ATATURK
UNIVERSITY
PUBLICATIONS

Research in Sport Education and Sciences

Formerly:
Journal of Physical Education and Sport Sciences Official journal of Atatürk University Faculty of Sport Sciences
Volume 27 • Issue 1 • March 2025

EISSN 2822-3527
https://dergipark.org.tr/en/pub/rses

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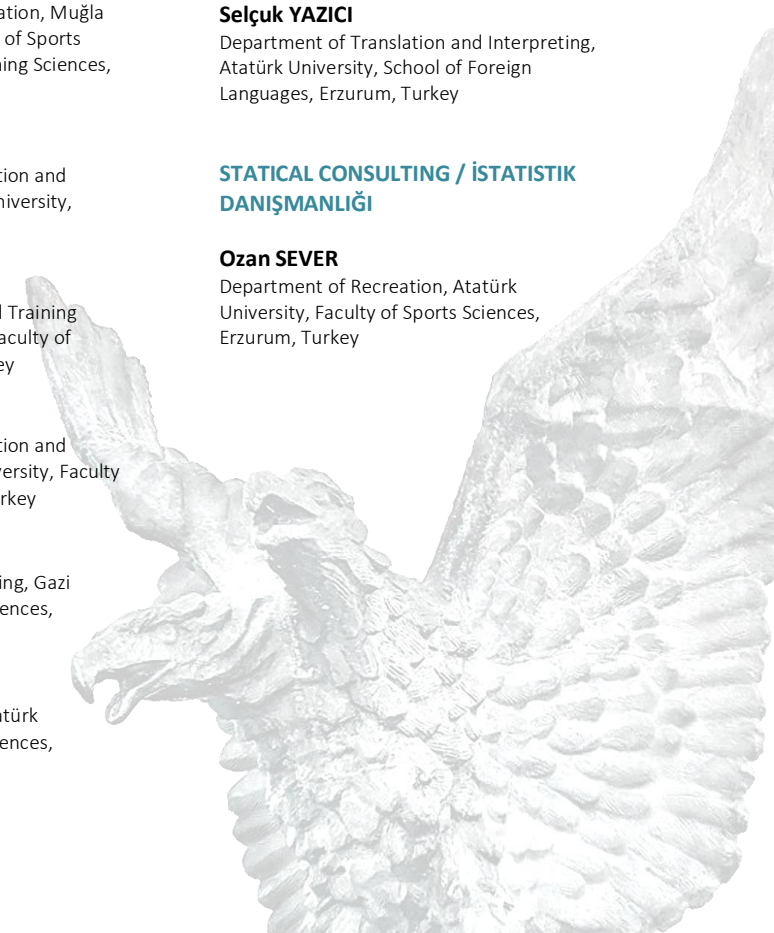

Research in Sport Education and Sciences

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Research in Sport Education and Sciences is a peer reviewed, open access, online-only journal published by the Atatürk University.

Research in Sport Education and Sciences is a quarterly journal published in English and Turkish in March, June, September, and December.

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Previous Title (1999-2021)

Atatürk Üniversitesi Beden Eğitimi Spor ve Yüksekokulu Dergisi/Journal of Physical Education and Sport Sciences
ISSN: 1302-2040

Current Title (2022-...)

Research in Sport Education and Sciences
EISSN: 2822-3527

Abstracting and Indexing

Research in Sport Education and Sciences is covered in the following abstracting and indexing database;

- Web of Science - Emerging Sources Citation Index (ESCI)
- Scopus
- DOAJ
- EBSCO
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The scope of the journal includes, but is not limited to, movement and training sciences, physical education and sport teaching sciences, recreation, health sciences in sport, management sciences in sports, and psycho-social sciences in sport.

