the training log at the end of each workout. Training intensity is expected to above RPE 15, and above 75% of the maximum heart rate (HRmax).

RPE and heart rate data at the end of each workout were examined by the researcher. Participants who failed to stay above 75% HRmax throughout the workout were obligated to redo the workout during the same week.

Analysis of Data

The statistical analysis for the study was conducted using the IBM SPSS Statistics 28 software. The maximum, minimum, mean and standard deviation values of the descriptive statistics, pretest and posttest scores were calculated by standard statistical methods. The distributions of the variables were analyzed for possible outliers. Univariate outliers were identified as scores that deviated more than 3 standard deviations from the mean. The comparison of pretest and posttest data was evaluated by using Wilcoxon signed rank test. The significance level used during the entire study was 0.05.

FINDINGS

Minimum, maximum, mean and standard deviation values of each parameter were analysed; no univariate outliers were revealed.

Cardiovascular endurance, muscular endurance, muscular strength, flexibility pretest and posttest data are given in Table 1.

Table 1. Health-related components of fitness excluding body composition

Variables	N	Pretest (M ± SD)	Posttest (M ± SD)	Z	p
Cardiovascular Endurance (ml/kg/min)	21	40.84 ± 4.75	42.02 ± 4.22	-2.03	**0.042***
Muscular Strength (kg)	21	41 ± 8.2	49.1 ± 10.2	-4.03	**<0.001***
Muscular Endurance (reps)	21	41.6 ± 10.5	54 ± 11	-4.02	**<0.001***
Flexibility (cm)	21	9.2 ± 8.9	11 ± 8.5	-3.41	**0.001***

***p<0.05**

Eight weeks of home-based bodyweight HIFT induced significant enhancements in cardiovascular endurance (p=0.042), muscular strength (p<0.001), muscular endurance (p<0.001) and flexibility (p=0.001) parameters of the participants. The body composition analysis data for the pretest and posttest are presented in Table 2.

Table 2. Body composition analysis pretest and posttest data

Variables	N	Pretest (M ± SD)	Posttest (M ± SD)	Z	p
Bodyweight (kg)	21	58.51 ± 7.91	58.83 ± 7.63	-1.438	0.150
Fat mass (kg)	21	15 ± 6.70	15.17 ± 6.24	-0.654	0.513
Fat free mass (kg)	21	43.53 ± 2.92	43.67 ± 2.86	-0.435	0.664
Body fat ratio (%)	21	24.73 ± 7.78	25.01 ± 7.16	-0.435	0.664

No statistically significant change (p>0.05) was found in any component of body composition. WHOQOL-BREF data for the pretest and posttest are presented in Table 3.

Table 3. WHOQOL-BREF pretest and posttest data

Variables	N	Pretest (M ± SD)	Posttest (M ± SD)	Z	p
Physical domain score	21	76 ± 12.6	81 ± 12.7	-2.44	**0.015***
Psychological domain score	21	74 ± 13	76 ± 13.6	-1.43	0.154
Social domain score	21	78 ± 14.9	80 ± 15	-0.63	0.531
Environmental domain score	21	69 ± 15.4	72 ± 13.5	-1.7	0.089
Quality of life score	21	74 ± 11.3	77.5 ± 12	-2.01	**0.045***

***p<0.05**

Significant improvement (p=0.045) was found in the quality of life scale. Among the four sub domains of WHOQOL-BREF, significant difference (p=0.011) was only found in the physical domain of the scale.

DISCUSSION and CONCLUSION

Research in the literature about the impact of HIFT on body composition in recreationally active women are examined and compared to our study. In the study conducted by Kapsis et al., (2022) on 22 female and 19 male recreationally active participants, three groups were formed as low load, medium load and control groups. Participants in the low load and the medium load groups applied HIFT three sessions per week for 12 weeks in the gym environment; the low load group performed resistance exercises with 30% of their 1RM and the medium load group performed resistance exercises with 70% of their 1RM.

At the end of sixth week, the mean percentage of body fat for both low load and medium load groups decreased significantly, but only the low load group experienced a highly significant decrease in the mean body fat percentage between 6^{th} and 12^{th} weeks. Although the training volumes (load x repetitions) of both groups were similar, the difference among the groups was attributed to the fact that the low load group did more repetitions of each exercise compared to the medium load group, and fat burning process improves at higher repetitions in HIFT

workouts. In addition, participants' diet was monitored by the researcher in the aforementioned study. In our study, no significant change was observed in the percentage of the body fat of the participants by the end of eight week even though our participants applied HIFT with high repetition bodyweight exercises; this result could be explained by not monitoring the diet of the participants unlike Kapsis and colleagues. In the research of Kapsis et al. (2022), only the medium load group experienced a significant increase in lean body mass at the end of sixth week while both goups experienced significant increase in lean body mass at the end of 12th week, which was attributed to the fact that neural adaptations take place earlier compared to the hypertrophy of the muscle; during the first 6 weeks, 70% of 1RM load was high enough to stimulate hypertrophy while it took more time for the low load group to experience significant hypertrophy. In our study, no significant increase was observed in lean body mass at the end of the eight week eventhough the muscular strength and muscular endurance parameters improved significantly; this is an indication that the participants developed sufficient neural adaptation but not sufficient hypertrophy at the end of eight-week period. The reason for this result could be explained by the load of resistance in our HIFT program which was consisted of bodyweight exercises; significant hypertrophy was not achieved by HIFT performed at this load in recreationally active women in 8-week period. The study of Lipecki and Rutowicz (2015) supports this view; 10-week bodyweight HIFT program was applied to 15 women between the ages of 21-23; even though significant improvements were observed in the muscular strength and muscular endurance tests after 10-week period, no significant difference was noted in body fat percentage or lean mass. This result was associated with the fact that the researcher did not monitor the diet of the participants, and the resistance exercises performed at bodyweight did not produce sufficient hypertrophy within 10 weeks.

In the literature, there are also studies related to our topic in which the diets of the participants were not monitored by the researcher and significant changes were observed in body composition values; in Clark's study (2014), nine female and four male recreationally active participants applied the P90X program, a HIFT training method, for four weeks by using bodyweight and minimum equipment at home environment. A significant decrease was observed in the mean body fat percentage of the participants by the end of four weeks, while no significant difference was observed in bodyweight which indirectly indicates the increase of lean body mass in four-week period. In the study of Sobrero et al. (2017), 19 recreationally active female participants were separated into two groups as HIFT group and traditional circuit training group; the participants were given exercises that require both bodyweight and external weights in the gym environment. After the training period of six weeks, the mean bodyweight of the HIFT group increased significantly while a significant decrease was observed in the mean body fat percentage. The discrepancies between the findings of these studies and our study could be explained by the fact that bodyweight HIFT might not produce sufficient hypertrophy in eight weeks compared to HIFT by using external weights or equipment.

There have been many studies in the literature stating that HIFT provides significant improvements on cardiovascular endurance: in the study of Murawska-Cialowicz et al. (2015), five female and seven male recreationally active participants applied HIFT by using both bodyweight and external weights two sessions per week for three months at a Crossfit gym. At the end of three months, the average VO2max of the female participants increased significantly.

In the study of Buckley et al. (2015), 28 recreationally active female participants applied HIFT by using both bodyweight and external weights in the gym environment three sessions per week for six weeks; the average VO2max of the participants improved significantly. In the study of McRae et al., (2012) on 22 recreationally active women, participants applied HIFT by using bodyweight and minimum equipment four sessions per week for four weeks; the mean VO2max of the group significantly increased. Information about the location of the training sessions in the aforementioned study was not given, but the researcher stated that HIFT can be performed at home by using bodyweight and minimum equipment. In our study, the participants applied bodyweight HIFT at home for eight weeks; the mean value of VO2max increased significantly from 40.84 ml/kg/min to 42.02 ml/kg/min. According to these results, applying bodyweight HIFT at home on recreationally active women produces similar results in terms of cardiovascular endurance development compared to applying HIFT with external weigths or equipment.

Various studies examining the impacts of HIFT on muscular strength are available in the literature: In the study of Posnakidis et al. (2022), eight female and five male physically active participants applied HIFT in the gym environment by using both bodyweight and external weights three sessions per week for eight weeks. By the end of the study, highly significant improvements were observed in muscular strength of the participants. In the study of Kliszczewicz et al. (2019), HIFT was applied to 10 female and 10 male recreationally active participants for four weeks by using both bodyweight and external weights in the gym environment; significant enhancements were observed in muscular strength of the participants. As an example of a longer study, in the study of Feito et al. (2018), 17 female and 9 male recreationally active participants applied HIFT by using both bodyweight and external weights in the gym environment at least two days per week for 16 weeks; significant enhancements were observed in muscular strength of the participants. In our study, highly significant improvements were observed in muscular strength of the participants who applied home-based bodyweight HIFT for eight weeks. These findings reveal that applying bodyweight HIFT at home environment and applying HIFT by using external weights or equipment in the gym environment can produce similar results in muscular strength parameter of recreationally active women. The only study in the literature which states that HIFT does not improve muscular strength in recreationally active women is the study of McRae et al. (2012); the reason for this result could be explained by the application of the grip strength test as the indicator of muscular strength instead of tests that involve large muscle groups in the lower and upper extremities.

According to our knowledge, all of the studies in the literature examining the impacts of HIFT on muscular endurance in women have revealed that HIFT provides significant improvements in this parameter. In the study conducted by Barfield et al. (2012) on 15 female and 45 male recreationally active university students, the Crossfit group applied HIFT by using both bodyweight and external weights in the gym environment two days per week throughout a school semester; significant improvements were observed in muscular endurance of the participants. In the studies of Posnakidis et al. (2022), Sobrero et al. (2017), and Buckley et al. (2015), participants applied HIFT three sessions per week by using both bodyweight and external weights in the gym environment for eight weeks, six weeks, and six weeks respectively; significant improvements were observed in muscular endurance of the participants

in all of these studies. In our study, a highly significant improvement was observed between the pretest and posttest results of muscular endurance of the participants who applied home-based bodyweight HIFT for eight weeks; our findings are consistent with the studies in which HIFT workouts were applied in the gym environment by using external weights, which reveal that the application of bodyweight HIFT at home environment can lead to similar improvements in muscular endurance compared to the application of HIFT in the gym environment by using external weights in recreationally active women.

There are contradictive findings in the literature about the effects of HIFT on flexibility in recreationally active women; in the research of Cosgrove et al. (2019), 23 female and 22 male recreationally active participants were seperated in two groups according to their HIFT history as "0-6 months group" and "+7 months group". The participants applied HIFT by using both bodyweight and external weights for six months in a Crossfit gym, four sessions per week on average; significant improvements were observed in sit and reach flexibility test results of the participants in both groups. In the aforementioned study, the participants also applied stretching exercises in the five-minute cool-down section of their workouts, but the improvements in flexibility were not associated with stretching exercises by the researcher. In the study of Sobrero et al. (2017), which is an example of a shorter duration research compared to the study of Cosgrove et al. (2019), no significant changes were detected in the sit and reach flexibility test results of the participants who performed HIFT for six weeks; it was also stated that the participants applied stretching exercises in the cool-down section of their workouts. In our study, a highly significant improvement was observed between the sit and reach flexibility pretest and posttest results of the participants. Throughout our study, the participants applied static stretching exercises in the cool-down section of the workouts; therefore, it is unknown whether the real reason for the improvement in flexibility score was due to HIFT workouts or static stretching exercises. As a result of the contradictory findings in our study and the literature, the effects of HIFT on flexibility cannot be interpreted clearly.

There is limited research in the literature on the effect of HIFT on quality of life. In the study of Engel et al., (2019) on 10 female and 10 male recreationally active participants, an 8-week HIFT program was applied to the participants; no significant change was observed in any parameter of WHOQOL-BREF. Contrary to this study, Sperlich et al.'s studies on overweight women in 2017 and on sedentary women in 2018 showed significant improvements in SF-36 Quality of Life Scale (Bullinger et al., 2008) in women who performed HIFT for nine weeks and four weeks, respectively. The reason for the difference in the findings of these studies can be explained as the responses given to exercise in overweight and sedentary women could be higher than in women who are recreationally active. However, in our study, statistically significant improvement was found on the quality of life and the physical domain of the scale.

The impacts of HIFT on health-related components of fitness and quality of life were previously studied in the gym environment, but this study was the first to investigate the effects of bodyweight HIFT at home environment on health related components of fitness and quality of life in women. Home-based bodyweight HIFT for eight weeks provided significant improvements in cardiovascular endurance, muscular endurance, muscular strength, flexibility

and quality of life in recreationally active women, which could help prevent the increase of health-related risk factors caused by inactivity.

Based on the results of this study, suggestions for future research on the effects of HIFT are as follows:

- Future research can be applied by monitoring the diet of the participants' during the training period.

- Future studies aiming to examine the effects of HIFT on flexibility can be conducted without stretching exercises at the end of training units.

- Future studies should include a control group to evaluate the effects of home-based HIFT on health-related fitness components; the absence of a control group was a major limitation of this research.

Conflicts of Interest: The authors declare that no financial or personal conflict of interests have influenced the research and findings presented in this study.

Authors' Contribution: Alp Aslan Uysal and Selda Bereket Yücel have given substantial contributions to the conception or the design of the manuscript, acquisition, analysis and interpretation of the data. All authors have participated to drafting the manuscript, Selda Bereket Yücel revised it critically. All authors read and approved the final version of the manuscript. All authors contributed equally to the manuscript and read and approved the final version of the manuscript.

Ethical Approval
Ethics Committee: The Ethics Committee of the Department of Medicine, Marmara University
Date / Protocol Number: 05.10.2021 / E-15342631-302.14.04-118565

REFERENCES

American College of Sports Medicine (2009). American College of Sports Medicine position stand. Progression models in resistance training for healthy adults. *Medicine and Science in Sports and Exercise*, *41*(3), 687–708. https://doi.org/10.1249/mss.0b013e3181915670

Barfield, J. P., Channell, B., Pugh, C., Tuck, M., & Pendel, D. (2012). Format of basic instruction program resistance training classes: effect on fitness change in college students. *The Physical Educator, 69*(4), 325-341.

Buckley, S., Knapp, K., Lackie, A., Lewry, C., Horvey, K., Benko, C., Trinh, J., & Butcher, S. (2015). Multimodal high-intensity interval training increases muscle function and metabolic performance in females. *Applied Physiology, Nutrition, and Metabolism = Physiologie Appliquee, Nutrition et Metabolisme*, *40*(11), 1157–1162. https://doi.org/10.1139/apnm-2015-0238

Bullinger, M., Kirchberger, I., & Ware, J. (1995). Der deutsche SF-36 health survey übersetzung und psychometrische testung eines krankheitsübergreifenden instruments zur erfassung der gesundheitsbezogenen lebensqualität. *Journal of Public Health*, *3*(1), 21–36. https://doi.org/10.1007/bf02959944

Caspersen, C. J., Powell, K. E., & Christenson, G. M. (1985). Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. *Public Health Reports, 100*(2), 126–131.

Clark, C. (2014). *Assessment of 4 weeks of P90X training on muscular strength and endurance, anaerobic power and body composition.* [Master's thesis, Middle Tennessee State University]. https://jewlscholar.mtsu.edu/items/6f5ed8a7-6e16-4595-9382-84befc7bab01

Cosgrove, S. J., Crawford, D. A., & Heinrich, K. M. (2019). Multiple fitness improvements found after 6-months of high intensity functional training. *Sports, 7*(9), Article 203. https://doi.org/10.3390/sports7090203

Crotti, M., Bosio, A., & Invernizzi, P. L. (2018). Validity and reliability of submaximal fitness tests based on perceptual variables. *The Journal of Sports Medicine and Physical Fitness*, *58*(5), 555–562. https://doi.org/10.23736/s0022-4707.17.07199-7

Cunningham, D. A., Paterson, D. H., Himann, J. E., & Rechnitzer, P. A. (1993). Determinants of independence in the elderly. *Canadian Journal of Applied Physiology = Revue Canadienne de Physiologie Appliquee, 18*(3), 243–254. https://doi.org/10.1139/h93-021

Engel, F. A., Rappelt, L., Held, S., & Donath, L. (2019). Can high-intensity functional suspension training over eight weeks improve resting blood pressure and quality of life in young adults? A randomized controlled trial. *International Journal of Environmental Research and Public Health*, *16*(24), Article 5062. https://doi.org/10.3390/ijerph16245062

Feito, Y., Heinrich, K. M., Butcher, S. J., & Poston, W. S. C. (2018). High-intensity functional training (HIFT): definition and research implications for improved fitness. *Sports, 6*(3), Article 76. https://doi.org/10.3390/sports6030076

Feito, Y., Hoffstetter, W., Serafini, P., & Mangine, G. (2018). Changes in body composition, bone metabolism, strength, and skill-specific performance resulting from 16-weeks of HIFT. *PloS One, 13(*6), Article e0198324. https://doi.org/10.1371/journal.pone.0198324

Haddock, C. K., Poston, W. S., Heinrich, K. M., Jahnke, S. A., & Jitnarin, N. (2016). The benefits of high-intensity functional training fitness programs for military personnel. *Military Medicine*, *181*(11), 508–514. https://doi.org/10.7205/MILMED-D-15-00503

Heinrich, K. M., Becker, C., Carlisle, T., Gilmore, K., Hauser, J., Frye, J., & Harms, C. A. (2015). High-intensity functional training improves functional movement and body composition among cancer survivors: a pilot study. *European Journal of Cancer Care*, *24*(6), 812–817. https://doi.org/10.1111/ecc.12338

Hollingsworth, J. C., Young, K. C., Abdullah, S. F., Wadsworth, D. D., Abukhader, A., Elfenbein, B., & Holley, Z. (2020). Protocol for minute calisthenics: a randomized controlled study of a daily, habit-based, bodyweight resistance training program. *BMC Public Health*, *20*(1), Article 1242. https://doi.org/10.1186/s12889-020-09355-4

Imboden, M. T., Harber, M. P., Whaley, M. H., Finch, W. H., Bishop, D. L., & Kaminsky, L. A. (2018). Cardiorespiratory fitness and mortality in healthy men and women. *Journal of the American College of Cardiology*, *72*(19), 2283–2292. https://doi.org/10.1016/j.jacc.2018.08.2166

Kapsis, D. P., Tsoukos, A., Psarraki, M. P., Douda, H. T., Smilios, I., & Bogdanis, G. C. (2022). Changes in body composition and strength after 12 weeks of high-intensity functional training with two different loads in physically active men and women: A randomized controlled study. *Sports*, *10*(1), Article 7. https://doi.org/10.3390/sports10010007

Kline, G. M., Porcari, J. P., Hintermeister, R., Freedson, P. S., Ward, A., McCarron, R. F., Ross, J., & Rippe, J. M. (1987). Estimation of VO2max from a one-mile track walk, gender, age, and body weight. *Medicine and Science in Sports and Exercise*, *19*(3), 253–259.

Kliszczewicz, B., McKenzie, M., Nickerson, B. (2019). Physiological adaptations following a four-week of high intensity functional training. *Vojnosanit Pregl*, *76*(3), 272–277. http://dx.doi.org/10.2298/VSP170228095K

Kodama, S., Saito, K., Tanaka, S., Maki, M., Yachi, Y., Asumi, M., Sugawara, A., Totsuka, K., Shimano, H., Ohashi, Y., Yamada, N., & Sone, H. (2009). Cardiorespiratory fitness as a quantitative predictor of all-cause mortality and cardiovascular events in healthy men and women: a meta-analysis. *JAMA*, *301*(19), 2024–2035. https://doi.org/10.1001/jama.2009.681

Lipecki, K., Rutowicz, B. (2015). The impact of ten weeks of bodyweight training on the level of physical fitness and selected parameters of body composition in women aged 21-23 years. *Polish Journal of Sport and Tourism*, *22*(2), 64-68. http://dx.doi.org/10.1515/pjst-2015-0014

McDermott, M. M. (2017). Exercise training for intermittent claudication. *Journal of Vascular Surgery*, *66*(5), 1612–1620. https://doi.org/10.1016/j.jvs.2017.05.111

McRae, G., Payne, A., Zelt, J. G., Scribbans, T. D., Jung, M. E., Little, J. P., & Gurd, B. J. (2012). Extremely low volume, whole-body aerobic-resistance training improves aerobic fitness and muscular endurance in females. *Applied Physiology, Nutrition, and Metabolism = Physiologie Appliquee, Nutrition et Metabolisme*, *37*(6), 1124–1131. https://doi.org/10.1139/h2012-093

Morales, J.O., & Sobonya, S. (1996). Use of submaximal repetition tests for predicting 1-RM strength in class athletes. *Journal of Strength and Conditioning Research*, *10*(3), 186–189.

Mulder, E., Clément, G., Linnarsson, D., Paloski, W. H., Wuyts, F. P., Zange, J., Frings-Meuthen, P., Johannes, B., Shushakov, V., Grunewald, M., Maassen, N., Buehlmeier, J., & Rittweger, J. (2015). Musculoskeletal effects of 5 days of bed rest with and without locomotion replacement training. *European Journal of Applied Physiology*, *115*(4), 727–738. https://doi.org/10.1007/s00421-014-3045-0

Murawska-Cialowicz, E., Wojna, J., & Zuwala-Jagiello, J. (2015). Crossfit training changes brain-derived neurotrophic factor and irisin levels at rest, after wingate and progressive tests, and improves aerobic

capacity and body composition of young physically active men and women. *Journal of Physiology and Pharmacology: An Official Journal of the Polish Physiological Society*, *66*(6), 811–821.

Narici, M.V., De Vito, G., Franchi, M., Paoli, A., Moro, T., Marcolin, G., Grassi, B., Baldassarre, G., Zuccarelli, L., Biolo, G., et al. (2020). Impact of sedentarism due to the COVID-19 home confinement on neuromuscular, cardiovascular and metabolic health: physiological and pathophysiological implications and recommendations for physical and nutritional countermeasures. *Eur. J. Sport Sci*, *21*(4), 614–635. https://doi.org/10.1080/17461391.2020.1761076

Ogwumike, O. O., Sanya, A. O., & Arowojolu, A. O. (2011). Endurance exercise effect on quality of life and menopausal symptoms in Nigerian women. *African Journal of Medicine and Medical Sciences*, *40*(3), 187–195.

Perrone, M. A., Feola, A., Pieri, M., Donatucci, B., Salimei, C., Lombardo, M., Perrone, A., & Parisi, A. (2021). The effects of reduced physical activity on the lipid profile in patients with high cardiovascular risk during COVID-19 Lockdown. *International Journal of Environmental Research and Public Health*, *18*(16), Article 8858. https://doi.org/10.3390/ijerph18168858

Porciúncula-Frenzel, A., Aberici-Pastore, C., & González, M. C. (2013). The influence of body composition on quality of life of patients with breast cancer. *Nutricion Hospitalaria*, *28*(5), 1475–1482. https://doi.org/10.3305/nh.2013.28.5.6705

Posnakidis, G., Aphamis, G., Giannaki, C. D., Mougios, V., Aristotelous, P., Samoutis, G., & Bogdanis, G. C. (2022). High-intensity functional training improves cardiorespiratory fitness and neuromuscular performance without inflammation or muscle damage. *Journal of Strength and Conditioning Research*, *36*(3), 615–623. https://doi.org/10.1519/jsc.0000000000003516

Ritchie, J. D., Miller, C. K., & Smiciklas-Wright, H. (2005). Tanita foot-to-foot bioelectrical impedance analysis system validated in older adults. *Journal of the American Dietetic Association*, *105*(10), 1617–1619. https://doi.org/10.1016/j.jada.2005.07.011

Saltin, B., Blomqvist, G., Mitchell, J. H., Johnson, R. L., Jr, Wildenthal, K., & Chapman, C. B. (1968). Response to exercise after bed rest and after training. *Circulation*, *38*(5 Suppl), VII1–VII78.

Shoup, R., Dalsky, G., Warner, S., Davies, M., Connors, M., Khan, M., Khan, F., & ZuWallack, R. (1997). Body composition and health-related quality of life in patients with obstructive airways disease. *The European Respiratory Journal*, *10*(7), 1576–1580. https://doi.org/10.1183/09031936.97.10071576

Sobrero, G.L., Arnett, S.W., Schafer, M.A., Stone, W.J., Tolbert, T.A., Salyer-Funk, A.L., Crandall, J., Farley, L., Brown, J., Lyons, S., Esslinger, T., Esslinger, K., & Maples, J.M. (2017). A comparison of high intensity functional training and circuit training on health and performance variables in women: a pilot study. *Women in Sport and Physical Activity Journal*, *25*(1), 1-10. http://dx.doi.org/10.1123/wspaj.2015-0035

Sperlich, B., Hahn, L. S., Edel, A., Behr, T., Helmprobst, J., Leppich, R., Wallmann-Sperlich, B., & Holmberg, H. C. (2018). A 4-week intervention involving mobile-based daily 6-minute micro-sessions of functional high-intensity circuit training improves strength and quality of life, but not cardio-respiratory fitness of young untrained adults. *Frontiers in Physiology*, *9*, Article 423. https://doi.org/10.3389/fphys.2018.00423

Sperlich, B., Wallmann-Sperlich, B., Zinner, C., Von Stauffenberg, V., Losert, H., & Holmberg, H. C. (2017). Functional high-intensity circuit training improves body composition, peak oxygen uptake, strength, and alters certain dimensions of quality of life in overweight women. *Frontiers in Physiology*, *8*, Article 172. https://doi.org/10.3389/fphys.2017.00172

World Health Organization. (1998). *Programme on mental health: WHOQOL user manual, 2012 revision*. World Health Organization. Retreived from https://iris.who.int/handle/10665/77932

World Health Organization. (2020). *How to stay physically active during COVID-19 self-quarantine*. World Health Organization. Retreived from https://www.who.int/europe/news/item/25-03-2020-how-to-stay-physically-active-during-covid-19-self-quarantine#:~:text=WHO%20recommends%20150%20minutes%20o

Spor Bilimleri Araştırmaları Dergisi
Journal of Sport Sciences Research
Vol: 9, Issue: 3, October 2024
E-ISSN: 2548-0723
URL: http://www.dergipark.org.tr/jssr

Relationship between Physical Activity, Physical Literacy Elements, and Gender among Senior Students

Vyte KONTAUTIENE[1], Asta BENIUSIENE[1*]
[1] Klaipeda University, Faculty of Health Sciences, Klaipeda, Lithuania

Research Article
DOI: 10.25307/jssr.1513354
Received: 10.07.2024 Accepted: 20.10.2024 Online Published: 31.10.2024

Abstract

The aim of research is to assess the relationship between physical activity, Physical Literacy (PL) and gender among senior students. The research was conducted in 2022 in Lithuania with five city schools. Research participants were selected using a convenience sampling method: grade 10 to 12 (n=287) students 148 boys and 139 girls. A questionnaire survey was used for data collection: Portuguese Physical Literacy Questionnaire for Adolescents (PPLA-Q) to assess the psychological domain of PL (motivation, self-confidence, emotional and physical regulation); Rapid Assessment of Physical Activity (RAPA) Questionnaire - RAPA1 part, which allows to assess the level of physical activity. After analysing the psychological aspects of PL related to physical activity by gender, the obtained results suggest that boys' motivation for physical activity, self-confidence, emotional stability, assessment of physical limits score higher compared to the group of girls ($p<0.01$). PA motivation has a strong positive correlation with self-confidence ($p<0.01$) and a moderate correlation with physical regulation ($p<0.01$). Physical regulation has statistically significantly correlated with self-confidence ($p<0.01$) and better emotional regulation ($p<0.01$). Statistically significant differences by gender were found with all indicators of the psychological domain: PA motivation, self-confidence, emotional regulation, and physical regulation. Mean ranks of boys were higher in all variables; however, the major differences were found in the areas of self-confidence and physical regulation. PA had a direct correlation with all psychological PL elements (PA motivation, self-confidence, emotional regulation, physical regulation) and an inverse correlation with gender.

Keywords: Physical literacy, Physical activity, Motivation, Self-confidence, Emotional regulation, Physical regulation

[*] **Corresponding Author:** Assoc. Prof. Vyte Kontautiene, **E-mail:** vyte.kontautiene1@ku.lt

INTRODUCTION

Physical literacy (PL) is a holistic concept embracing interrelated physical, cognitive, psychological, and social variables applied in the context of physical activity (Mota et al., 2021). Although previous studies have shown that the level of student physical literacy is sufficient, it was found that, in contrast to physical competence, the level of knowledge and understanding needs to be improved (Tremblay et al., 2018). Lack of knowledge at a young age can lead to poor physical activity habits that tend to persist into adulthood (Johansen et al., 2006). There are reasonable grounds to believe that poor physical literacy can influence the decreasing level of students' physical activity. Physical literacy intervention programs have shown a positive change in increased physical activity and greater willingness and motivation to lead an active lifestyle (Choi et al., 2021). Physical literacy has been found to be associated not only with more frequent leisure time physical activities but also with academic achievements, less time spent on computers or phones, and better social skills (Gu et al., 2019; Saunders et al., 2018). This suggests that for the overall well-being of schoolchildren, it is essential to study and develop their physical literacy. People still lack knowledge about the type, benefits, and technicality of physical activity, because many who have started to increase their level of physical activity do it incorrectly and sometimes even harmfully (Rudd et al., 2020). The most accurate and popular definition of physical literacy was proposed in 2014 by the International Physical Literacy Association which was officially adopted in 2015 at the International Physical Literacy Conference, which defines physical literacy as the motivation, confidence, physical competence, knowledge, and understanding to value and take responsibility for engagement in physical activities for life. This article uses a physical literacy (PL) model conceptualized by Mota, Martins and Onofre (2021), consisting of four interrelated PL domains: Physical, psychological, cognitive, and social. The questionnaire developed by these authors (PPLA-Q) is an instrument designed to assess the psychological, social, and cognitive domains of PL for grade 10 to 12 adolescents.

Physical literacy has not been widely studied in Lithuania, as previously conducted research have focused on the level of literacy in relation to health, covering the ability of the respondents to find and understand information about health (Jakubauskaitė, 2022; Sveikauskas, 2008). Meanwhile, physical literacy is a multifaceted conceptualisation of the skills and knowledge required to fully realize the potential of physical limits and remain active throughout life (Giblin et al., 2014). Increasing the level of health-enhancing physical activity requires understanding of what knowledge or skills are lacking in the field of physical literacy.

Psychological factors related to physical activity (PA), such as PA motivation, self-confidence, physical self-concept, and emotional and physical regulation, have been investigated in previous studies both in Lithuania and internationally (Pulido et al., 2024; Skurvydas et all, 2021). However, these factors have not been examined as part of the structural components of physical literacy. Therefore, this study contributes to scientific novelty by exploring the psychological element of physical literacy.

It is likely that more physically active students, through engaging in physical activity, gain experience in overcoming psychological challenges related to PA, such as motivation and self-

confidence. Research shows that physical activity has an impact on self-confidence (Rutkauskaitė and Bendaravičiūtė, 2017) and induces favorable changes in motivation (Knittle et al., 2018). Based on these findings, the first hypothesis (H1) is proposed: More physically active senior students will demonstrate better psychological indicators of physical literacy (PA motivation, self-confidence, emotional regulation, physical regulation).

Scientific studies indicate that physical activity decreases among female students in higher grades (Lamanauskas and Armonienė, 2011). From a gender perspective, male students in grades 9–12 are more physically active (42.3%) compared to females (25.00%) (Rutkauskaitė and Bendaravičiūtė, 2017). According to WHO (2010) data, only 27.3% of 15-year-old girls meet physical activity recommendations, compared to 44.6% of boys (WHO, 2010). Therefore, the second hypothesis (H2) is proposed: psychological indicators of physical literacy are related to the gender of senior students. The aim - to assess the relationship between physical activity, Physical Literacy and gender among senior students.

METHODS

Research Model

This research study was designed according to the quantitative research method.

Population-Sample

The research sample was selected using the convenience sampling method. Based on data from the Education Management Information System, in 2022, there were five high schools operating in the city and district of Plungė, with a total enrollment of 517 senior students (aged 15–18). To calculate a reliable sample size, the Paniotto formula with a 5% margin of error was applied (Kardelis, 2017), determining that at least 226 students should be surveyed. A total of 287 students agreed to participate in the study and correctly completed the questionnaires (n=287), of whom 148 (51.56%) were male and 139 (48.43%) were female. The research was conducted in 2022 in the region of Western Lithuania with five city and/or region schools of Plungė.

Data collection methods

Quantitative research method and a survey were chosen to assess the level of physical literacy in senior secondary education students and its affecting factors. The respondents were surveyed by distributing questionnaires in schools and by sending an electronic version of the questionnaire via the "apklausa.lt" website.

Data Collection Tools

The research instrument consisted of two parts:

Physical Literacy and Physical Activity: Having received a permission from the author, the Portuguese Physical Literacy Questionnaire for Adolescents (PPLA-Q) Mota et al. (2021), was used, however, this article focuses only on results of the psychological PL domain. The psychological domain items covered 4 areas: Motivation for physical activity, self-confidence in physical activity, and questions on emotional and physical regulation.

Physical activity (PA) was assessed using the Rapid Assessment of Physical Activity (RAPA) Questionnaire - RAPA1 (the first seven scale items) part, which allows to assess the level of physical activity. Respondents who scored less than 6 points were assigned to a physically inactive group of people. Meanwhile, those with a physical activity score of 6 and above were assigned to a physically active group (Azfar et al., 2019).
The questionnaire additionally included questions to identify the sociodemographic indicators.

Ethical Approval

Prior to conducting the research, an informed consent was obtained from the school administration and parents to include the students in this research. Ethical approval was obtained from Klaipeda University Faculty of Health Sciences Ethics Committee (2022/02-03) for this study. The research participants received a questionnaire to complete at their school and were sent an electronic version of the questionnaire on the website "apklausa.lt". The respondents were introduced to the aim of the research, guaranteed data confidentiality, anonymity, and assured of their voluntary participation in the survey. It took 10 - 15 minutes to complete the questionnaire.

Analysis of Data

Descriptive and mathematical statistical analysis were used for the data analysis: percentage frequencies, mean ranks and standard deviations were calculated. The chi-square test was used to assess the gender-based differences in physical activity and physical literacy. Derived subscale quantitative variables were created reflecting the general psychological indicators of the subscales. After confirming that the data followed a normal distribution according to the Kolmogorov-Smirnov test, the Student's t-test was used to compare these indicators by gender. The effect size (ES) was assessed using Cohen's d coefficient, which is interpreted as follows: 0 to 0.2 indicates a very small effect, 0.2 to 0.5 a small effect, 0.5 to 0.8 a medium effect, and >0.8 a large effect (Cohen, 1988; Cohen et al., 2000). The effect size was calculated only when a statistically significant difference was found. Correlation between the variables were measured using the Pearson correlation coefficient (r). The levels of statistical significance were calculated based on Cekanavicius and Murauskas (2014). Results were considered statistically significant when p-value was 0.05 or lower. SPSS 25 statistical software was used for the statistical data analysis.

FINDINGS

The obtained research results suggest that almost half (48.5%) of the respondents to the survey are physically inactive, i.e., the calculated physical activity index is <6 points. Gender-based results showed that 34.7% of boys and 62.3% of girls are physically inactive. Meanwhile, 65.3% of boys and 37.7% of girls are physically active. Boys are statistically significantly more physically active than girls ($\chi 2 = 168.28$, $df=8$, $p<0.05$).

Gender-based differences in the psychological domain indicators of physical literacy (PL)

Having created the derived variables, the indicators of the psychological PL variable elements were assessed (Table 1).

Table 1. Physical activity-related psychological indicators in gender groups

Elements of PL psychological domain	Gender	Mean Rank ± SD	t	df	p	Effect size (Cohen d)
PA motivation	Boy	15.45 ±3.74	4.79	285	0.01	0,56***
	Girl	13.39±3.63				
Self-confidence	Boy	29.39±7.34	6.38	285	0.01	0,75***
	Girl	24.05±6.74				
Emotional regulation	Boy	26.59±5.11	3.19	285	0.01	0.46**
	Girl	24.05±5.82				
Physical regulation	Boy	23.02±4.89	4.67	285	0.01	0,56***
	Girl	20.44±4.35				

A note: * extremely small effect, ** small effect, ***medium effect, **** large effect; SD - the standard deviation.

Statistical analysis of the results using the Student's t-test revealed statistically significant differences in the groups of boys and girls in terms of motivation for physical activity, self-confidence, emotional regulation, and physical regulation. Obtained data suggest that boys' motivation for physical activity is higher than girls', they are more self-confident and better assess their physical regulation and have more stable emotions.

Effect sizes were calculated using Cohen's coefficient. It was found that moderate correlations with gender were observed for PA motivation (Cohen's d = 0.56), self-confidence (Cohen's d = 0.75), and physical regulation (Cohen's d = 0.56), while a weak correlation was identified between gender and emotional regulation (Cohen's d = 0.46).

After a detailed analysis of each psychological element, only statistically significant results are presented below.

Having analysed motivation for physical activity, statistically significant differences between gender groups were observed in three of the seven statements measuring motivation. Based on the results presented in Figure 1, it may be concluded that boys are more motivated to engage in physical activity than girls. They chose the response option stating that they are highly motivated for physical activities three times more often than girls. Meanwhile, girls' motivation to engage in physical activities is average, as most girls chose the statement "moderately agree" and "somewhat agree". These differences in gender groups are statistically significant ($\chi 2$ =168.679; df =10; $p < 0.05$).

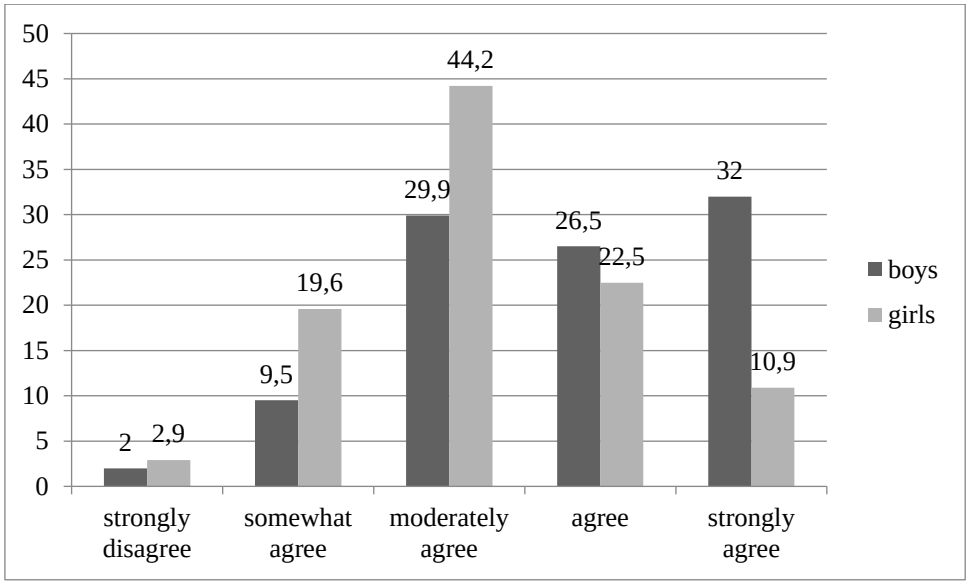

Figure 1. Gender-based analysis of the statement "I am motivated to practice PA"

Results demonstrate that girls practice physical activities statistically significantly more often than boys because of external motivation ($\chi 2 = 80.789$; $df = 10$; $p < 0.05$), (Fig. 2).

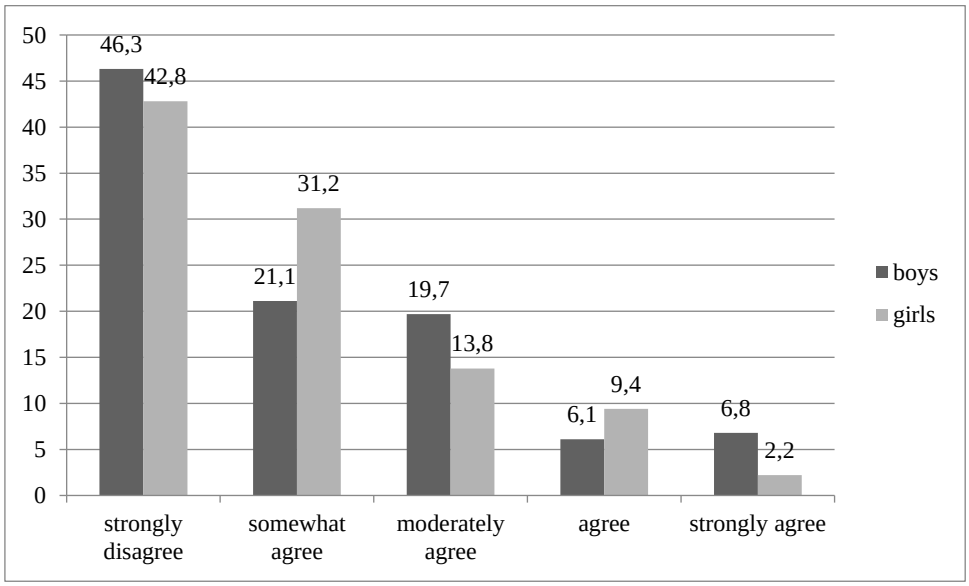

Figure 2. Gender-based analysis of the statement "I practice PA because others tell me I should"

Boys enjoy physical activity twice as often as girls ($\chi 2 = 167.843$; $df = 10$; $p < 0.05$). Almost half (44.2%) of the surveyed male students chose "strongly agree" with the statement that physical activity is fun, while girls only "moderately agree" (30.4%) and "somewhat agree" (17.4%) with the statement that physical activity is fun, (Fig. 3).