The target audience of the journal includes sport professionals, amateurs and researchers who are interested or working in physical education and sports sciences, and sports medicine physicians.
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Publisher: Atatürk University
Address: Atatürk University, Yakutiye, Erzurum, Turkey
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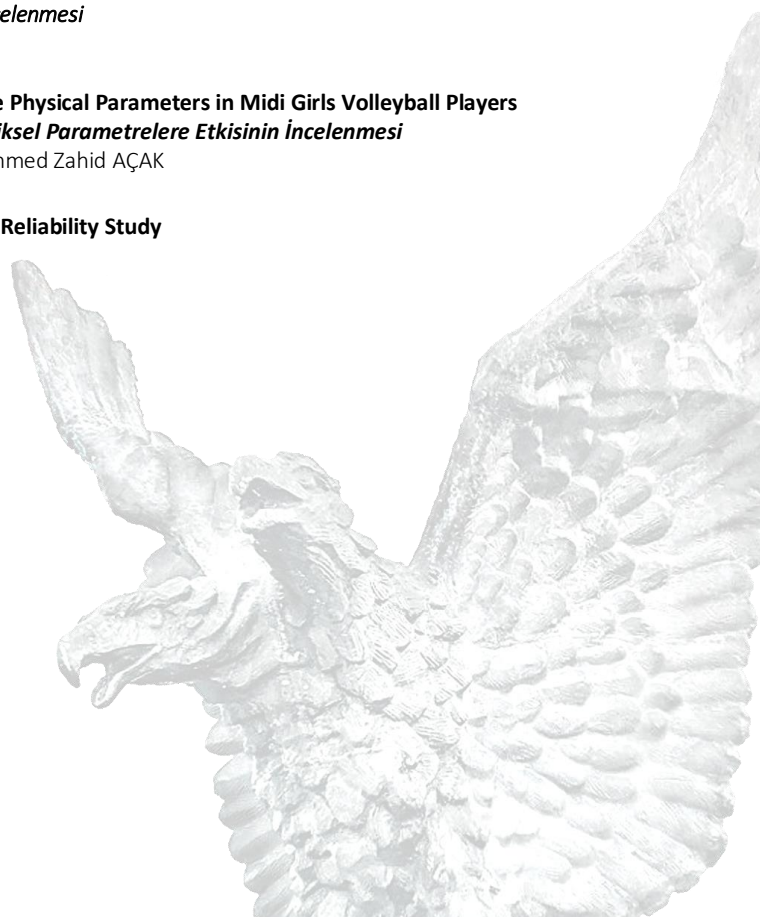

ATATÜRK ÜNİVERSİTESİ YAYINLARI
ATATURK UNIVERSITY PUBLICATIONS

Research Article *Araştırma Makalesi* DOI: 10.62425/rses.1476438

Indirect Effects of Relationship Quality on Organizational Commitment among Academics in Sports Sciences: The Mediating Roles of Psychological Empowerment and Organizational Cynicism

Spor Bilimleri Akademisyenleri Arasında İlişki Kalitesinin Örgütsel Bağlılık Üzerindeki Dolaylı Etkileri: Psikolojik Güçlendirme ve Örgütsel Sinizmin Aracı Rolleri

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ABSTRACT

This study examines the mediating role of psychological empowerment and organizational cynicism in the relationship between leader-member exchange (LMX) and organizational commitment among academics in sports science faculties in Turkey. Conducted as a cross-sectional survey with 405 participants (72.8% male, mean age=41.62) from various universities in Turkey, this research employed the PROCESS macro in SPSS to conduct a multiple mediation analysis. The findings revealed positive associations among the variables, particularly highlighting the direct impact of academics' LMX on organizational commitment. Additionally, the study identified a relative influence of organizational cynicism and empowerment on organizational commitment. Thus, it was concluded that relationship quality indirectly affects organizational commitment through these mediating factors. By examining the mediation processes between LMX and organizational commitment, this study contributes significantly to the existing literature. Moreover, the necessity for academic institutions to develop policies and programs designed to strengthen interactions between leaders and academics is emphasized. Furthermore, focusing on strategies to enhance trust and collaboration among employees and implementing measures to reduce organizational cynicism are essential. These measures include establishing transparent communication channels, promoting supportive leadership practices, and organizing activities to enhance employee participation. By adopting such measures, academic institutions can enhance employee commitment and foster a more productive work environment.

Keywords: Leader-member exchange (LMX), organizational commitment, psychological empowerment, organizational cynicism, academic institutions

ÖZ

Bu çalışma, Türkiye'deki spor bilimleri fakültelerindeki akademisyenler arasında lider-üye değişimi (LMX) ve örgütsel bağlılık arasındaki ilişkide psikolojik güçlendirme ve örgütsel sinizmin aracılık rolünü incelemektedir. Türkiye'deki çeşitli üniversitelerden 405 katılımcı (%72,8 erkek, ortalama yaş=41,62) ile kesitsel bir anket olarak yürütülen bu araştırma, çoklu aracılık analizi yapmak için SPSS'te PROCESS makrosunu kullanmıştır. Bulgular, değişkenler arasında pozitif ilişkiler olduğunu ortaya koymuş, özellikle akademisyenlerin LMX'inin örgütsel bağlılık üzerindeki doğrudan etkisini vurgulamıştır. Ayrıca, çalışma örgütsel sinizm ve güçlendirmenin örgütsel bağlılık üzerinde göreceli bir etkisi olduğunu tespit etmiştir. Böylece, ilişki kalitesinin bu aracı faktörler vasıtasıyla örgütsel bağlılığı dolaylı olarak etkilediği sonucuna varılmıştır. Bu çalışma, LMX ve örgütsel bağlılık arasındaki aracılık süreçlerini inceleyerek mevcut literatüre önemli bir katkı sağlamaktadır. Ayrıca, akademik kurumların liderler ve akademisyenler arasındaki etkileşimi güçlendirmek için tasarlanmış politika ve programlar geliştirmelerinin gerekliliği vurgulanmaktadır. Ayrıca, çalışanlar arasında güven ve işbirliğini artıracak stratejilere odaklanılması ve örgütsel sinizmi azaltacak tedbirlerin uygulanması elzemdir. Bu tedbirler arasında şeffaf iletişim kanallarının kurulması, destekleyici liderlik uygulamalarının teşvik edilmesi ve çalışanların katılımını artıracak faaliyetlerin düzenlenmesi yer almaktadır. Akademik kurumlar bu tür önlemleri benimseyerek çalışanların bağlılığını artırabilir ve daha üretken bir çalışma ortamını teşvik edebilir.

Anahtar Kelimeler: Lider-üye ilişkisi (LMX), örgütsel bağlılık, psikolojik güçlendirme, örgütsel sinizm, akademik kurumlar

Geliş Tarihi/Received 01.05.2024
Kabul Tarihi/Accepted 31.12.2024
Yayın Tarihi/Publication Date 25.03.2025

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Cite this article: Ulukan, M., Ersoy, A., & Nozohouri , H. (2025). Indirect effects of relationship quality on organizational commitment among academics in sports sciences: The mediating roles of psychological empowerment and organizational cynicism. *Research in Sport Education and Sciences, 27*(1), 1-11.

Educational Relevance and Implications

This study emphasizes the importance of academicians' commitment to their institutions and the quality of intra-organizational relationships in enhancing educational quality. Academicians serve as the cornerstone of institutions, such as universities, which specialize in educating future professionals. Therefore, the evaluation and enhancement of university environments are crucial in nurturing competent candidates capable of delivering high-quality education. The research demonstrates how the quality of relationships among academicians influences their commitment to the institution. The study demonstrates that academicians who actively promote their institutions and foster strong relationships play a pivotal role in fostering academic development. Furthermore, the study elucidates how organizational cynicism indirectly impacts organizational commitment. This phenomenon, though unexpected in work environments, is prevalent in education-focused institutions like universities, where personal sacrifices are often demanded. Despite educators' dedicated efforts to provide quality education, the lack of egalitarian leadership in the empowerment process or insincere relationships can contribute to intra-organizational cynicism. However, heightened commitment among academicians exhibiting organizational cynicism can facilitate their attainment of desired rewards, such as accolades and promotions, within a limited timeframe. Hence, enhancing the quality of Leader-Member Exchange (LMX) is imperative. Within the organizational context, management's change strategy plays a crucial role in effecting successful transformations. A robust LMX enhances the efficiency of educational institutions, like universities, and serves as a cornerstone for institutional growth and success. The establishment of positive and goal-oriented relationships between managers and subordinates serves to motivate employees to engage with the institution and enhance their performance in educational settings. This strengthens the presence of universities, ensures the cultivation of a better-educated workforce, and nurtures subject matter experts for the future.

Introduction

In today's context, personnel working in many public institutions increasingly hold appreciable authority. However, factors such as remote work, knowledge-based tasks, and the evolving nature of work can influence academics' commitment to their institutions (Audenaert et al., 2017; De Vries et al., 2019; Walsh, 2016). This study aims to enhance our understanding of organizational commitment among academics working in Sports Science faculties. In the public sector, esteemed academics often have the freedom to pursue their own priorities and beliefs.

The presence of effective and attentive personnel in a university plays a critical role in ensuring the delivery of quality education. However, numerous factors affect organizational commitment. Employees' perceptions of their organization's support, psychological empowerment, and their leaders' commitment to common goals can contribute to increased organizational commitment (Allen, 2003). Therefore, the positive impact of leader-member exchange (LMX) on psychological empowerment and organizational commitment levels enables universities to offer higher-quality education.