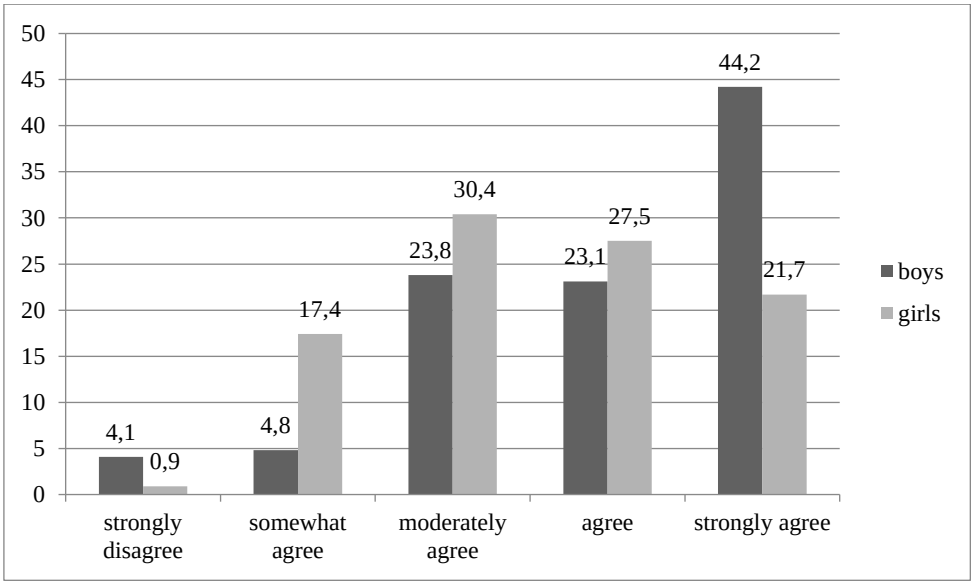

Figure 3. Gender-based analysis of the statement "I practice PA because it is fun"

Having analysed self-confidence in physical activity, gender-based statistical differences were found. Boys are more than twice as likely to be completely confident in their abilities during physical activities than girls. This difference is statistically significant ($\chi 2 = 97.97$, $df=10$, $p < 0.05$), (Fig. 4).

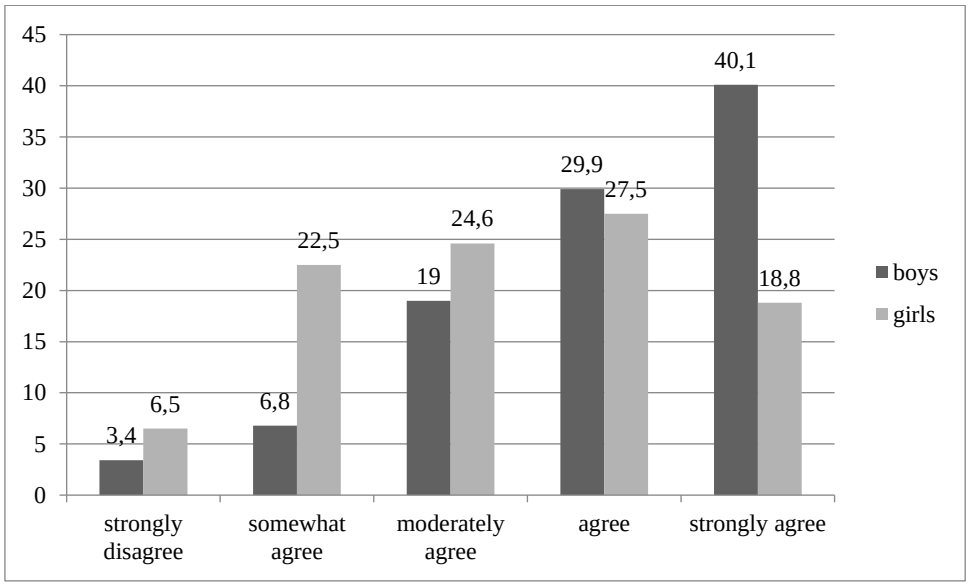

Figure 4. Gender-based analysis of the statement "I feel confident to practice PA"

We have further analysed how boys and girls rate their knowledge of how to become more self-confident (Fig. 5). A major statistically significant difference in the understanding of how to improve self-confidence between boys and girls was observed, revealing that girls lack knowledge of how to build self-confidence ($\chi 2 = 178.757$; $df= 10$, $p < 0.05$).

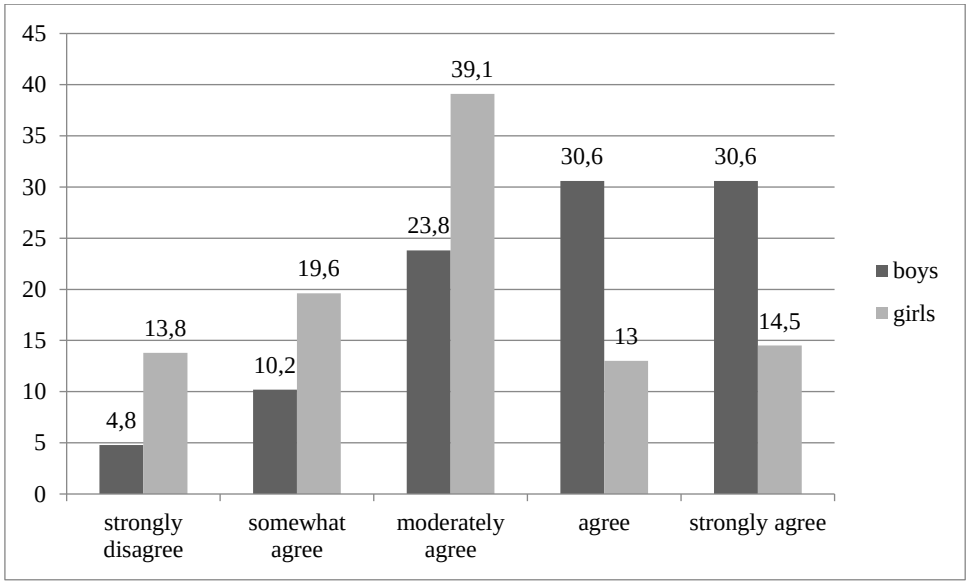

Figure 5. Gender-based analysis of the statement "I know how to become more self-confident"

Analysis of emotional regulation has revealed statistical gender-based differences (Fig. 6). Based on the scores of the emotion management item, it may be concluded that boys are better at managing their emotions since more than two thirds (67.4% in total) of boys "strongly agree" and "agree" with the statement that they can manage their emotions, while only 47.1% ($\chi 2$ =177.425; df=10; $p < 0.05$) of girls do so.

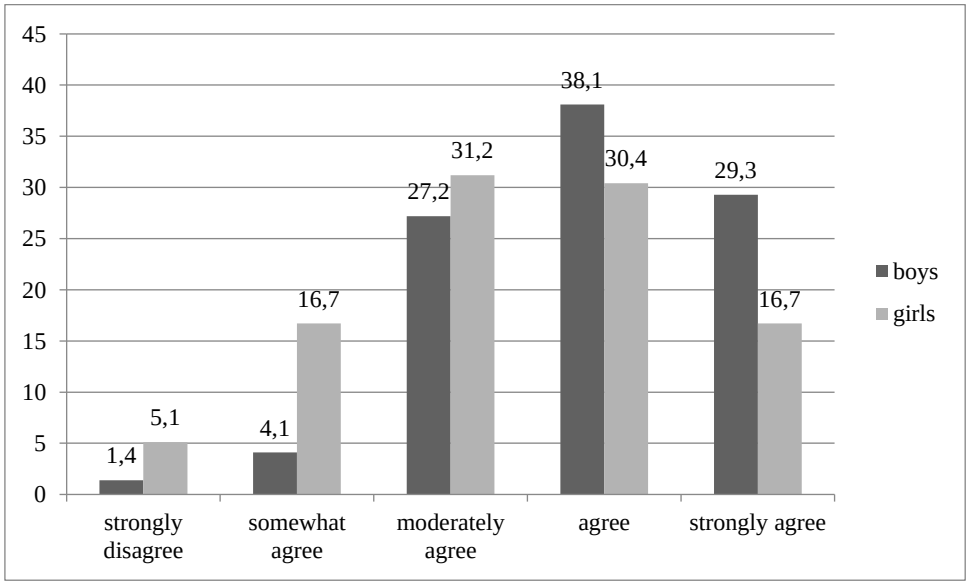

Figure 6. Gender-based analysis of the statement "I can manage my emotions"

When analysing physical regulation, statistical gender-based differences were found. Results of the statement "I recognize my physical limits" show that boys fully identify their limits more often than girls ($\chi 2$ =160.89, df= 10, $p < 0.05$), (Fig. 7). More girls than boys rate their understanding of physical limits as "moderately agree" (29.0%) and "agree" (36.2%).

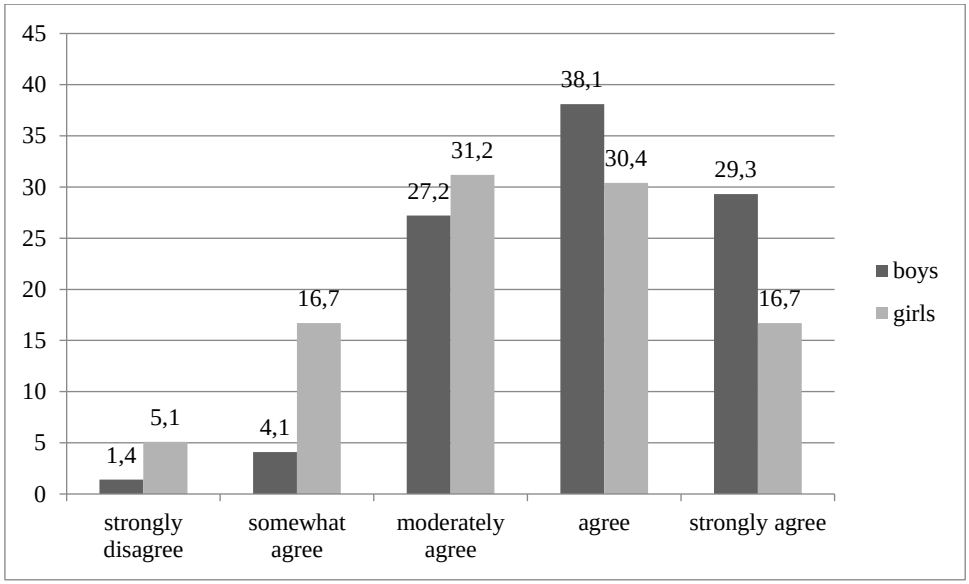

Figure 6. Gender-based analysis of the statement "I can manage my emotions"

Having analysed the student involvement in physical activities to improve their physical skills, the results have revealed that boys twice as often (36.1% of boys and 18.1% of girls) take actions to improve their physical skills compared to girls of the same age ($\chi 2 = 174.91$ df $= 10$, $p < 0.05$), (Fig. 8).

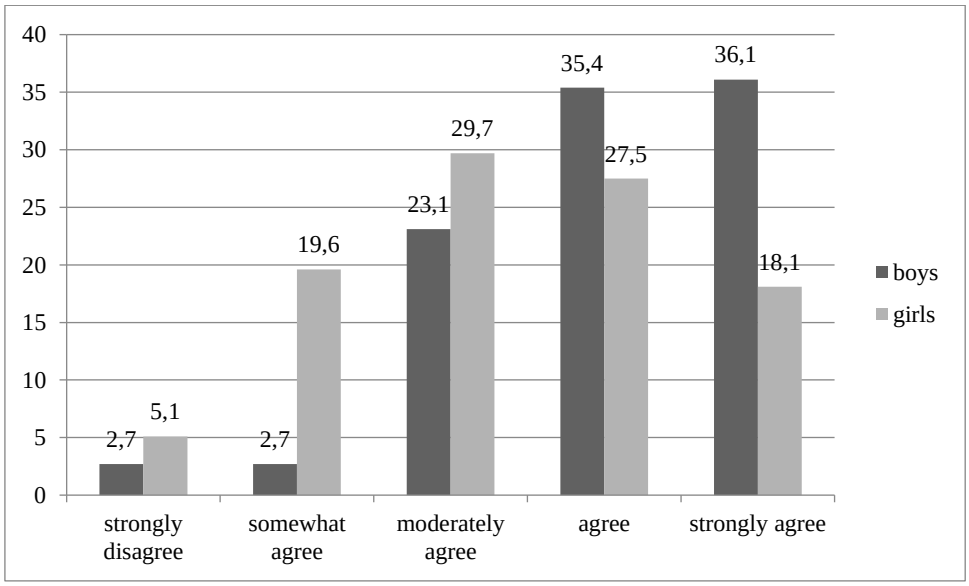

Figure 8. Gender-based analysis of the statement "I take action to improve my physical skills"

Relationship between physical literacy and physical activity

The aim was to determine whether there is a statistically significant relationship and the strength of the relationship between the physical activity and the elements of physical literacy (motivation, self-confidence, emotional regulation, and physical regulation) (Table 2).

Table 2. Relationship between PA, PL elements and gender

Variables	PA motivation	Self-confidence	Emotional regulation	Physical regulation	Gender	PA
PA motivation						
Self-confidence	**0.809****					
Emotional regulation	0.407**	**0.560****				
Physical regulation	**0.618****	**0.662****	**0.579****			
Gender	-0.227**	-0.306**	-0.144*	-0.195**		
PA	0.383**	0.279**	0.108	0.327**	-0.235**	

* ($p<0.05$), ** ($p<0.01$) – level of statistical significance. Differences were assessed using the Pearson correlation coefficient.

Correlation analysis of the considered variables has revealed that physical activity correlates with motivation for physical activity, self-confidence, emotional regulation, and physical regulation. Data presented in the table allow to conclude that motivation for physical activity has a strong ($r = 0.809$, $p<0.01$), positive correlation with self-confidence and a moderate ($r = 0.618$, $p<0.01$) correlation with physical regulation and a weak correlation with emotional regulation ($r = 0.407$, $p<0.01$). Physical regulation has statistically significantly correlated with self-confidence ($r = 0.662$, $p<0.01$) and better emotional regulation ($r = 0.579$, $p<0.01$). Correlation between the students' (grade 10 to 12) gender and psychological PL elements was weak, although statistically significant. The correlations between physical activity and the psychological elements of physical literacy are statistically significant, but weak.

DISCUSSION

Physical literacy radiates through a conscious decision to engage in physical activity for life, taking personal responsibility to be active on a regular basis. This includes establishment of priorities and sustainable engagement in different, meaningful, and personally challenging physical activity as an integral part of lifestyle. Lithuanian research results revealed that the total scor e of self-perceived physical literacy on average was 88.8 ± 17.6 of possible 125 points. The analysis of diferences by gender revealed, that more of girls (18.4 %) than of boys (17.5 %) evaluate their physical literacy (PL) level as insufficient. The self-perceived PL of boys (in total as well as in separate domains) was higher than that of girls ($p < 0.05$) (Brokiene & Gruodyte-Raciene, 2023).

Researchers propose that physical literacy focuses on skill acquisition. This way, it is similar to the construct of health literacy, which develops the ability to find, understand, evaluate and apply health information, thus linking knowledge with motivation and competence (Batterham et al., 2016; Mota et al., 2021). Physical literacy has been found to increase as children grow, as both girls and boys develop motor competence, which in turn builds children's self-confidence and understanding of movement control and terminology, as well as motivates more active engagement in physical activities (Cairney et al., 2019).

Psychological competence is one of the key components of physical literacy covering motivation for physical activity, self-confidence, emotional and physical regulation (Mota et

al., 2021). Our study confirmed the importance of these indicators in the study of the construct of physical literacy, and the effect size (0.75) shows a sufficiently large difference between the self-confidence of boys and girls.

Comparing our research results with other similar studies on gender differences in the context of psychological indicators, we observe certain patterns. Our findings indicate that boys generally exhibit higher scores in various psychological domains of physical literacy (particularly in self-confidence and motivation) than girls. The effect sizes (Cohen's d values range from 0.46 to 0.75) reflect small to medium differences. These results align with trends found in previous studies, which suggest that boys are more likely to have higher intrinsic motivation for physical activity, greater self-confidence, and that differences in emotional regulation also exist, although they are smaller, as indicated by the effect sizes in our study.

Studying the issue of motivation for physical activity has revealed that boys are more motivated to engage in physical activities than girls, and positive emotions is one of the key motivational aspects. The effect size (0.56) shows a moderate difference between boys' and girls' motivation for physical activity. Comparing our data with the results of a similar study conducted by Espada et al., (2023) with university students, we observe a similar trend that significant gender differences in physical activity motivation were found. Boys showed higher intrinsic and identified motivation than girls, where effect sizes were also moderate to large (for example, identified motivation with a large effect: Cohen's d about 0.60), (Espada et al., 2023).

Sattler et al., (2018) support this statement with similar results, i.e., girls are less motivated to engage in vigorous/moderate intensity physical activity compared to boys, and usually engage in physical activity only because they are dissatisfied with their bodies. We also managed to find more findings from other research supporting our results. According to a study conducted by Butt et al. (2011), the element of fun and enjoyment of sport experience and appeal of physical activity were the main pleasurable aspects of sport for boys but not for girls.

Recent research articles note that enjoyment of sport experience and motivation for physical activity are strongly correlated with the daily level of physical activity. This suggests that increasing children’s physical activity, first of all, requires a focus on their motivation (Burns et al., 2022).

Lithuanian researchers have also found that physical activity is strongly related to the autonomy of physical activity, a more positive assessment of body image Derkintiene et al. (2022), more frequent leisure time physical activity habits, positive self-esteem and better physical functions affecting the quality of life (Baceviciene et al., 2021). Having addressed the issue of self-confidence, our results are supported by Sechi et al., (2021) who found that girls are more often dissatisfied with themselves and are less confident than boys. Our study has found that girls had lower self-confidence scores. In a meta-analysis of gender differences in self-confidence in physical activity, boys were found to be significantly more self-confident than girls, with medium effect sizes (Cohen's d around 0.50), (Guérin et al., 2012; Morano et al., 2020). These results reflect similar patterns to our study, where boys are significantly more self-confident than girls (d = 0.75).

Research articles also report correlations between a female gender, lower levels of physical activity, higher cortisol release affecting negative emotional response and stress (Alghadir et al., 2020). Recent research also addresses the lack of confidence at a young age, which leads to poor engagement in physical activities. The authors of this research have found that respondents' knowledge of physical literacy was rated better than self-confidence (Buckler & Bredin, 2021). Studies have shown that physical activity is closely related to positive mental health outcomes in children and youth, especially in depression prevention and understanding of physical self-image, which is an integral component of self-esteem and self-confidence (Dale et al., 2019). Self-confidence and emotional stability increase motivation for physical activity, which highly affects exercise engagement. In turn, physical activity and its various experiences accumulate knowledge and competences that allow the physical literacy to develop. Thus, it can be said that the hypothesis H2 has been confirmed. When studying the psychological aspects of PL related to physical activity according to gender, it was found that boys' physical activity motivation, self-confidence, emotional stability, assessment of physical capabilities are manifested more than in the group of girls ($p < 0.01$). Although the correlations between gender and psychological PL items were weak, but statistically significant.

We found evidence in the scientific literature that physical literacy is closely related to physical activity (Caldwell et al., 2022). These research-supported statements agree with our collected results. When analysing the situation of physical activity, researchers emphasize three essential aspects: physical activity among children and adolescents is insufficient worldwide, girls are less active than boys and the level of physical activity decreases with age (Aubert et al., 2021). These statements agree with the results obtained during our study - girls are less active. Findings of a study conducted in Lithuania in 2020 confirm this conclusion - boys and younger students tend to be more active (Karklelis et al., 2021).

We found that 34.7% of boys and even 62.3% of girls do not reach the weekly recommended levels of physical activity. Similar results were also recorded by other Lithuanian researchers as 64.2% of girls and 39.6% of boys were not physically active enough (Rutkauskaite, & Visockyte, 2021). Research conducted on a global scale also reports a particularly high number of young people failing to meet the physical activity recommendations. According to Sallis et al. (2016), as much as 80% of youth is inactive. According to a recent study conducted in 52 states, physical activity among young people varies by region, with the percentage of students who are not physically active enough ranging from 36% to 72% (Ozemek et al., 2019). Researchers also notice that physical activity continues to decline and during the period from 2006 to 2016, the level of physical activity among schoolchildren has decreased by one tenth (Fernandes, 2018). According to data from surveys conducted in 64 countries around the world, exercise engagement among boys was on average 1.58 times higher than among girls, with the largest differences observed in high-income countries (Ricardo et al., 2022).

During a study on physical activity conducted in 49 states, it was found that less than 30% of older schoolchildren comply with physical activity recommendations provided by WHO (2015), which the boys follow more often. The major gender-based difference is recorded in the Middle East and North Africa region (Darfour-Oduro et al., 2018). During a study conducted in Portugal, it was found that 52% of boys were moderately physically active and

only 16% very active, and 42% of girls were moderately physically active, while only 5% of girls were very active (Pereira et al., 2018). These results support our research results that boys are more physically active than girls. Researchers believe that girls are less likely to reach the WHO-recommended levels of physical activity due to perceived barriers to physical activity, which are more common in girls than in boys (Rosselli et al., 2020).

There are also several scientific publications claiming a further decrease in physical activity among students during the COVID-19 pandemic (Morres et al., 2021). It was noticed that girls who previously were less physically activity than boys maintained their previous level of physical activity better during the quarantine period, while boys' physical activity has dropped more (Orlandi et al., 2021). Our study was conducted after the pandemic; however, we cannot compare whether the physical activity of students in higher grades has decreased because we did not study this aspect.

After analysing the correlation between physical activity and the psychological elements of physical literacy (motivation, self-confidence, emotional regulation, and physical regulation), we found that they are influenced by the level of physical activity, but the established correlations are statistically significant but weak. Thus, the hypothesis (H1) was confirmed: FA was directly correlated with all psychological elements of PL (FA motivation, self-confidence, emotional regulation, physical regulation). Scientists increasingly emphasize the importance of physical education for the development of students' physical literacy. Physical education lessons promote integrated physical activity experience that develops both theoretical knowledge and practical skills in the context of self-awareness and motivation to exercise (Lundvall, 2015). Other researchers have documented significant relationships between physical literacy and moderate/vigorous intensity physical activity, physical competence, and motivation to exercise, play sports, and self-confidence (Coyne et al., 2019). The level of physical literacy is also associated with better physical performance, which is a result of more frequent and higher intensity physical activity (Pastor-Cisneros et al., 2021). Theory suggests that a higher level of physical literacy improves movement skills, encourages active leisure time, outdoor games, involvement in physical education, and sports (Faigenbaum, & Rebullido, 2018).

Scientists highlight the increasing impact of the Internet. More than ever before, information on social media is critical to physical literacy. Physical literacy videos were found to generate the most interest, followed by visual information covering emotional domains of physical literacy such as motivation, self-confidence, and self-esteem (Bopp et al., 2019). According to researchers, physical literacy is a holistic concept embracing interrelated physical, cognitive, psychological, and social variables applied in the context of physical activity (Mota et al., 2021). Thus, having summarised our collected results and the analysed research articles, it may be concluded that physical literacy is affected not only by physical activity but also by psychological health. The psychological indicators of physical literacy between boys and girls differ significantly, and this should be considered when developing interventions aimed at reducing gender disparities in physical literacy.

CONCLUSIONS

Having analysed the indicators of the psychological domain of physical literacy (PL), statistically significant differences by gender were found in all indicators of the psychological component: PA motivation, self-confidence, emotional regulation, and physical regulation. Mean ranks of boys were higher in all variables, however the major differences were found in the areas of self-confidence and physical regulation.

Having analysed the indicators of the psychological domain of physical literacy (PL) by gender, it was found that boys are more motivated than girls to engage in physical activity ($p< 0.05$), the idea of fun and enjoyment is more important for them ($p< 0.05$); they are self-confident and feel confident when performing physical activities twice as often as girls ($p < 0.05$); have better emotional and physical regulation: are able to control emotions better ($p < 0.05$), more often identify their physical limits ($p < 0.05$) and more often take actions to improve their physical skills ($p < 0.05$). PA motivation among girls mainly arises from external encouragement to engage in physical activity ($p<0.05$), yet in terms of self-confidence, they lack knowledge on how to build self-confidence ($p < 0.05$).

Physical activity has a direct correlation with all PL psychological elements (PA motivation, self-confidence, emotional regulation, physical regulation) and an inverse correlation with gender. It was found that PA motivation has a strong ($r = 0.809$, $p<0.01$) positive correlation with self-confidence and a moderate ($r = 0.618$, $p<0.01$) relationship with physical regulation. Physical regulation has statistically significantly correlated with self-confidence ($r = 0.662$, $p<0.01$) and better emotional regulation ($r = 0.579$, $p<0.01$). The correlation between gender and psychological PL elements was weak, although statistically significant.

Limitations

The conducted research came with both strengths and weaknesses. One of its strengths is an international, research-based physical literacy questionnaire. The major weakness is a relatively small sample of research subjects, based only in the region of Western Lithuania. Further studies should conduct research with a larger sample of subjects and cover a greater area of the country. In addition, to assess the physical activity, it is recommended to use accelerometers that can objectively measure the level of physical activity, rather than a questionnaire.

Author Contributions: All authors have read and agreed to the published version of the manuscript. Research Design - VK, Data Collection - VK and AB, statistical analysis - VK; Manuscript preparation - AB and VK.

Conflicts of Interest: The authors declare no conflict of interest in the study.

Ethical Approval

Ethics Committee: Klaipeda University Faculty of Health Sciences Ethics Committee
Date: 2022/02-03
Decision/Protocol Number: KU Nr. 45Sv – 22

REFERENCES

Alghadir, A. H., Gabr, S. A., & Iqbal, Z. A. (2020). Effect of gender, physical activity and stress-related hormones on adolescent's academic achievements. *International Journal of Environmental Research and Public Health*, *17*(11), Article 4143. https://doi.org/10.3390/ijerph17114143

Aubert, S., Brazo-Sayavera, J., González, S. A., Janssen, I., Manyanga, T., Oyeyemi, A. L., ... & Tremblay, M. S. (2021). Global prevalence of physical activity for children and adolescents; inconsistencies, research gaps, and recommendations: A narrative review. *International Journal of Behavioral Nutrition and Physical Activity*, *18*(1), Article 81. https://doi.org/10.1186/s12966-021-01155-2

Azfar, S., Murad, M., & Azim, S. (2019). Rapid assessment of physical activity and its association among patients with low back pain. *Cureus*, *11*(12), Article e6373. https://doi.org/10.7759/cureus.6373

Bacevičienė, M., Jankauskienė, R., & Širkaitė, M. (2021). Associations between intuitive exercise, physical activity, exercise motivation, exercise habits and positive body image. *Public Health*, *95*(4), 57-66.

Batterham, R. W., Hawkins, M., Collins, P. A., Buchbinder, R., & Osborne, R. H. (2016). Health literacy: Applying current concepts to improve health services and reduce health inequalities. *Public Health*, *132*, 3-12. https://doi.org/10.1016/j.puhe.2016.01.001

Bopp, T., Vadeboncoeur, J. D., Stellefson, M., & Weinsz, M. (2019). Moving beyond the gym: A content analysis of YouTube as an information resource for physical literacy. *International Journal of Environmental Research and Public Health*, *16*(18), Article 3335. https://doi.org/10.3390/ijerph16183335

Brokiene, R., & Gruodyte-Raciene, R. (2023). Self-perceived physical literacy of adolescents and it's relationship with body mass index. *Public Health, 3*(102), 62-70.

Buckler, E. J., & Bredin, S. S. D. (2021). Examining the knowledge base and level of confidence of early childhood educators in physical literacy and its application to practice. *Early Years*, *41*(2-3), 202-217. https://doi.org/10.1080/09575146.2018.1514488

Burns, R. D., Bai, Y., Podlog, L. W., Brusseau, T. A., & Welk, G. J. (2022). Associations of physical activity enjoyment and physical education enjoyment with segmented daily physical activity in children: Exploring tenets of the trans-contextual model of motivation. *Journal of Teaching in Physical Education*, *42*(1), 184-188. https://doi.org/10.1123/jtpe.2021-0263

Butt, J., Weinberg, R. S., Breckon, J. D., & Claytor, R. P. (2011). Adolescent physical activity participation and motivational determinants across gender, age, and race. *Journal of Physical Activity and Health*, *8*(8), 1074-1083. https://doi.org/10.1123/jpah.8.8.1074

Cairney, J., Dudley, D., Kwan, M., Bulten, R., & Kriellaars, D. (2019). Physical literacy, physical activity and health: Toward an evidence-informed conceptual model. *Sports Med., 49*, 371–383. https://doi.org/10.1007/s40279-019-01063-3

Caldwell, H. A. T., Proudfoot, N. A., DiCristofaro, N. A., Cairney, J., Bray, S. R., & Timmons, B. W. (2022). Preschool to school-age physical activity trajectories and school-age physical literacy: A longitudinal analysis. *Journal of Physical Activity and Health*, *19*(4), 275-28. https://doi.org/10.1123/jpah.2021-0635

Cekanavicius, V., & Murauskas, G. (2014). *Applied regression analysis in social studies*. Vilnius University.

Choi, S. M., Sum, K. W. R., Leung, F. L. E., Wallhead, T., Morgan, K., Milton, D., ... & Sit, H. P. C. (2021). Effect of sport education on students' perceived physical literacy, motivation, and physical activity levels in university required physical education: A cluster-randomized trial. *Higher Education*, *81*(6), 1137-1155. http://dx.doi.org/10.1007/s10734-020-00603-5

Cohen, L., Manion, L., & Morrison, K. (2000). *Research methods in education* (5th ed.). Routledge. https://doi.org/10.4324/9780203224342

Cohen, J. (1988). Statistical power analysis for the behavioral sciences. (2nd ed.). Lawrence Erlbaum. https://doi.org/10.4324/9780203771587

Coyne, P., Dubé, P., Santarossa, S., & Woodruff, S. J. (2019). The relationship between physical literacy and moderate to vigorous physical activity among children 8-12 years. *Physical & Health Education Journal*, *84*(4), 1-13.

Dale, L. P., Vanderloo, L., Moore, S., & Faulkner, G. (2019). Physical activity and depression, anxiety, and self-esteem in children and youth: An umbrella systematic review. *Mental Health and Physical Activity*, *16*, 66-79. https://doi.org/10.1016/j.mhpa.2018.12.001

Darfour-Oduro, S. A., Buchner, D. M., Andrade, J. E., & Grigsby-Toussaint, D. S. (2018). A comparative study of fruit and vegetable consumption and physical activity among adolescents in 49 low-and-middle-income countries. *Scientific Reports, 8*(1), Article 1623. https://doi.org/10.1038/s41598-018-19956-0

Derkintiene, S., Budreikaite, A., & Kontautiene, V. (2022). (Dis)satisfaction with the body image among 13-14-year-old students of Lithuanian schools. *European Journal of Contemporary Education, V*11, (2), 338-349. https://doi.org/10.13187/ejced.2022.2.338

Espada, M., Romero-Parra, N., Bores-García, D., & Delfa-De La Morena, J. M. (2023). Gender differences in university students' levels of physical activity and motivations to engage in physical activity. *Education Sciences, 13*(4), Article 340. https://doi.org/10.3390/educsci13040340

Faigenbaum, A. D., & Rebullido, T. R. (2018). Understanding physical literacy in youth. *Strength & Conditioning Journal*, *40*(6), 90-94. https://doi.org/10.1519/SSC.0000000000000417

Fernandes, H. M. (2018). Physical activity levels in Portuguese adolescents: A 10-year trend analysis (2006–2016). *Journal of Science and Medicine in Sport*, *21*(2), 185-189. https://doi.org/10.1016/j.jsams.2017.05.015

Giblin, S., Collins, D., & Button, C. (2014). Physical literacy: Importance, assessment and future directions. *Sports Medicine*, *44*(9), 1177-1184. https://doi.org/10.1007/s40279-014-0205-7

Gu, X., Zhang, T., Lun-(Alan)-Chu, T., Zhang, X., & Thomas-Thomas, K. (2019). Do physically literate adolescents have better academic performance?. *Perceptual and Motor Skills*, *126*(4), 585-602. https://doi.org/10.1177/0031512519845274

Guérin, E., Bales, E., Sweet, S., & Fortier, M. (2012). A meta-analysis of the influence of gender on self-determination theory's motivational regulations for physical activity. *Canadian Psychology, 53*(4), 291–300. https://doi.org/10.1037/a0030215

Haas, P., Yang, C. H., & Dunton, G.F. (2021). Associations between physical activity enjoyment and age-related decline in physical activity in children-results from a longitudinal within-person study. *Journal of Sport & Exercise Psychology*, *43*(3), 205-214. https://doi.org/10.1123/jsep.2020-0156

Jakubauskaitė, J. (2022). *Fizinio ugdymo mokytojų fizinis raštingumas bei jo komponentų taikymas fizinio ugdymo pamokų met [Physical literacy of teachers of physical education and application of its components in lessons of physical education].* Master Thesis, Lietuvos sporto universitetas, Kaunas, Lithunia

Johansen, A., Rasmussen, S., & Madsen, M. (2006). Health behaviour among adolescents in Denmark: Influence of school class and individual risk factors. *Scandinavian Journal of Public Health, 34*(1), 32-40. https://doi.org/10.1080/14034940510032158

Karklelis, I., Vebriene, O., & Lisinskiene, A. (2021). Physical activity of adolescents between the age of 14 – 19 years. *Sport Science, 2*(100), 14-19. https://doi.org/10.15823/sm.2021.100.2

Lundvall, S. (2015). Physical literacy in the field of physical education–A challenge and a possibility. *Journal of Sport and Health Science, 4*(2), 113-118. https://doi.org/10.1016/j.jshs.2015.02.001

Morano, M., Robazza, C., Ruiz, M. C., Cataldi, S., Fischetti, F., & Bortoli, L. (2020). Gender-typed sport practice, physical self-perceptions, and performance-related emotions in adolescent girls. *Sustainability, 12*(20), Article 8518. https://doi.org/10.3390/su12208518

Morres, I. D., Galanis, E., Hatzigeorgiadis, A., Androutsos, O., & Theodorakis, Y. (2021). Physical activity, sedentariness, eating behaviour and well-being during a COVID-19 lockdown period in Greek adolescents. *Nutrients, 13*(5), Article 1449. https://doi.org/10.3390/nu13051449

Mota, J., Martins, J., & Onofre, M. (2021). Portuguese Physical Literacy Assessment Questionnaire (PPLA-Q) for adolescents (15–18 years) from grades 10–12: Development, content validation and pilot testing. *BMC Public Health, 21*(1), Article 2183. https://doi.org/10.1186/s12889-021-12230-5

Orlandi, M., Rosselli, M., Pellegrino, A., Boddi, M., Stefani, L., Toncelli, L., & Modesti, P. A. (2021). Gender differences in the impact on physical activity and lifestyle in Italy during the lockdown, due to the COVID-19 pandemic. *Nutrition, Metabolism and Cardiovascular Diseases, 31*(7), 2173-2180. https://doi.org/10.1016/j.numecd.2021.03.011

Ozemek, C., Lavie, C. J., & Rognmo, Ø. (2019). Global physical activity levels-Need for intervention. *Progress in Cardiovascular Diseases, 62*(2), 102-107. https://doi.org/10.1016/j.pcad.2019.02.004

Pastor-Cisneros, R., Carlos-Vivas, J., Muñoz-Bermejo, L., Adsuar-Sala, J. C., Merellano-Navarro, E., & Mendoza-Muñoz, M. (2021). Association between physical literacy and self-perceived fitness level in children and adolescents. *Biology, 10*(12), Articlee 1358. https://doi.org/10.3390/biology10121358

Pereira, R., Santos, R., Póvoas, S., & Silva, P. (2018). Environment perception and leisure-time physical activity in Portuguese high school students. *Preventive Medicine Reports, 10*, 221-226. https://doi.org/10.1016/j.pmedr.2017.10.013

Pulido, J.J., Tapia-Serrano, M.Á., Díaz-García, J., Ponce-Bordón, J.C., & López-Gajardo, M.Á. (2021). The Relationship between students' physical self-concept and their physical activity levels and sedentary behavior: The role of students' motivation. *Internationas Journals of Environmental Research and Public Health, 18*(15), Article 7775. https://doi.org/ 10.3390/ijerph18157775

Ricardo, L. I. C., Wendt, A., Costa, C. D. S., Mielke, G. I., Brazo-Sayavera, J., Khan, A., Kolbe-Alexander, T. L., & Crochemore-Silva, I. (2022). Gender inequalities in physical activity among adolescents from 64 Global South countries. *Journal of Sport and Health Science, 11*(4), 509–520. https://doi.org/10.1016/j.jshs.2022.01.007

Rosselli, M., Ermini, E., Tosi, B., Boddi, M., Stefani, L., Toncelli, L., & Modesti, P. A. (2020). Gender differences in barriers to physical activity among adolescents. *Nutrition, Metabolism and Cardiovascular Diseases*, *30*(9), 1582-1589. https://doi.org/10.1016/j.numecd.2020.05.005

Rudd, J. R., Pesce, C., Strafford, B. W., & Davids, K. (2020). Physical literacy-A journey of individual enrichment: An ecological dynamics rationale for enhancing performance and physical activity in all. *Frontiers in Psychology*, *19*(7), Article 1904. https://doi.org/10.3389/fpsyg.2020.01904

Rutkauskaite, R., & Visockyte, E. (2021). Students‘ skills and experiences using informatikon and communication technologies in remote physical education lessons. *Sport Science*, *2*(100), 46-56. https://doi.org/10.15823/sm.2021.100.6

Sallis, J. F., Bull, F., Guthold, R., Heath, G. W., Inoue, S., Kelly, P., ... & Lancet Physical Activity Series 2 Executive Committee. (2016). Progress in physical activity over the Olympic quadrennium. *The Lancet*, *388*(10051), 1325-1336. https://doi.org/10.1016/s0140-6736(16)30581-5

Sattler, K. M., Deane, F. P., Tapsell, L., & Kelly, P. J. (2018). Gender differences in the relationship of weight-based stigmatisation with motivation to exercise and physical activity in overweight individuals. *Health Psychology Open*, *5*(1), 1-11. https://doi.org/10.1177/2055102918759691

Saunders, T. J., MacDonald, D. J., Copeland, J. L., Longmuir, P. E., Barnes, J. D., Belanger, K., ... & Tremblay, M. S. (2018). The relationship between sedentary behaviour and physical literacy in Canadian children: a cross-sectional analysis from the RBC-CAPL Learn to Play study. *BMC Public Health*, *18*(2), Article 1037. https://doi.org/10.1186/s12889-018-5892-9

Sechi, C., Loi, G., & Cabras, C. (2021). Addictive internet behaviors: The role of trait emotional intelligence, self-esteem, age, and gender. *Scandinavian Journal of Psychology*, *62*(3), 409-417. https://doi.org/10.1111/sjop.12698

Skurvydas, A., Lisinskiene, A., Lochbaum, M., Majauskiene, D., Valanciene, D., Dadeliene, R., Fatkulina, N., Sarkauskiene, A. (2021). Physical activity, stress, depression, emotional intelligence, logical thinking, and overall health in a large Lithuanian from October 2019 to June 2020: Age and gender differences adult sample. *Internationas Journals of Environmental Research and Public Health*, 18(23), Article 12809. https://doi.org/10.3390/ijerph182312809

Sveikauskas, V. (2008). *Health education.* Medical University Publishing House.

Tremblay, M. S., Costas-Bradstreet, C., Barnes, J. D., Bartlett, B., Dampier, D., Lalonde, C., ... & Yessis, J. (2018). Canada’s physical literacy consensus statement: Process and outcome. *BMC Public Health*, *18*(2), 1-18. https://doi.org/10.1186/s12889-018-5903-x

Spor Bilimleri Araştırmaları Dergisi
Journal of Sport Sciences Research
Vol: 9, Issue: 3, October 2024
E-ISSN: 2548-0723
URL: http://www.dergipark.org.tr/jssr

Artificial Intelligence and the Internet of Things in Recreation: A Systematic Literature Review*

Sinem PARLAKYILDIZ[1†], Sevim KÜL AVAN[1]
[1] Nevşehir Hacı Bektaş Veli University, Faculty of Sport Sciences, Nevşehir.

Research Article **DOI: 10.25307/jssr.1516895**
Received: 16.07.2024 Accepted: 25.08.2024 Online Published: 31.10.2024

Abstract

This study aimed to examine the literature on the use of artificial intelligence and the Internet of Things in the field of recreation and leisure and present the results within themes identified inductively from the data. We employed a systematic review methodology, consisting of determining appropriate selection criteria, choosing data sources, extracting data, categorizing the results, and reporting. Using the Web of Science database, we identified a total of 69 articles published between 2017 and 2024. After filtering and screening for keywords, 23 full-text articles related to artificial intelligence and the Internet of Things in the field of recreation and leisure were included in the analysis. Relevant studies were evaluated according to year, journal, focus, country, type of technology, recreation area, and results obtained. Findings from the reviewed articles are discussed under six themes: safety, ecosystem, personalized recreation experience, wearable technology, health, and potential recreation and leisure areas. We observed that the most frequently investigated topic in the studies was recreational tourism, with a general focus on outdoor recreation. The studies often referred to nature conservation and planned and safe personal leisure time. In conclusion, we determined that artificial intelligence and Internet of Things technologies have various applications in the field of recreation, but relevant studies are limited.
Keywords: Internet of things, Recreation, Artificial intelligence

Rekreasyon Alanında Yapay Zeka ve Nesnelerin İnterneti: Sistematik Literatür İncelemesi

Öz

Bu çalışmanın amacı rekreasyon ve serbest zaman alanında yapay zeka ve nesnelerin interneti kullanımı ile ilgili literatürün incelenmesi ve araştırmalardan elde edilen sonuçların oluşturulan temalara göre sınıflandırılmasıdır. Sistematik literatür taraması yönteminin kullanıldığı araştırma kapsamında amaca uygun seçim kriterlerinin belirlenmesi, veri kaynağının seçilmesi, veri çıkarma, sonuçların sınıflandırılması ve raporlama protokolü izlenmiştir. Rekreasyon ve serbest zaman alanında yapay zeka ve nesnelerin interneti kavramlarını konu alan 2017-2024 yılları arasında Web of Science (WOS) veri tabanında yer alan 69 makaleye ulaşılmış filtreleme işlemlerinin ardından anahtar kelimeler ışığında 23 tam metinli makale sistematik incelemeye tabi tutulmuştur. İlgili çalışmalar yıl, dergi, odak noktası, ülke, teknoloji türü, rekreasyon alanı ve elde edilen sonuçlara göre sınıflandırılmıştır. İlgili makalelerden elde edilen bulgular güvenlik, ekosistem, kişiselleştirilmiş rekreasyon deneyimi, giyilebilir teknoloji, sağlık, potansiyel rekreasyon ve serbest zaman alanları olmak üzere altı tema altında ele alınmıştır. Çalışmalarda en çok araştırılan rekreasyon alanları rekreasyonel turizm alanları olurken, genel olarak bakıldığında ise açık alan rekreasyon konusu üzerinde yoğunlaşıldığı görülmüştür. Çalışmalarda genellikle doğa koruma ile planlı ve güvenli kişisel serbest zamana atıfta bulunulduğu belirlenmiştir. Sonuç olarak rekreasyon alanında yapay zeka ve nesnelerin interneti teknolojilerinin farklı konseptlerde kullanıldığı belirlenmiş ve yapılan çalışma sayısının sınırlı olduğu tespit edilmiştir.
Anahtar kelimeler: Nesnelerin interneti, Rekreasyon, Yapay zeka

* This study was presented as an oral presentation at the 5th International Recreation and Sport Management Congress.

† **Corresponding Author:** Sinem Parlakyıldız, **E-mail:** sinemparlakyildiz@nevsehir.edu.tr

INTRODUCTION

The digital age has transformed many areas of life. These transformations include the growing importance of innovative technologies such as artificial intelligence (AI) and the Internet of Things (IoT). AI and IoT have critical and complementary roles in the technology world (Zhu & Liu, 2022). Both technologies are related to big data usage and continuous communication. IoT devices collect data through various sensors and these data are analyzed by AI algorithms and converted into meaningful information. However, while AI focuses more on intelligence and learning, IoT focuses on device connectivity and data exchange (Sun et al., 2020).

The concept of IoT was first introduced by Kevin Ashton in 1999 in a presentation about how the benefits of inter-device communication based on radio frequency identification (RFID) technology could be reflected in business. According to Ashton, the IoT has an even greater potential to change the world than the internet (Hajjaji et al., 2021). The IoT is a technological concept in which physical devices exchange data by connecting and/or the internet (Borgia, 2014). This communication among various devices (e.g., smartphones, wearable technologies, household appliances, industrial machines, vehicles) enable users or systems to transfer data between devices, remotely control devices, analyze data, and perform various automated operations (Atzori et al., 2010). Common applications of IoT include smart home systems, industrial automation, health monitoring equipment, agricultural technology, transportation, and logistics (Farrokhi et al., 2021).

AI is generally defined as processes that require human intelligence and use computers and algorithms to perform tasks such as learning, reasoning, and problem solving (Bozkurt et al., 2021). AI is a rapidly developing field that has shown major advances in recent years. The concept of using computers to simulate intelligent behavior and critical thinking was first proposed by Alan Turing in 1950 (Ramesh et al., 2004). In his seminal 1950 paper “Computing Machinery and Intelligence”, Turing described a test known as the “Turing test”, which is used to determine whether a computer complies with the human definition of intelligence (Greenhill & Edmunds, 2020). Six years later, it is stated that John McCarthy defined the concept of AI as "the science and engineering of making intelligent machines" (Malik et al., 2019). AI began as a simple set of *if-then* rules and has evolved over the years to include more complex algorithms that perform similarly to the human brain. The term is now used to describe systems that can accurately interpret data, learn to make decisions and achieve certain objectives (Visvikis et al., 2019).

Today, AI and IoT play an important role in many areas. These technologies save people time and effort by automating various business and production processes, as well as reducing errors and contributing to more accurate results in decision-making processes. AI is used effectively in many areas, such as health, transportation, security, education, communication, agriculture, and industry (Altıntop, 2023).

It can be seen from the literature that these rapidly adopted new technologies are also being studied in the field of recreation. This research is especially concentrated in the international literature. Therefore, we believe that identifying in which areas IoT and AI use is most prevalent

will contribute to the field. Our aim in this study was to examine the literature on the use of AI and the IoT in the field of recreation and leisure and to classify the results obtained according to the themes generated from the data. To achieve this, articles on AI and the IoT in the field of recreation and leisure in the Web of Science database were examined through a systematic literature review.

METHODS

Systematic literature reviews aim to identify literature gaps by reviewing the relevant literature and determining the breadth and depth of existing studies (Xiao & Watson, 2019). This process comprises the steps of identifying, evaluating, and interpreting published studies related to a specific research question, topic, or phenomenon. Summarizing the literature data on the subject or phenomenon under investigation draws attention to the importance of previous studies (Kitchenham, 2004). In addition, systematic reviews contain more scientific information than traditional reviews and are recognized as a rigorous evidence-based method for several reasons: 1) they contain less bias and personal opinion, 2) they are more comprehensive because they follow systematic methodology, 3) they clearly specify the methods and selection criteria used for literature review, 4) the quality of the included studies is often evaluated, and 5) other investigators can repeat the systematic literature review and verify the results (Hemingway & Brereton, 2009).

In this study, the research questions, data sources, research strategy, selection criteria, data extraction, reporting protocol, and study limitations were taken into account during the systematic review process.

Research Questions

A systematic review was conducted to evaluate the relevant literature in four respects (years, journals, research foci, and themes). The basic research questions related to these four headings are shown in Table 1.

Table 1. Research questions

1.	In which years have research on AI and/or IoT intensified in the field of recreation and leisure?
2.	In which journals have studies on AI and/or IoT in the field of recreation and leisure been published?
3.	What was the focal point of studies on AI and/or IoT in the field of recreation and leisure?
4.	Which countries were focused on in studies on AI and/or IoT in the field of recreation and leisure?
5.	What type of technology was used in studies on AI and/or IoT in the field of recreation and leisure?
6.	In which recreation area(s) were studies conducted on AI and/or IoT in the field of recreation and leisure?
7.	Under what themes can the studies on AI and/or IoT in the field of recreation and leisure be examined?

Data Source

The international electronic Web of Science database was searched for articles on AI and the IoT in the field of recreation. The extensive coverage of English-language publications, the availability of unlimited access for authors, and the capability for comprehensive searches were significant criteria in the selection of this database. The date range for scanned articles was limited to between 2017 and 2024. The main factor determining this time period is that the first study was published in 2017.

Search Strategy

In addition to using the database filtering features, we searched for the relevant keywords in the titles and abstracts. The keywords used were [("internet of things") OR ("artificial intelligence") AND ("recreation") OR ("leisure")]. “Serious leisure” was also initially included in the search keywords but was not included in the concept search because no relevant studies were found.

Selection Criteria

Inclusion and exclusion criteria were defined for the selection of scientific articles to include in the systematic review (Table 2).

Table 2. Inclusion and exclusion criteria

Inclusion	Exclusion
• Published in international peer-reviewed journals • Full-text articles • Articles in English • Articles with relevant title and content	• Reports, theses, book or book chapters, news • Articles for which the full text was not accessible • Articles in languages other than English • Articles with irrelevant title and content • Repeated records

After applying the appropriate Web of Science database filters, 69 articles were obtained using search keywords. We excluded 44 articles that did not focus on AI or the IoT in recreation, 1 article for which the full text was not accessible, and 1 article that had been retracted. Therefore, the systematic review included 23 full-text articles published in international peer-reviewed journals which were relevant to the scope of this study.

Data Extraction

All articles selected for this review were classified according to the criteria of publication year, publishing journal, focal point, country, type of technology, and recreational area.

Reporting

Although in the social sciences there is no widely accepted standard protocol for reporting the data obtained by systematic literature review, many investigators utilize the 2009 PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) criteria, which have been adopted in recent years as the gold standard in the health sciences. This guideline was developed according to the reporting criteria accepted by different researchers applying these research methods. The PRISMA reporting guidelines are designed to facilitate the presentation of systematic review and meta-analysis studies and enable researchers to critically evaluate previous systematic reviews and meta-analyses (Moher et al., 2010). The PRISMA diagram for the present study is shown in Figure 1.

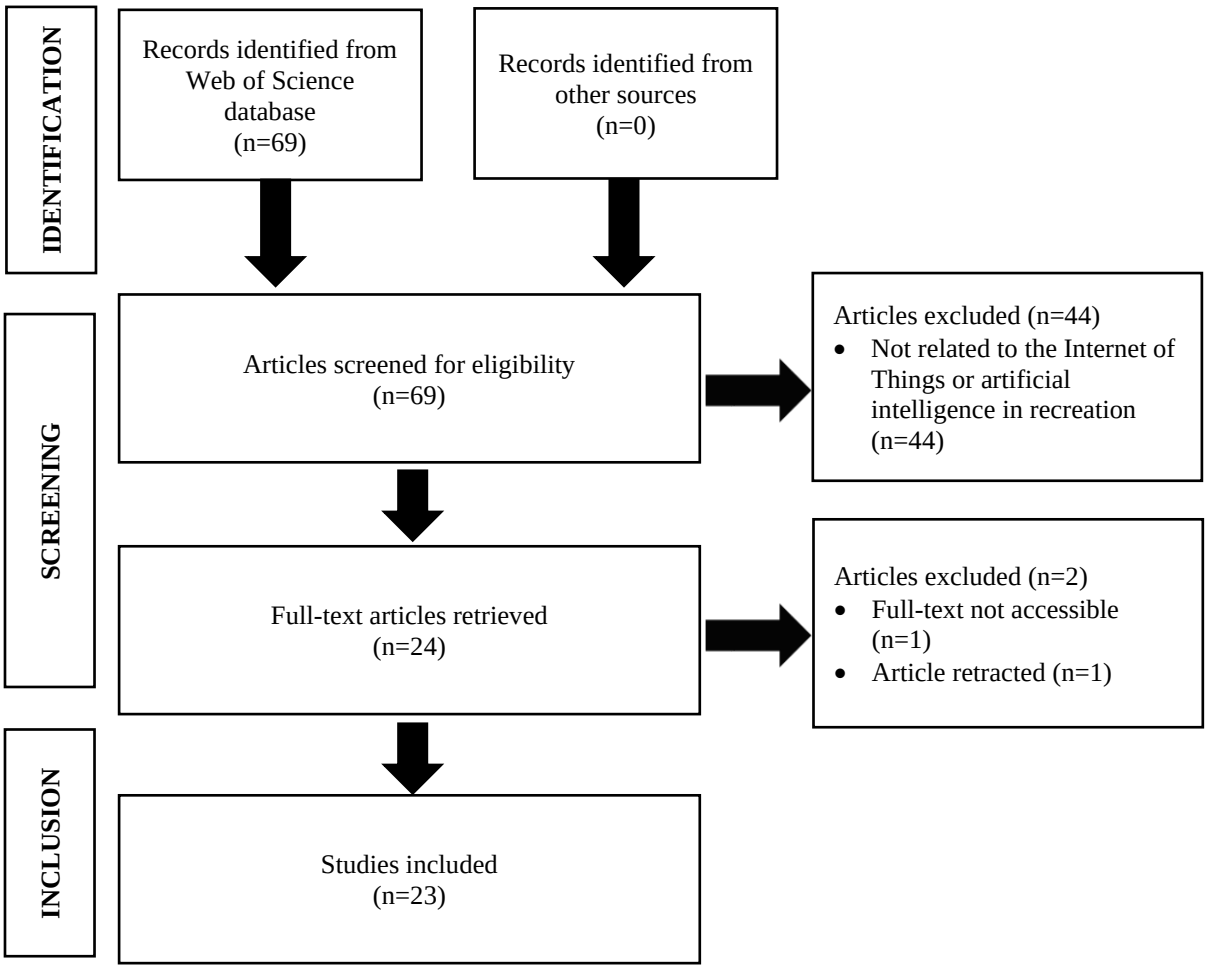

Figure 1. PRISMA diagram

Limitations

A systematic review has inherent limitations, especially the inclusion and exclusion criteria determined by the researchers. Limitations of the present study include our decision to focus on articles published in peer-reviewed journals included in the Web of Science database between 2017 and 2024 and exclude articles that were not published in English, did not have full text available, and whose title and content were outside the scope of the study.

Results

Our data source for this systematic review was the Web of Science database. The articles selected for analysis are summarized in Table 3.

Table 3. Summary of the studies included in the systematic review

Author (Year)	Journal	Focal Point	Country	IoT/AI	Recreation Area
Abang-Abdurahman et al., (2022)	Sustainability	Visitor classification	Malaysia	AI	Tourism
Baalbaki et al., (2022)	EURASIP Journal on Wireless Communications and Networking	Energy conservation	Lebanon	IoT	Water-based recreation
Binesh & Baloglu (2023)	Computers in Human Behavior	Service robots	USA	AI	Tourism
Cao (2023)	IEEE Access	Ecological safety	China	IoT	Tourism
Capriolo et al., (2020)	Ecosystem Services	Ecosystem	Spain	AI	Outdoor recreation
Cepeda-Pacheco & Domingo (2022)	Neural Computing & Applications	Tourist attraction recommendation	Spain	IoT	Tourism
Coman et al., (2023)	IEEE Access	Safety	Romania	IoT	Forest recreation
Ding et al., (2023)	Journal of Heritage Tourism	Time-space analysis	China	AI	Tourism
Eskerod et al., (2019)	Sustainability	Sustainability	Austria	IoT	Tourism
Feng et al., (2022)	Mobile Information System	Smart forest tourism	China	IoT	Tourism
Fennell et al., (2022)	Global Ecology and Conservation	Ecological efficiency	Canada	AI	Outdoor recreation
Hämäläinen et al., (2020)	IEEE Access	Ban standardization	Finland	IoT	Leisure
Ko & Choi (2017)	International Journal of Grid and Distributed Computing	Forest navigation	North Korea	IoT	Forest recreation
Leonidis et al., (2019)	Sensors	Smart home	Greece	AI	Leisure
Lin & Chen (2022)	Digital Health	Nature destinations	Taiwan	AI	Nature recreation
Lin et al., (2019)	IEEE Access	Assistance and safety provision	Taiwan	IoT	Forest recreation
Marin et al., (2017)	Sensors	Wearable devices	Spain	IoT	Health recreation
Miller et al., (2023)	PEERJ	Health	Australia	AI	Outdoor recreation
Riboni (2019)	CCF Transactions on Pervasive Computing and Interaction	Daily life	Italy	AI	Leisure
Sabbioni et al., (2022)	Sensors	Smart tourism	Italy	IoT	Tourism
Sun (2020)	Symmetry-Basel	Image perception of winter tourism	China	AI	Tourism
Winder et al., (2022)	People and Nature	Cultural ecosystem	USA	AI	Activity recreation
Zhou & Wu (2023)	IEEE Access	Sports and leisure-themed cities	China	AI	Urban recreation

Publication year and journal types

Figure 2 shows the distribution of articles by year of publication. The first relevant journal article was published in 2017. There were no publications in 2018, 2021, or 2024 (as of the date of this review), while most records were published in 2022 (8 articles). This demonstrates considerable fluctuation in the number of articles published per year.

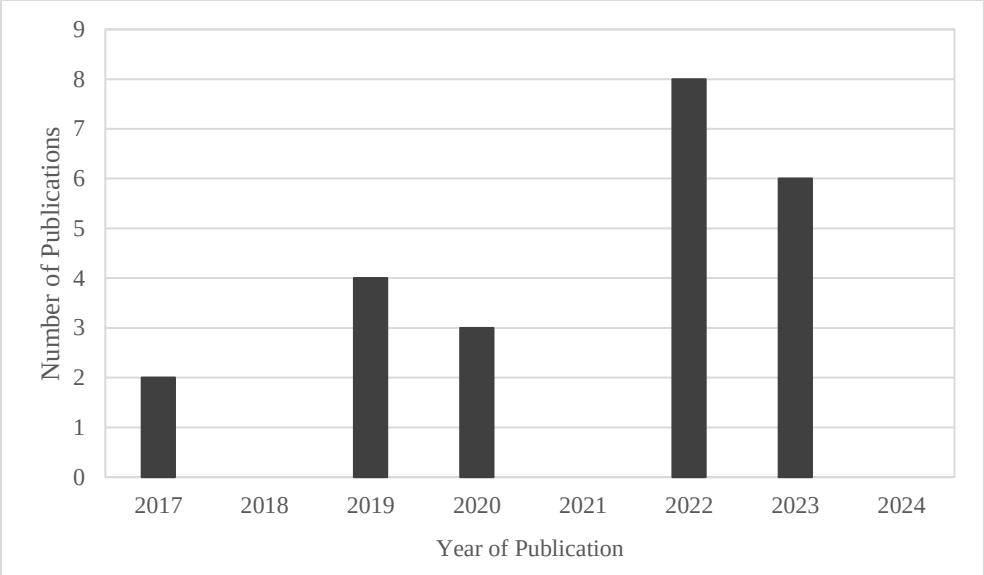

Figure 2. Distribution of articles by year

When the articles on AI and/or IoT in the field of recreation were examined in terms of publishing journals, we noted that the highest number of articles were in the journals *IEEE Access* (5 articles), *Sensors* (3 articles), and *Sustainability* (2 articles). The articles included in the review were published in a total of 17 different journals (Figure 3). However, it is noteworthy that none of these journals' main scope is recreation.

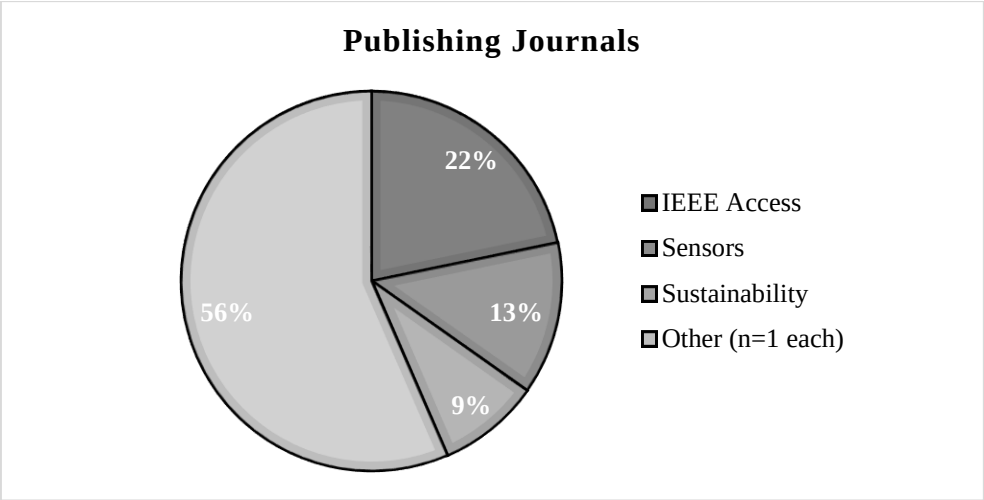

Figure 3. Journals in which the articles were published

Focal points of the articles

The articles on AI and IoT in the field of recreation focused on various points. As seen in Table 3, these focal points included visitor classification, energy conservation, robot use, ecological safety, ecosystem services, tourist attractions, model recommendation, time-space analysis, sustainability, distribution of tourism resources, smart forest tourism, ecological efficiency, body area network (BAN) standardization, forest navigation, smart home, nature destinations, safety and assistance provision, wearable devices, health, daily life, smart tourism, winter tourism, ecosystem culture, and sports- and leisure-characteristic towns.

Focal countries of the articles

Studies on AI and the IoT in the field of recreation mostly focused on China (5 articles) and Spain (3 articles). The United States, Taiwan, and Italy each had 2 articles, while Romania,

Austria, Canada, Finland, North Korea, Lebanon, Malaysia, and Greece had 1 article each (Figure 4).

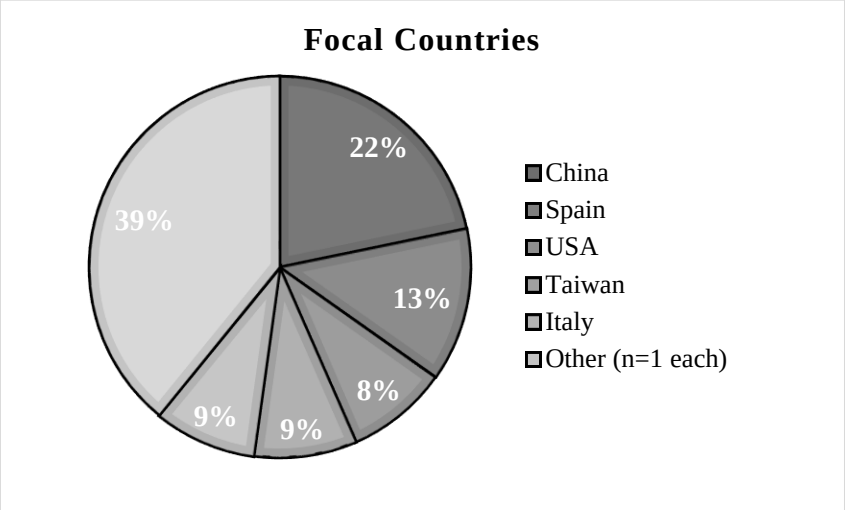

Figure 4. Countries of focus

Technology Type

Articles on AI and the IoT in the field of recreation were fairly evenly divided between those about artificial intelligence (12 articles) and those focused on the IoT (11 articles).

Themes related to the research findings

Studies on AI and the IoT in the field of recreation and leisure addressed six different themes: safety, ecosystem, personalized recreation experience, wearable technology, health, and potential recreation and leisure areas. We also observed that some articles encompassed more than one theme.

Safety

Under the theme of safety, IoT technology and advanced navigation systems play an important role in emergency assistance for visitors lost in recreational forests. A navigation system proposed by Ko and Choi (2017) verifies visitors' location through smartphones and beacons running on Bluetooth 4.0. The system aims to guide users to their targets quickly and easily with a route search algorithm based on direction information used in recreational forests. It was noted that this algorithm is more effective than traditional depth- and breadth-first search (DFS/BFS) methods, which provides a critical advantage in emergency situations, especially. A study by Lin et al., (2019) describes a system framework for deploying IoT technology in a recreational forest park. In their system, data is collected from visitors through wearable devices and used for physiological detection and positioning, which can facilitate the provision of emergency assistance to sick or lost visitors. Fennell et al., (2022) showed that the use of object detection models such as MegaDetector in the analysis of data obtained from camera traps helped to detect humans and animals with high sensitivity, thereby increasing forest safety. The authors suggested this technology could also significantly increase processing speed to improve efficiency in complex ecological studies. Furthermore, the expert system presented by Coman et al., (2023) utilized light detection and ranging (LiDAR) sensors to ensure the effective analysis of data obtained from the forest environment and improve conservation efforts.

Ecosystem

Ecosystem-oriented approaches using various technologies play an important role in the management of recreational areas. Winder et al., (2022) proposed a convolutional neural network model that combines social media analysis and AI technologies to enable the effective identification of recreational activities. They stated that this model has potential applications in environmental management and may contribute to the sustainable use of natural resources. Capriolo et al., (2020) recommended the evaluation of four ecosystem services (agricultural pollination, outdoor recreation, flood regulation, and water provision) in Italy with the use of the Artificial Intelligence for Ecosystem Services (ARIES) technology. This provides a systematic approach that utilizes extent, supply, and use accounting tables to facilitate the management of ecosystem services at the national level, thereby aiming to increase the sustainability of ecosystems and improve environmental performance. Baalbaki et al., (2022) proposed a data collection mechanism called LOGO for remote monitoring of water bodies used for recreational purposes against factors such as climate change using IoT technology. This approach is critical for the effective management and protection of water resources, and the authors noted that such systems supported by remote sensing technologies can help protect the health of ecosystems. Cao (2023) highlighted the importance of the use of technologies such as IoT and deep learning to assess the ecological safety of ice and snow tourism destinations. Using these technologies as remote sensing and data analysis tools has a critical role in protecting natural environments and ensuring the sustainability of touristic destinations.

Personalized Recreation Experience

Within the theme of personalized recreation experience, it can be said that the integration of common technologies and AI tools has led to substantial enrichment. The hybrid AI model proposed by Riboni (2019) highlights how mainstream information technologies can change human life and reveals the need for these technologies to be able to personalize services and interfaces by taking into account the user context. Cepeda-Pacheco and Domingo (2022) enabled the personalization of tourist activities through an IoT-supported deep learning-based recommendation system for tourists. The system analyzes users' travel profiles and preferences and suggests optimal attractions and activities based on real-time data. Sabbioni et al. (2022), on the other hand, proposed the holistic integration of tourism services with IoT technologies and the provision of personalized services for tourists by introducing an innovative architecture called APERTO5.0. This approach aims to increase customer satisfaction while promoting digital transformation in the tourism industry. The smart living room concept proposed by Leonidis et al., (2019) supports the leisure activities of home residents by using Ambient Intelligence and IoT devices, allowing users to personalize their living room experiences.

Wearable Technology

Studies on how wearable technologies can be used in the field of recreation and tourism provide important information. As mentioned above, Lin et al., (2019) described a system for forest recreation that uses IoT technology and wearable devices to collect data from visitors, which can then be used to detect visitors' location and physiological state. In another study, Marin et al., (2017) developed a design methodology called Octopus to increase the integration and utility of the human motion capture (MoCap) technology in wearable devices. Octopus aims to identify design requirements, create a common framework, and facilitate communication between multidisciplinary teams.

Health

The studies related to this theme provide different perspectives on how technology can be used in the field of health. Hämäläinen et al., (2020) aimed to create a standard framework to facilitate the widespread use of wireless BAN technology in health, medicine, sports, leisure, and IoT markets. Their goal with the SmartBAN system is to form the basis of future smart health coordination systems by providing solutions in areas such as data transmission, security, and semantic interaction compatibility. Miller et al., (2023) reported the performance of commercial AI-supported software to evaluate the skin cancer and melanoma risks of individuals participating in outdoor leisure activities. Their study shows how technology can be used in dermatological health assessments, playing an important role as a potential tool for the monitoring and early detection of individuals' health conditions. From another angle, Binesh & Baloglu (2023) examined the use of service robots as a contactless solution in hotel tourism during the COVID-19 pandemic, evaluating how the pandemic accelerated technology-driven changes in the sector and the effects of these technologies on guest satisfaction and operational efficiency. Their findings reveal demographic factors that determine guests' attitudes towards this technology but highlight the potential of robots to offer contactless solutions in the service industry.

Potential Recreation Areas

The studies examined under this theme demonstrate how advanced technologies such as AI, robotics, video analysis, and machine learning can be used in potential recreation areas and especially in the tourism sector. Sun (2020) analyzed online travel journals and reviews about ice-snow tourism using AI technologies, examining the frequency, classification, word cloud, and concordance of frequently used words. The author analyzed the public image of ice-snow tourism in the Jilin province under five main categories and identified elements such as tourism attractions, events, facilities, features, and service environment. This analysis presented a comprehensive approach to determine the perceived image of ice-snow tourism and provided examples of how data analysis with AI can be used in the tourism sector. Zhou & Wu (2023) investigated how AI and robot technologies can be used in the intelligent construction of sports- and leisure-characteristic towns. By developing a MobilNetV2-based image recognition system, they integrated tasks such as face recognition and automatic license plate recognition. The study proposed hardware acceleration schemes to improve the performance of the image recognition system, showing how AI-powered solutions can be optimized in sports fields. Ding et al., (2023) analyzed tourist density at world heritage sites using video-based computer vision technology to address the problems of overcrowding caused by tourism. In the case of the Master-of-Nets Garden, they examined the spatial-temporal distribution of tourists and emphasized the effects of local crowding on sustainable development. In another study, Abang-Abdurahman et al., (2022) used machine learning techniques to identify the personal preferences of domestic and foreign tourists according to the distance to recreation areas. They predicted park classification using visitor data and showed how the potential of machine learning in tourism planning could be evaluated.

DISCUSSION

Our aim in this systematic review was to examine the literature on the use of AI and IoT technologies in the field of recreation and leisure and to classify the results obtained from the analyzed studies according to inductively identified themes.

The articles examined in this review address various applications of advanced technology involving the IoT and AI in recreation areas. Studies under the theme of safety demonstrate how IoT and advanced navigation systems play a critical role in emergency responses for visitors lost in recreational environments (Ko & Choi, 2017; Lin et al., 2019). This research shows how IoT technologies and advanced object detection systems can be integrated to increase safety in recreational forests.

Under the ecosystem theme, there is a strong focus on the contribution of AI integration and social media analysis to sustainable environmental management (Capriolo et al., 2020; Winder et al., 2022). These studies highlight how technology can be used in the management and conservation of various ecosystems.

The theme of personalized recreation experience focuses on AI models and deep learning systems that increase the capacity to provide customized services based on user preferences (Riboni, 2019; Sabbioni et al., 2022). The potential of wearable technologies in recreation and tourism is emphasized through functions such as monitoring the physiological status of visitors and determining their location (Lin et al., 2019; Marin et al., 2017). These studies show how the use of these technologies can contribute both to improving the user experience and increasing operational efficiency. The study by Lin et al., (2019) emphasized key functions of IoT such as location detection and safety, whereas Marin et al., (2017) described how wearable technologies can optimize the design process.

The health theme emphasizes how wireless BAN technologies can be used in the fields of health services and sport (Hämäläinen et al., 2020; Miller et al., 2023). Studies conducted in this context demonstrate potential applications of these technologies in the health sector and highlight the steps to be taken for their dissemination. Both wireless communication technologies and AI-powered health applications can increase the accessibility of health services and provide more effective health management.

Under the theme of potential recreation areas, studies focused on how AI and robot technologies can be integrated into the tourism sector and contribute to the sustainability of touristic destinations (Sun, 2020; Zhou & Wu, 2023). This research can enhance the sustainability of touristic spaces by showing how video analysis technologies can be used for tourism management. The articles related to this theme also reveal how technology can contribute to different areas such as tourism management, sustainable tourism development, and improving tourist experiences.

In summary, the articles examined in this review show that IoT and AI technologies can play important roles in the field of recreation and leisure. The research being conducted in this area offers various technological solutions and innovations in myriad applications ranging from safety measures to personalized services and environmental sustainability to health management.

Recommendations

The use of IoT and AI in the field of recreation is growing in importance. Directions for future research include further diversifying studies related to technology use in recreation and more comprehensively evaluating the effects of IoT and AI-based solutions in areas such as different types of tourism, natural area management, and sports activities. Additionally, systematic reviews utilizing different databases will contribute to the knowledge on this topic. Finally, future studies should also encompass new technological approaches and explore how technologies such as augmented reality, virtual reality, and advanced wearable devices can be integrated into recreational experiences. These recommendations may make significant contributions to the advancement and effective use of technology in the field of recreation.

Conflict of Interest: There is no financial or personal conflict of interest among the authors of the article within the scope of the study.

Authors' Contribution: Study Design-SP, SKA, Data Collection- SP, SKA, Analysis- SP, SKA, Manuscript Preparation- SP, SKA.

Ethical Approval: Not applicable, because this article does not contain any studies with human or animal subjects.

REFERENCES

Abang-Abdurahman, A. Z., Wan Yaacob, W. F., Md Nasir, S. A., Jaya, S., & Mokhtar, S. (2022). Using machine learning to predict visitors to totally protected areas in Sarawak, Malaysia. *Sustainability*, *14*(5), Article 2735. https://doi.org/10.3390/su14052735

Altıntop, M. (2023). Yapay zekâ/akıllı öğrenme teknolojileriyle akademik metin yazma: Chatgpt örneği. *Süleyman Demirel Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, *46*, 186-211.

Atzori, L., Iera, A., & Morabito, G. (2010). The internet of things: A survey. *Computer Networks*, *54*(15), 2787-2805. https://doi.org/10.1016/j.comnet.2010.05.010

Baalbaki, H., Harb, H., Rashid, A. S. K., Jaber, A., Jaoude, C. A., Zaki, C., & Tout, K. (2022). LOGO: An efficient local and global data collection mechanism for remote underwater monitoring. *EURASIP Journal on Wireless Communications and Networking*, *2022*(1), 1-22. https://doi.org/10.1186/s13638-022-02086-7

Binesh, F., & Baloglu, S. (2023). Are we ready for hotel robots after the pandemic? A profile analysis. *Computers in Human Behavior*, *147*, Article 107854. https://doi.org/10.1016/j.chb.2023.107854

Borgia, E. (2014). The internet of things vision: Key features, applications and open issues. *Computer Communications*, *54*, 1-31. https://doi.org/10.1016/j.comcom.2014.09.008

Bozkurt, A., Karadeniz, A., Baneres, D., Guerrero-Roldán, A. E., & Rodríguez, M. E. (2021). Artificial intelligence and reflections from educational landscape: A review of AI Studies in half a century. *Sustainability*, *13*(2), Article 800. https://doi.org/10.3390/su13020800

Cao, J. (2023). The ecological safety assessment and brand communication of ice-snow tourism under the internet of things and deep learning. *IEEE Access*, *11*, 128235-128244. https://doi.org/10.1109/ACCESS.2023.3332688

Capriolo, A., Boschetto, R. G., Mascolo, R. A., Balbi, S., & Villa, F. J. E. S. (2020). Biophysical and economic assessment of four ecosystem services for natural capital accounting in Italy. *Ecosystem Services*, *46*, Article 101207. https://doi.org/10.1016/j.ecoser.2020.101207

Cepeda-Pacheco, J. C., & Domingo, M. C. (2022). Deep learning and internet of things for tourist attraction recommendations in smart cities. *Neural Computing and Applications*, *34*(10), 7691-7709. https://doi.org/10.1007/s00521-021-06872-0

Coman, C. M., Toma, B. C., Constantin, M. A., & Florescu, A. (2023). Ground level LiDAR as a contributing indicator in an environmental protection application. *IEEE Access*, *11*, 106277-106288. https://doi.org/10.1109/ACCESS.2023.3319453.

Ding, S., Zhang, R., Liu, Y., Lu, P., & Liu, M. (2023). Visitor crowding at World Heritage Sites based on tourist spatial-temporal distribution: A case study of the Master-of-Nets Garden, China. *Journal of Heritage Tourism*, *18*(5), 632-657. https://doi.org/10.1080/1743873X.2023.2214680

Eskerod, P., Hollensen, S., Morales-Contreras, M. F., & Arteaga-Ortiz, J. (2019). Drivers for pursuing sustainability through IoT technology within high-end hotels—an exploratory study. *Sustainability*, *11*(19), Article 5372. https://doi.org/10.3390/su11195372

Farrokhi, A., Farahbakhsh, R., Rezazadeh, J., & Minerva, R. (2021). Application of Internet of Things and artificial intelligence for smart fitness: A survey. *Computer Networks*, *189*, Article 107859. https://doi.org/10.1016/j.comnet.2021.107859

Feng, M., Zhang, X., & Liu, P. (2022). Development potential of the Internet of Things-based forest recreation under the background of informatization. *Mobile Information Systems*, *2022*(1), Article 6309178. https://doi.org/10.1155/2022/6309178

Fennell, M., Beirne, C., & Burton, A. C. (2022). Use of object detection in camera trap image identification: Assessing a method to rapidly and accurately classify human and animal detections for research and application in recreation ecology. *Global Ecology and Conservation*, *35*, e02104. https://doi.org/10.1016/j.gecco.2022.e02104

Greenhill, A. T., & Edmunds, B. R. (2020). A primer of artificial intelligence in medicine. *Techniques and Innovations in Gastrointestinal Endoscopy*, *22*(2), 85-89. https://doi.org/10.1016/j.tgie.2019.150642

Hajjaji, Y., Boulila, W., Farah, I. R., Romdhani, I., & Hussain, A. (2021). Big data and IoT-based applications in smart environments: A systematic review. *Computer Science Review*, *39*, Article 100318. https://doi.org/10.1016/j.cosrev.2020.100318

Hämäläinen, M., Mucchi, L., Girod-Genet, M., Paso, T., Farserotu, J., Tanaka, H., ... & Dallemagne, P. (2020). ETSI SmartBAN architecture: The global vision for smart body area networks. *IEEE Access*, *8*, 150611-150625. https://doi.org/10.1109/ACCESS.2020.3016705

Hemingway P., & Brereton N. (2009). *What is a systematic review?. What is…? Series* (2nd ed.). Hayward Medical Communications.

Kitchenham, B. (2004). Procedures for performing systematic reviews. *Keele, UK*, *33*(2004), 1-26.

Ko, D., & Choi, J. (2017). Forest lodge room navigation algorithm based on beacon. *International Journal of Grid and Distributed Computing*, *10*(12), 1-10. https://doi.org/10.14257/ijgdc.2017.10.12.01

Leonidis, A., Korozi, M., Kouroumalis, V., Poutouris, E., Stefanidi, E., Arampatzis, D., ... & Antona, M. (2019). Ambient intelligence in the living room. *Sensors*, *19*(22), Article 5011. https://doi.org/10.3390/s19225011

Lin, C. C., Liu, W. Y., & Lu, Y. W. (2019). Three-dimensional internet-of-things deployment with optimal management service benefits for smart tourism services in forest recreation parks. *IEEE Access*, *7*, 182366-182380. https://doi.org/10.1109/ACCESS.2019.2960212

Lin, Y. C., & Chen, T. C. T. (2022). Type-II fuzzy approach with explainable artificial intelligence for nature-based leisure travel destination selection amid the COVID-19 pandemic. *Digital Health*, *8*, 1-15. https://doi.org/10.1177/20552076221106322

Malik, P., Pathania, M., & Rathaur, V. K. (2019). Overview of artificial intelligence in medicine. *Journal of Family Medicine and Primary Care*, *8*(7), 2328-2331. https://doi.org/10.4103/jfmpc.jfmpc_440_19

Marin, J., Blanco, T., & Marin, J. J. (2017). Octopus: A design methodology for motion capture wearables. *Sensors*, *17*(8), 1875. https://doi.org/10.3390/s17081875

Miller, I. J., Stapelberg, M., Rosic, N., Hudson, J., Coxon, P., Furness, J., ... & Climstein, M. (2023). Implementation of artificial intelligence for the detection of cutaneous melanoma within a primary care setting: prevalence and types of skin cancer in outdoor enthusiasts. *PeerJ*, *11*, e15737. https://doi.org/10.7717/peerj.15737

Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & Prisma Group. (2010). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *International Journal of Surgery*, *8*(5), 336-341. https://doi.org/10.1016/j.ijsu.2010.02.007

Ramesh A. N., Kambhampati C., Monson J. R., Drew P. J. (2004). Artificial intelligence in medicine. *Annals of the Royal College of Surgeons of England*, 86(5), 334-338. https://doi.org/10.1308/147870804290

Riboni, D. (2019). Opportunistic pervasive computing: adaptive context recognition and interfaces. *CCF Transactions on Pervasive Computing and Interaction*, *1*(2), 125-139. https://doi.org/10.1007/s42486-018-00004-9

Sabbioni, A., Villano, T., & Corradi, A. (2022). An architecture for service integration to fully support novel personalized smart tourism offerings. *Sensors*, *22*(4), 1619. https://doi.org/10.3390/s22041619

Sun, G. (2020). Symmetry analysis in analyzing cognitive and emotional attitudes for tourism consumers by applying artificial intelligence python technology. *Symmetry*, *12*(4), Article 606. https://doi.org/10.3390/sym12040606

Sun, L., Jiang, X., Ren, H., & Guo, Y. (2020). Edge-cloud computing and artificial intelligence in internet of medical things: architecture, technology and application. *IEEE Access*, *8*, 101079-101092. https://doi.org/10.1109/ACCESS.2020.2997831

Visvikis, D., Cheze Le Rest, C., Jaouen, V., & Hatt, M. (2019). Artificial intelligence, machine (deep) learning and radio (geno) mics: Definitions and nuclear medicine imaging applications. *European Journal of Nuclear Medicine and Molecular Imaging*, *46*(13), 2630-2637. https://doi.org/10.1007/s00259-019-04373-w

Winder, S. G., Lee, H., Seo, B., Lia, E. H., & Wood, S. A. (2022). An open-source image classifier for characterizing recreational activities across landscapes. *People and Nature*, *4*(5), 1249-1262. https://doi.org/10.1002/pan3.10382

Xiao, Y., & Watson, M. (2019). Guidance on conducting a systematic literature review. *Journal of Planning Education and Research*, *39*(1), 93-112. https://doi.org/10.1177/0739456X17723971

Zhou, R., & Wu, F. (2023). Inheritance and Innovation Development of Sports based on Deep Learning and Artificial Intelligence. *IEEE Access*, *11*, 116511-116523. https://doi.org/10.1109/ACCESS.2023.3325670

Zhu, Y., & Liu, L. (2022). Difference between artificial intelligence of the internet of things and the traditional internet. In *2022 World Automation Congress (WAC)* (pp. 287-291). IEEE. https://doi.org/10.23919/WAC55640.2022.9934002

Spor Bilimleri Araştırmaları Dergisi
Journal of Sport Sciences Research
Vol: 9, Issue: 3, 2024
E-ISSN: 2548-0723
URL: http://www.dergipark.org.tr/jssr

Olympism through the Eyes of Coaches: Metaphorical Texture and Colors of Sport

Melek MAKARACI[1*], Gizem CEYLAN ACAR[2], Akan BAYRAKDAR[3]
[1]Karamanoğlu Mehmetbey University, Faculty of Sports Sciences, Karaman.
[2]Mus Alparslan University, Faculty of Sports Sciences, Mus.
[3]Alanya Alaaddin Keykubat University, Faculty of Sports Sciences, Antalya.

Research Article
DOI: 10.25307/jssr.1543444
Received: 04.09.2024 Accepted: 30.10.2024 Online Published: 31.10.2024

Abstract

This study aims to explore coaches' metaphorical perceptions of the concept of "Olympism." The research sample consists of 170 coaches (86 male, 84 female) from various sports disciplines, working in both public and private organizations in Turkey during the 2023-2024 academic year. Data were collected using a "metaphor form," where participants were prompted to complete the sentence: "Olympism is like …; because …". Content analysis was employed to examine the responses, leading to the development of categories and themes. The metaphors were organized into five categories, each comprising eleven themes. The most prominent category was 'values of sport,' followed by 'abstract concepts and spiritual development' and 'universal values.'. The most frequent metaphors included life, Olympiad, summit, success, harmony, spirit, and sport. These findings indicate that coaches view sport as both a physical and a spiritual journey, emphasizing that Olympism supports athletes' personal and professional development. In the category of "Sport and Ethical Competition," coaches highlighted that Olympism encompasses ethical values and social contributions in addition to achieving success. In the "Abstract Concepts and Spiritual Development" category, coaches described Olympism as a spiritual journey and a philosophy of life. Meanwhile, in the "Universal Values" category, they conveyed that sport serves as a means of fostering global unity and understanding. Overall, the study highlights that metaphors are an effective means of expressing the complex and multifaceted nature of Olympism.
Keywords: Olympism, Olympics, Coach, Metaphor, Qualitative research method

Antrenörlerin Gözünden Olimpizm: Metaforik Doku ve Sporun Renkleri

Öz

Bu araştırmanın amacı; Antrenörlerin "Olimpizm" olgusuna ilişkin metaforik algılarının incelenmesidir. Bu amaçla araştırma grubunu 2023-2024 eğitim öğretim yılında Türkiye'nin kamu veya özel kuruluşlarına bağlı çeşitli il ve ilçelerinde farklı branşlarda antrenörlük görev yapmakta olan 86'sı erkek, 84'ü kadın toplam 170 antrenör oluşturmaktadır. Araştırmada veri toplama aracı olarak katılımcıların olimpizm kavramına ilişkin sahip oldukları algılarını belirlemek için "metafor formu" hazırlanmıştır. Bu formda katılımcılardan "Olimpizm … gibidir; Çünkü …" cümlesini tamamlamaları istenmiştir. Veriler içerik analizi yöntemi ile analiz edilerek, kategoriler ve temalar oluşturulmuştur. Katılımcıların 68 metafor ürettiği görülmüştür. Üretilen metaforlar 5 kategori ve bu kategoriler altında yer alan 11 temadan oluşmaktadır. Katılımcıların en çok "sporun değerleri" kategorisinde metaforlar geliştirdikleri belirlenirken, bu kategorileri "soyut kavramlar ve ruhsal gelişim" ve "evrensel değerler" kategorileri izlemiştir. Katılımcıların en fazla ürettiği metaforlar yaşam, olimpiyat, hayat, zirve, başarı, ahenk, ruh ve spor şeklinde sıralanmıştır. Bu bulgular, antrenörlerin olimpizmi anlamlandırmak için sporcuların kişisel ve profesyonel gelişimini destekleme yolunda, sporun yalnızca fiziksel değil, aynı zamanda ruhsal ve felsefi bir yolculuk olduğunu vurguladığını göstermektedir. Antrenörlerin olimpizmi yorumlama ve anlamlandırma biçimlerine dair önemli bir ışık tutmaktadır. Kategori ve temalarda özellikle öne çıkanlar göz önüne alındığında, "spor ve etik rekabet" kategorisinde antrenörler olimpizmi, başarı sağlamanın yanında, etik değerler ve toplumsal katkılarıda kapsayan geniş bir perspektif olduğunu vurgulamaktadırlar."Soyut kavramlar ve ruhsal gelişim" kategorisinde antrenörler, olimpizmin, ruhsal bir yolculuk ve yaşam felsefesi olduğunu belirtmektedirler. "Evrensel değerler" kategorisinde ise antrenörler, sporun küresel bir birlik ve anlayış oluşturma aracı olarak kullanıldığını vurgulamaktadır. Araştırma, olimpizmin anlamını belirlerken metaforların güçlü bir araç olduğunu ortaya koymaktadır.
Anahtar Kelimeler: Olimpizm, Olimpiyatlar, Antrenör, Metafor, Nitel araştırma yöntemi

[*] **Corresponding Author:** Assist. Prof. Melek MAKARACI, **E-mail:** melek.kozak@gmail.com

INTRODUCTION

Olympism is a social philosophy that underscores the significance of sport in advancing global development, fostering international understanding, promoting peaceful coexistence, and supporting social and moral education (Parry, 2012). Modern Olympism finds its origins in the writings of Baron Pierre de Coubertin, the founder of the inaugural modern Olympic Games held in Athens in 1896 (Gebauer, 2020). Olympism is fundamentally a state of mind rather than a system. It integrates sport, culture, and education to foster a way of life centered on the joy of effort, the educational impact of setting a good example, social responsibility, and adherence to universal ethical principles. Instead of being viewed as a structured system or practical guide, Olympism should be seen as an accessible mindset for everyone (Coubertin, 2000). This philosophy represents a harmonious integration of physical, mental, and moral development, emphasizing that Olympism is fundamentally a holistic approach to living that combines the qualities of body, will, and mind (Olympic Charter, 2020). The principles of Olympism, which advocate for the harmonious development of body, mind, and spirit, guide coaches in their mission to mentor athletes, emphasizing not only performance excellence but also the importance of sportsmanship and personal integrity (Olympic Charter, 2021).

Coaching plays a crucial role in supporting athletes' development on physical, mental, and emotional levels. According to Gültekin (2020), coaching involves "providing the necessary technical and psychological support to maximize the talents of athletes and lead them to success." This approach aligns with the principles of Olympism, which are often conveyed through metaphors that impart deeper significance to both athletes and audiences. For instance, the Olympic motto "Higher, faster, stronger" (Coubertin, 2000) not only inspires physical advancement but also encourages mental and emotional growth. By incorporating Olympic values into their training and mentorship, coaches not only help athletes develop their technical skills but also instill key principles such as friendship, respect, and justice, which are fundamental to the Olympic philosophy.". Binder (2012) assert that "coaches assume the role of transferring Olympic values to athletes and guiding them according to these values." Additionally, Côté and Gilbert (2009) highlight the importance of this value transfer and its positive impact on athletes' performance. The concept of coaching within the framework of Olympism is essential for understanding how sport can serve as a tool for both physical and moral development. Integrating Olympic values into coaching practices allows athletes to enhance not only their technical skills but also their character and sense of social responsibility. This holistic approach maximizes the benefits of sport for both individual growth and societal development (Tomlinson, 2005).

Metaphors serve to clarify a new or complex concept, phenomenon, or event by relating it to a simpler, more familiar one. They act as mechanisms for revealing various dimensions and facilitating a deeper understanding by connecting the subject to other areas of meaning (Güneş and Fırat, 2016). When the literature is examined, it is possible to come across studies on metaphors in different research fields, with samples of physical education teachers, academicians, sports managers and coaches. (Can et al., 2022; Iğdır and Aydos, 2023; İnan et al., 2019; Kurtipek and Güngör, 2019; Kurtipek and Sönmezoglu, 2018; Küçükahmetoğlu and İlhan, 2023; Sarı and Şahin, 2021; Yanar and Akpınar, 2023). When viewed as powerful

metaphors that convey the shared values and ideals of humanity beyond the realm of sport, Olympism offers a lens through which coaches, responsible for both executing and teaching sport, play a crucial role in the development of values emerging from sport. Accordingly, this study aims to explore coaches' metaphorical perceptions of the concept of 'Olympism.'

METHODS

Study Design

Phenomenology, a qualitative research design, was employed in this study. This approach leverages insights gained from individuals' experiences to explore and understand the phenomenon under investigation (Kocabıyık, 2015). In phenomenological research, the concept of 'experience' is central and critically important. A key aspect of this research design is that it emphasizes the commonalities among participants' experiences, rather than focusing solely on the unique value of each individual's experience (Toprak, 2021).

Participants

The study utilized criterion sampling, a type of purposive sampling method, to select the research participants. Criterion sampling involves choosing information-rich cases that are critical for addressing the research questions. This approach is a form of purposive sampling, which focuses on identifying and selecting cases that provide deep insights into the phenomenon under study (Patton, 2014). Şahan and Uyangör (2021) defined criterion sampling as the process of selecting individuals who meet specific predetermined criteria and represent a particular group. In line with this method, the research group for this study comprises coaches from various sports disciplines across different provinces and districts in Turkey, working in both public and private organizations during the 2023-2024 academic year (Table 1).

Table 1. Demographic data of participants

Variables	**f**
Gender	
Female	84
Male	86
Age	
18-20 years	12
21-23 years	26
24-26 years	31
27 years and over	101
SportsType	
Team sports	67
Individual sports	103

Data Collection Tools

In this study, a 'Metaphor Form' was utilized to assess coaches' perceptions of the concept of 'Olympism.' This form, along with an introductory text, was distributed to participants via a link through the social network application (WhatsApp), on a voluntary basis. Participants first provided their demographic information, including gender, age, and the type of sport they coach, in the initial section of the form. In the second section, they completed the sentence "Olympism is like …; because …" to express their metaphors and reveal their perspectives on

Olympism. The link was accessible from March 5 to April 25, 2024. Once the data were collected, they were transferred to a Word file and compiled into a dataset for statistical analysis.

Ethical Approval

This research was approved by the Research Ethics Committee of Karamanoğlu Mehmetbey University Social and Human Sciences (Approval ID: 05-2024/93)

Data Analysis

Since the metaphors obtained in this study served as descriptive tools, content analysis, a qualitative research approach, was employed to analyze the data. Content analysis involves both quantitative and qualitative examination of the meanings embedded in texts or transcripts, systematically organizing these into concepts and categories (Güler et al., 2015). Qualitative analysis entails separating the data into key themes, categories, and illustrative examples, and then transforming them into coherent narrative descriptions. The categories and themes derived from this process are the products of qualitative research (Patton, 2014).

To begin the analysis, participants' forms were numbered from P1 to P170. To ensure research reliability, two field experts (one educational scientist and one sports scientist) analyzed the data to verify that the conceptual categories reflected the identified themes. The codes and their corresponding categories were then compared. After coding the research data separately, a final code and category list were established. Reliability was calculated using the formula [Agreement / (Agreement + Disagreement) x 100] (Miles and Huberman, 1994). The study produced a total of 68 metaphors from 170 responses, with three metaphors (*index, coffee and machine*) identified. The average reliability between coders was 95% [65 / (65+3) x 100 = 95%], indicating that the desired level of reliability was achieved.

RESULTS

Table 2 presents the types and categories of metaphors that coaches produce to describe the concept of Olympism.

Table 2. The metaphors that coaches produceto describe the concept of Olympism

Metaphor Order	Metaphor Name	f	Metaphor Order	Metaphor Name	f
1	Life	**17**	35	Power	**2**
2	Olympiad	**10**	36	Cooking	**1**
3	Life	**9**	37	Torch	**1**
4	Summit	**9**	38	Roof	**1**
5	Success	**6**	39	Modernitiy	**1**
6	Harmony	**5**	40	Tea	**1**
7	Spirit	**5**	41	Strawberry	**1**
8	Sports	**5**	42	Friend	**1**
9	World view	**4**	43	Machine	**1**
10	Champion	**4**	44	Worship	**1**
11	*Pulse*	**3**	45	Candle	**1**
12	Excitement	**3**	46	Unity	**1**
13	Passion	**3**	47	Road	**1**
14	Competition	**3**	48	Music	**1**
15	Combination	**3**	49	Humanity	**1**
16	Belief	**3**	50	Intellectuality	**1**
17	Friendship	**3**	51	Heart	**1**
18	Culture	**3**	52	Formation	**1**
19	Perfection	**3**	53	Breath	**1**
20	Self-discipline	**3**	54	Inequality	**1**
21	Water	**3**	55	Index	**1**
22	Balance	**3**	56	Duck	**1**
23	Peace	**3**	57	Order	**1**
24	Fairplay	**2**	58	Freedom	**1**
25	Pride	**2**	59	Hope	**1**
26	Labor	**2**	60	Socialization	**1**
27	Farmer	**2**	61	Principle	**1**
28	Coffee	**2**	62	Sea	**1**
29	Target	**2**	63	Menemen	**1**
30	Ocean	**2**	64	Book	**1**
31	Fighting	**2**	65	Justice	**1**
32	Intelligence	**2**	66	Adaptation	**1**
33	Development	**2**	67	Imagination	**1**
34	Dream	**2**	68	Interaction	**1**
				Total Opinion	**170**

Table 2 reveals that coaches produced a total of 68 different metaphors for the concept of 'Olympism' and provided 170 related opinions. The most frequently produced metaphor was "life," which appeared 17 times. Additionally, metaphors such as Olympiad (10), summit (9) and life (9), and success(6) were used more frequently compared to others.

Table 3. Distribution of the metaphors produced by the participants about the concept of 'Olympism' according to themes and categories

Category	Theme	f	Metaphors
Universal Values	Humanity and Faith	18	*Spirit (n=5), faith (n=3), peace (n=3), pride (n=2), worship (n=1), humanity (n=1), unity (n=1), hope (n=1), heart (n=1)*
	Ethical Values and Code of Conduct	3	*Freedom (n=1), index (n=1), harmony (n=1)*
	Philosophical Principles and Perspectives	15	*Life (n=9), world view (n=4), justice (n=1), principle (n=1)*
Sports and Ethical Competition	Values of Sport	33	*Olympiad (n=10), success (n=6), sport (n=5), champion (n=4), perfection (n=3), passion (n=3), power (n=2)*
	Sports Ethics and Code of Conduct	12	*Self-discipline (n=3), competition (n=3), goal (n=2), fighting (n=2), fair play (n=2)*
Nature and Inner Harmony	Nature and Environment Connection	11	*Water (n=3), ocean (n=2), farmer (n=2), duck (n=1), order (n=1), tea (n=1), strawberry (n=1)*
	Inner Experience and Focus	24	*Summit (n=9), balance (n=3), excitement (n=3), labor (n=2), coffee (n=2), breath (n=1), sea (n=1), music (n=1), book (n=1), cooking (n=1)*
Culture and Social Connections	Cultural Diversity and Connections	9	*Culture (n=3), friendship (n=3), intellectuality (n=1), modernity (n=1), interaction (n=1)*
	Social Bonds and Relationships	5	*Inequality (n=1), friend (n=1), socialization (n=1), road (n=1), roof (n=1)*
Abstract Concepts and Spiritual Development	Abstract Concepts and Philosophical Thoughts	30	*Life (n=17), pulse (n=3), harmony (n=5), intelligence (n=2), dream (n=2), imagination (n=1)*
	Spiritual and Inner Development	10	*Combination (n=3), development (n=2), menemen (n=1), machine (n=1), torch (n=1), formation (n=1), candle (n=1)*
Total		**170**	

The metaphors produced by the coaches regarding Olympism are categorized into five main groups, with a total of eleven themes identified within these categories, as shown in Table 3. The Universal Values category includes themes such as Humanity and Faith (18), Ethical Values and Codes of Conduct (3), and Philosophical Principles and Perspectives (15). In the Sports and Ethical Competition category, the themes are Values of Sport (33) and Sports Ethics and Codes of Conduct (12). The Nature and Inner Harmony category features themes like Nature and Environment Connection (11) and Inner Experience and Focus (24). For Culture and Social Connections, the relevant themes are Cultural Diversity and Connections(9) and Social Bonds and Relationships (5). Finally, the Abstract Concepts and Spiritual Development category encompasses Abstract Concepts and Philosophical Thoughts (5) and Spiritual and Inner Development (10).

Table 4. Metaphors and explanation examples in the "Universal Values" category

Category	Theme	f	Metaphors
Universal Values	Humanity and Faith	18	*Spirit (n=5), faith (n=3), peace (n=3), pride (n=2), worship (n=1), humanity (n=1), unity (n=1), hope (n=1), heart (n=1)*
	Ethical Values and Code of Conduct	3	*Freedom (n=1), index (n=1), harmony (n=1)*
	Philosophical Principles and Perspectives	15	*Life (n=9), worldview (n=4), justice (n=1), principle (n=1)*

Quotes from examples of coaches' explanations;
Spirit: Because; *"The individual with the spirit of Olympism makes sports more meaningful" (P113).*
Spirit: Because; *"Invisible, untouchable but lived" (P109).*
Humanity: Because; *"It is the point where the whole world unites under one roof without discrimination of language, religion, or race" (P34).*
Heart: Because; *"When I believe with my heart, my emotions come into play" (P114).*
Hope: Because; *"It represents the highest expression of humanity's capabilities and unity" (P157).*
Index: Because; "*It has a broad definition and contains many elements related to sports" (P143).*
Life: Because; *"I wholeheartedly believe in the philosophy of: share the success, take the failure" (P32).*
Life: Because; *"Those who make sports a philosophy in their lives and active life standards achieve success in every field" (P45).*
Worldview: Because; *"The integrity of all countries" (P6).*
Justice: Because; *"Everything is fair, conditions and powers are equal, and rules are clear" (P164).*

According to Table 4, a total of 36 metaphors were identified in the category of "Universal Values" related to Olympism. The coaches produced metaphors such as spirit, humanity, heart, hope, life, world, and justice to emphasize different aspects of the universal values inherent in Olympism. These metaphors illustrate the diverse dimensions of Olympism and universal values, highlighting humanitarian, ethical, and philosophical elements. This variety reflects the broad spectrum of universal values that underpin the concept of Olympism.

Table 5. Metaphors and explanation examples in the "Sports and Ethical Competition" category

Category	Theme	f	Metaphors
Sports and Ethical Competition	Values of Sport	33	*Olympiad (n=10), success (n=6), sport (n=5), champion (n=4), perfection (n=3), passion (n=3), power (n=2)*
	Sports Ethics and Code of Conduct	12	*Self-discipline (n=3), competition (n=3), goal (n=2), fighting (n=2), fair play (n=2)*

Quotes from examples of coaches' explanations;
Olympiad:Because; *"The word directly makes you feel it" (P101).*
Olympiad:Because; *"Gave birth to the Olympics" (P105).*
Success:Because; *"The place of the best and to be the best you need to be successful" (P151).*
Success:Because; *"I think it is the last stage of success in sport" (P139).*
Sport:Because; *"A worldview and understanding of life based on the basic characteristics of the sporting event" (P49).*
Champion:Because; *"If he/she made it to the Olympics, he/she is a champion" (K84).*
Competition:Because; *"An organization where even the political presence of all countries from the past to the present is represented" (P57).*
Fairplay:Because; *"Games and players competing on equal terms" (P89).*
Goal:Because; *"Olympism is success and the path to success is the goal" (P16).*

According to Table 5, 45 metaphors were identified in the category of "Sport and Ethical Competition" related to Olympism. The coaches produced metaphors such as Olympiad, success, sport, champion, competition, fairplay, and goal to illustrate various facets of Olympism. These metaphors highlight that Olympism promotes not only athletic success but also ethical competition, friendship among athletes, and the core human values of sports. This suggests that Olympism is a multifaceted concept that emphasizes ethical competition, performance, fair play, and the friendship among athletes, in addition to sports.

Table 6. Metaphors and explanation examples in the "Nature and Inner Harmony" category

Category	Theme	f	Metaphors
Nature and Inner Harmony	Nature and Environment Connection	11	*Water (n=3), ocean (n=2), farmer (n=2), duck (n=1), order (n=1), tea (n=1), strawberry (n=1)*
	Inner Experience and Focus	24	*Summit (n=9), balance (n=3), excitement (n=3), labor (n=2), coffee (n=2), breath (n=1), sea (n=1), music (n=1), book (n=1), cooking (n=1)*

Quotes from examples of coaches' explanations;

Water:Because;*"It is a must for an athlete" (P94)*

Farmer*:* Because; *"One day you will reap the rewards of your labor" (P163).*

Duck:Because;*"It stands nobly above the water, but its feet are always working under the water" (P74).*

Strawberry:Because;*"It must first be above the soil and then ripen and go to the market" (P133).*

Peak:Because;*"The end point of an athlete's career" (K110).*

Labor:Because;*"It is an important expression and meaning that is achieved through labor and effort, which requires a more imaginative and realistic mission rather than an individual approach" (P7).*

Ocean: Because; *"Oceans form from the combination of seas, and since Olympism covers the sports in the world, it is the ocean for me" (P22).*

Book:Because;*"The more I read, themore my horizons broaden and I can look from wider windows" (P165).*

According to Table 6, 35 metaphors were identified in the category of "Nature and Inner Harmony" related to Olympism. The coaches produced metaphors such as water, farmer, duck, strawberry, peak, and labor to illustrate how Olympism represents the balance and harmony between nature and the inner world of individuals. These metaphors suggest that Olympism encompasses more than just sports; it also emphasizes the importance of being in harmony with nature, achieving balance, labor, and maintaining inner focus.

Table 7. Metaphors and Explanation Examples in the "Culture and Social Connections" Category

Category	Theme	f	Metaphors
Culture and Social Connections	Cultural Diversity and Connections	9	*Culture (n=3), friendship (n=3), intellectuality (n=1), modernity (n=1), interaction (n=1)*
	Social Bonds and Relationships	5	*Inequality (n=1), friend (n=1), socialization (n=1), road (n=1), roof (n=1)*

Quotes from examples of coaches' explanations;

Culture:Because;*"All athletes and sports disciplines can be practiced together without discrimination of religion, language, or race" (P53).*

Culture:Because;*"There will be a generation that will carry this flag tomorrow as it was yesterday" (P128).*

Friendship:Because; *"Five continents uniting without any distinction and playing sports with the Olympic spirit within the framework of fair play" (P59).*

Intellectuality:Because;*"Means that the individual has raised himself mentally above a certain level" (P54).*

Road: *"In order to reach the goal, you need to set out on the road, and the road to success starts from Olympism" (P15).*

Roof:Because;*"It is the roof of the sports family where all sports compete together and all branches come into contact with each other" (P155).*

According to Table 7, 14 metaphors were identified in the category of "Culture and Social Connections" related to Olympism. The coaches produced metaphors such as culture, friendship, road, and intellectuality to highlight how Olympism encompasses not just sports but also cultural diversity, social connections, and a philosophy rooted in equality. These metaphors suggest that Olympism is a broad concept that emphasizes cultural understanding, social ties, equality, and social awareness, extending beyond the realm of sports.

Tablo 8. Metaphors and explanation examples in the "Abstract Concepts and Spiritual Development" category

Category	**Theme**	**f**	**Metaphors**
Abstract Concepts and Spiritual Development	Abstract Concepts and Philosophical Thoughts	30	*Life (n=17), pulse (n=3), harmony (n=5), intelligence (n=2), dream (n=2), imagination (n=1)*
	Spiritual and Inner Development	10	*Combination (n=3), development (n=2), menemen (n=1), machine (n=1), torch (n=1), formation (n=1), candle (n=1)*

Quotes from examples of coaches' explanations:
Life:Because; *"Olympism is at the very heart of the lifeblood of sport" (P29).*
Life:Because;*"A practical philosophy of life that is not only related to professional sport but can also be carried over into everyday life, using one's body to its fullest potential through regular and systematic training" (P48).*
Pulse:Because;*"Olympism is the pulse of the athlete" (P116).*
Harmony:Because;*"The harmonious dance of body power, intelligence, morality" (P92).*
Dream:Because;*"For someone whose life is sport, Olympism is a dream" (P152).*
Menemen:Because;*"It brings different people together and creates a perfect flavor" (P162).*
Torch:Because;*"We need to light the torch to see the way ahead" (P148).*
Candle: Because; *"Olympism is an understanding of life and a concept that sheds light on the future. It should be continued and shed light on future generations" (P6).*

According to Table 8, 40 metaphors were identified in the category of "Abstract Concepts and Spiritual Development" related to Olympism. The coaches produced metaphors such as life, pulse, harmony, intelligence, dream, menemen, torch, and candle to highlight that Olympism reflects not only physical performance but also philosophical thoughts and spiritual growth. These metaphors suggest that Olympism extends beyond the realm of physical achievement to encompass spiritual, personal, and emotional development, appealing to the deeper layers of the human experience.

DISCUSSION AND CONCLUSION

This study aims to explore coaches' metaphorical perceptions of the concept of "Olympism." We analyzed explanatory statements from individuals actively coaching in various sports and identified a total of 68 unique metaphors. These metaphors were categorized into five main categories and eleven themes within these categories. The most frequently produced metaphors were in the category of "values of sport," followed by "abstract concepts," "spiritual development," and "universal values." The most commonly used metaphors included "life," "Olympiad," "summit," "success," "harmony," "spirit," and "sport."

Olympism is a conception of life based on the Olympic Games in ancient Greece and combining sport, culture, and philosophy (life, Olympiad, lifetime). It encourages individuals to push their limits and maximize their potential (peak). For athletes, this means reaching peak performance physically and mentally. Major sporting events, such as the Olympic Games, represent the goal for athletes to achieve the highest level of achievement (success). Olympism promotes harmony both physically and mentally and offers a life philosophy that positively influences spiritual health (spirit) through aspects such as spiritual integrity, resilience, purification, and social bonds. Analysis of the metaphors developed by the coaches shows a positive emphasis on many different facets of Olympism. This finding supports the idea that metaphors can explain abstract concepts by relating them to more tangible experiences (Lakoff and Johnson, 2005).

When the metaphors were categorized from most to least used, *"Sport and Ethical Competition"* emerged as the category with the highest number of metaphors (45 metaphors). These include "Olympics, success, sport, champion, perfection, passion, self-discipline, competition, power, goal, fighting, and fair play." According to the Olympic Charter (Olympic Rules and Guidelines), one of the aims of the Olympic Movement is to promote "clean and honest competition" (Olympic Charter, 2020). Within this framework, ensuring ethical competition is directly aligned with Olympism. Additionally, Coubertin's assertion that "the Olympic ideal is based on passion and dedication" (Coubertin, 2000) reinforces the relevance of these metaphors to Olympism. Côté and Gilbert (2009) suggest that Olympic values serve as a beacon, guiding athletes' personal and sporting development. Brown (2008) describes Olympism as a "pursuit of excellence," highlighting the effort of athletes and nations to achieve excellence and seek continuous improvement. Milton-Smith (2002) argue that Olympism views ethical competition as integral to the pursuit of spiritual excellence, which, in turn, encourages athletes' spiritual development and enhances their ethical and spiritual growth.

In the category of *"Abstract Concepts and Spiritual Development"*, 40 metaphors were produced. The metaphors identified by the coaches for the phenomenon of Olympism include "life, harmony, pulse, combination, intelligence, dream, development, imagination, menemen, machine, torch, formation, candle." MacAloon (Coubertin, 2000) views Olympism as "an ideal that encourages spiritual and character development in sport." Sartre (2007) describes Olympism as an "existential test," suggesting that the Olympic Games offer a stage for individuals to explore their existential meaning and identity. Tomlinson (2005) frames Olympism as part of a journey, illustrating how sport functions as a tool for both physical and spiritual development. The journey metaphor underscores the role of sport in fostering personal growth. Beschloss (2008) characterizes the Olympics as a "test of the human spirit," highlighting how the Games push athletes and societies to explore the limits of human capacity. In this context, it can be said that Olympism seeks to foster an environment of harmony and unity at the international level through sport.

In the category of *"Universal Values"*, 36 metaphors were produced. These include "life, spirit, worldview, faith, peace, pride, worship, humanity, unity, heart, hope, freedom, index, harmony, justice, principle." Kelmendi et al., (2015) describes Olympism as an ideal that "promotes not only physical but also social and moral development." This perspective highlights that Olympism emphasizes universal values such as justice, equality, and honesty, which are

advanced through sport. Additionally, the Olympic Games are said to "bring together people from different cultures and nations, creating universal unity and understanding" (Olympic Charter, 2020), illustrating Olympism's aim to foster global unity and solidarity through sport. (Arnold, 1996) notes that Olympic values serve as a symbol for athletes, reflecting principles such as justice, friendship, and excellence. Kidd (2013) likens Olympism to a flame, suggesting that sport acts as a fire representing these universal values. Overall, the metaphors in the "Universal Values" category reflect Olympism's emphasis on fundamental principles such as justice, unity, and peace, highlighting how the Olympic Games strive to promote global solidarity and embody these universal values through sport.

In the category of *"Nature and Inner Harmony"*, 35 metaphors were produced, including "summit, water, balance, excitement, labor, ocean, farmer, coffee, duck, order, tea, strawberry, breath, sea, music, book, cooking." MacAloon (2013) describes Olympism as a movement that "encourages athletes to reach their highest performance and aims to reach the peak in this process." Leopold (1949) defines Olympism as an "ecological balance," emphasizing the importance of harmony with nature. Gould (2007) likens Olympism to a labyrinth, suggesting that athletes and societies navigate challenges using Olympic values. Lovelock (2016) refers to Olympism as "Gaia's festival," highlighting the opportunity to celebrate vitality within the Gaia Theory framework. Messner (1995) states that Olympism is "a system developed to ensure that individuals remain physically and spiritually balanced," illustrating how Olympism promotes balance through sports. These metaphors capture Olympism's focus on achieving inner harmony and balance, both personally and with nature.

In the *"Culture and Social Connections"* category, 14 metaphors were produced, including "culture, friendship, road, intellectuality, modernity, interaction, inequality, socialization, roof, friend." Bach (2023) highlights that the Olympics foster a global community by uniting diverse cultures, thus supporting their cultural and social dimensions. UNESCO (2016) notes that the Olympics "strengthen social bonds by celebrating cultural diversity," illustrating how sports enhance social cohesion and cultural connections. Goldblatt (2016) refers to Olympism as an "ocean of ideals," emphasizing its role in merging various cultural and social elements. Goldblatt (2014) also describes Olympism as a platform that "supports international harmony and social cohesion." Yuting (2013) characterizes Olympism as a "cultural feast," celebrating diverse cultural expressions and traditions. Smith and Smoll (2011) view Olympism as a symphony, reflecting the harmonious integration of different cultural values. Similarly, Tomlinson (2005) describes Olympism as a global network, showcasing its extensive international influence and cultural amalgamation. Hobsbawm (1995) suggests that Olympism contributes to the internationalization of sports as part of the modernization process, highlighting its connection to global development. These metaphors illustrate how Olympism fosters cultural exchange, social cohesion, and modernization through the global celebration of diverse cultural values.

In conclusion, this study analyzed 68 metaphors produced by coaches from various sports to explore their perceptions of Olympism. The findings reveal that coaches associate Olympism with profound and multifaceted themes, particularly emphasizing its universal and spiritual dimensions. The most frequently produced metaphors underscore the importance of Olympism as a high value and ideal within sports education and culture. Moreover, the strong focus on

ethical and universal values highlights the coaches' commitment to imparting these principles to athletes. Overall, the study demonstrates that coaches view Olympism, along with universal and ethical values, as having a positive impact on their approaches and philosophies. Future research could benefit from exploring how metaphorical perceptions of Olympism differ among coaches at various levels, such as youth, amateur, and professional. Additionally, cross-cultural comparisons could provide valuable insights into how Olympism is interpreted and valued in different cultural contexts, further enriching our understanding of its global significance.

Conflicts of Interest: There is no financial or personal conflict of interest on the part of the authors in this study.

Authors' Contribution: Research Design – MM, Data Collection - MM; GCA; AB, Statistical Analysis - GCA, MM, Manuscript Preparation – MM, AB, GCA.

Ethical Approval
Ethics Committee: Karamanoğlu Mehmetbey University Social and Human Sciences Ethics Committee
Date: 08.03.2024
Decision No: 05-2024/93

REFERENCES

Arnold, P. J. (1996). Olympism, sport, and education. *Quest, 48*(1), 93–101. https://doi.org/10.1080/00336297.1996.10484181

Bach, T. (2023). *The Olympic vision and global unity*. International Olympic Committee (IOC) Report.

Beschloss, M. (2008). *The Olympics and the spirit of competition*. Viking Press.

Binder, D. L. (2012). Olympic values education: evolution of a pedagogy. *Educational Review, 64*(3), 275-302. https://doi.org/10.1080/00131911.2012.676539

Brown, D. A. (2008). *From the partners in pursuit of excellence to Own the Podium: An ideological slip in Canadian Olympic sport.* In Proceedings: International Symposium for Olympic Research (pp. 432-448). International Centre for Olympic Studies.

Can, H. C., Işım, A. T., & Zorba, E. (2022). Perception of teaching models of physical education teachers and teacher candidates: Metaphor analysis. *Journal of National Education, 51*(235), 2179-2196. https://doi.org/10.37669 milliegitim.901873

Côté, J., & Gilbert, W. (2009). An integrative definition of coaching effectiveness and expertise. *International Journal of Sports Science & Coaching, 4*(3), 307-323. https://doi.org/10.1260/17479540978962389

De Coubertin, P. (2000). *Olympism*. Comité Internationnal Olympique.

Goldblatt, D. (2014). *The game of our lives: The English Premier League and the making of modern Britain*. Bold Type Books.

Goldblatt, D. (2016). *The games: A global history of the Olympics*. Pan Macmillan.

Gould, D. (2007). Understanding the role of the coach in athletic performance. *Journal of Applied Sport Psychology, 19*(3), 304-317. https://doi.org/10.1080/10413200701329134

Güler, A., Halıcıoğlu, M. B., & Taşğın, A. (2015). *Qualitative research in social sciences: Theoretical framework-practical suggestions-7 different qualitative research approaches-quality and ethical considerations.* Seçkin Publisher.

Gültekin, E. (2020). *Coaching: Theory and practice.* Sports Publications.

Hobsbawm, E. J., & Cumming, M. (1995). *Age of extremes: The short twentieth century, 1914-1991*. Abacus.

Iğdır, E. C., & Aydos, L. (2023). Examining academicians' views on sports literacy: A Metaphor study. *Aksaray University Journal of Sport and Health Researches, 4*(1), 48-61. https://doi.org/10.54152/asujshr.1286545

İnan, M., Dervent, F., & Karadağ, B. (2019). Metaphorical perceptions of sports stakeholders regarding the concept of fair play. *Journal of Sports Sciences, 30*(2), 85-95. https://doi.org/10.17644/sbd.339141

Kelmendi, D., Hvziu, B., & Arifi, F. (2024). Olympism and role of olympic values in sport. *Journal of Anthropology of Sport and Physical Education, 8*(2), 13-17. https://doi.org/10.26773/jaspe.240403

Kidd, B. (2013). Human rights and the olympic movement after Beijing. In D.P. Martinez, K. Latham (Edt.), *Documenting the Beijing Olympics* (pp.167-176). Routledge.

Kocabıyık, O. (2015). Phenomenology and grounded theory: A Comparison of some features. *Journal of Trakya University Faculty of Education, 6*(1), 55-66.

Kurtipek, S., & Sönmezoglu, U. (2018). Determining the perceptions of sports managers regarding the concept of sports: A Metaphor analysis study. *International Journal of Higher Education, 7*(4), 17-25. https://doi.org/10.5430/ijhe.v7n4p17

Kurtipek, S., & Güngör, N.B. (2019). Coaches' perception of athletes. *Journal of Turkish Sports and Exercise, 21* (2), 379-385. https://doi.org/10.30769/usbd.725038

Küçükahmetoğlu, R., & İlhan, E. L. (2023). Examining the perceptions of physical education teachers towards inclusive students through metaphors. *Journal of Human Sciences*, *20*(3),424-438. https://doi.org/10.14687/jhs.v20i36399

Leopold, A. (1949). *A Sand County Almanac*: Oxford University Press.

Lovelock, J. (2016). *Gaia: A new look at life on earth*. Oxford University Press.

MacAloon, J. J. (2013). *This great symbol: Pierre de Coubertin and the origins of the modern Olympic Games*. Routledge. https://doi.org/10.4324/9780203819852

Messner, M. A. (1995). *Power at play: Sports and the problem of masculinity*. Beacon Press. https://doi.org/10.1249/00005768-199403000-00022

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded source book*. Sage.

Milton-Smith, J. (2002). Ethics, the Olympics and the search for global values. *Journal of Business Ethics*, *35*, 131-142. https://doi.org/10.1023/A:1013015331517

Olympic Charter. (2020*). International Olympic Committee.* www.olympic.org

Olympic Charter. (2021). *International Olympic Committee*. www.olympic.org

Patton, M. Q. (2014). *Qualitative research & evaluation methods: Integrating theory and practice*. Sage publications.

Sarı, İ., & Şahin, D. (2021). Is the athlete's family harmful like a tick or safe like a castle? Metaphorical perceptions of coaches towards the athletes' families. *Journal of Türkiye Clinics Sports Sciences, 13*(1),110-23. https://doi.org/10.5336/sportsci.2020-79430

Sartre, J, P. (2007). *Existentialism is a Humanism*. Yale University Press. https://doi.org/10.12987/9780300242539

Smith, R. E., & Smoll, F. L. (2011). Cognitive–behavioral coach training: A translational approach to theory, research, and intervention. In J. K. Luiselli & D. D. Reed (Eds.), *Behavioral sport psychology: Evidence-based approaches to performance enhancement* (pp. 227-248). Springer. https://doi.org/10.1007/978-1-4614-0070-7_14

Şahan, H.H., & Uyangör, N. (2021). *Sample selection in scientific research.* In M. Çelebi (Edts.), *Qualitative research methods* (pp.132). Pegem Academia.

Tomlinson, A. (2005) The Commercialization of the Olympics: Cities, corporations, and the olympic commodity. In K. Young and K. B. Wamsley (eds) *Global olympics: Historical and sociological studies of the modern games* (pp. 179-200). Elsevier.

Toprak, E. (2021). *Phenomenology.* In *M. Çelebi (Edt.), Qualitative research methods* (pp. 31-36), Seçkin.

UNESCO. (2016). *The Role of Sport and Culture in Promoting Peace*. UNESCO Publishing.

Yanar, N., & Akpınar, Ö. (2023). Metaphorical Perceptions of Female Academicians in the Glass Ceiling Syndrome. *Mediterranean Journal of Sports Sciences*, *6*(2), 507-520. https://doi.org/10.38021/asbid.1269776

Yuting, Z. (2023). Inheritance and enrichment: The Cultural heritage of Beijing Olympic Games. In *F. Hong, L. Li* (Edt.), Routledge handbook of sport in China, (pp. 329-336). https://doi.org/10.4324/9781003204015-48