The influence of leaders on their subordinates and the development of positive relationships between leaders and subordinates are essential for creating a conducive work environment. Leader-member exchange (LMX) reflects the degree of mutual respect and trust-based interaction between leaders and subordinates (Hsiung & Tsai, 2009). Employees in strong relationships exhibit higher levels of organizational commitment, decision-making flexibility, and contribution opportunities (Kraimer et al., 2001; Mittal & Dhar, 2015; Morrow et al., 2005; Wayne et al., 2002). Therefore, investigating the relationship between LMX and organizational commitment among academics is crucial.

Empowerment, defined as "providing power and authority," is associated with the delegation of power from upper management to lower management within an organization (Tulloch, 1993). Increased empowerment and authorization lead individuals to be more committed to their jobs, thereby fostering higher organizational commitment (Liden et al., 2000). Employees who perceive themselves as psychologically empowered demonstrate greater commitment to the organization. Therefore, as previously indicated, psychological empowerment can enhance the quality of education provided by university employees (Moye et al., 2005; Safari et al., 2011).

Organizational cynicism is defined as a lack of belief in the organization one works for and includes critical behaviors consistent with this belief (Dean et al., 1998). Individuals with high levels of organizational cynicism perceive the company as lacking integrity, honesty, and justice (Davis & Gardner, 2004). Therefore, organizational cynicism has a negative relationship

with organizational commitment (Barton & Ambrosini, 2012; Sanoubar & Bajestani, 2015; Yasin & Khalid, 2015). In line with this, the aim of this study is to identify factors influencing organizational commitment among academics working in Sports Science faculties and examine the relationships between these factors.

Methods

Design

This study adopts a correlational research design to investigate the relationships between independent, mediator, and dependent variables and their respective patterns. The research initially formulates theoretical explanations for value fit effects, employs survey methodology for data collection, and subsequently conducts intricate statistical analyses to generate empirical findings and test mediation hypotheses (Limpanitgul, 2009).

The survey serves as the primary data collection tool due to its suitability for examining and explaining relationships between structures, particularly causal links, within a deductive approach (Saunders et al., 2007). The survey was selected for its ability to efficiently gather data on multiple variables and is a preferred method for large-scale sampling. Two survey models were utilized: descriptive and relational. The descriptive model defined the research data and calculated descriptive statistics, including the number of samples, arithmetic mean, and standard deviation (Christensen et al., 2015). Correlational survey models were employed to determine the presence and extent of fluctuations between two or more variables (Fraenkel & Wallen, 2006; Karasar, 2015). The investigation utilized "Model 6" as the mediation model, examining the sequential mediating influence of psychological empowerment (PE) and organizational cynicism (OCy.) in the association between relationship quality (LMX) and organizational commitment (OC) (see Figure 1).

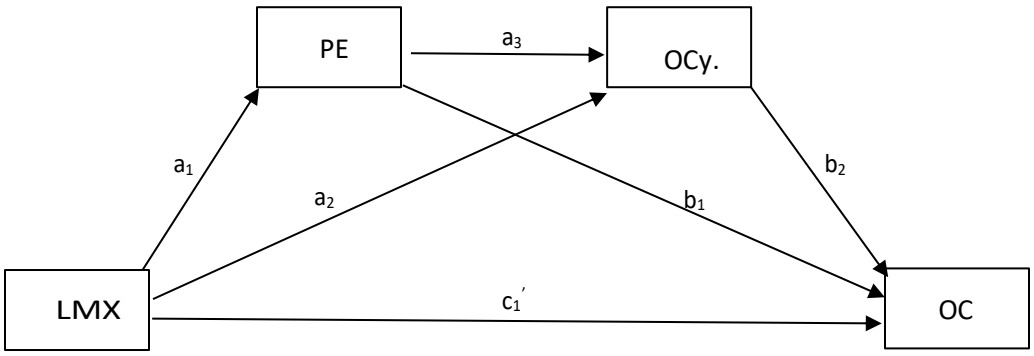


Figure 1.
Serial multiple mediation.

Participant

The study's sample comprised 410 academics voluntarily participating from the faculties of sports sciences in Turkey, working in fields including coaching, physical education and sports teaching, sports management, and recreation. Excluding five participants due to missing data, the final sample consisted of 405 academics aged 22-68 (M=41.62; SD=10.91), including 295 (72.8%) males and 110 (27.2%) females.

Procedures

Ethical standards were strictly adhered to throughout the research process, with approval granted by the Ethics Committee. Ethics committee approval was received for this study from the ethics committee of Kütahya Dumlupınar University (Date: February 17, 2022, Decision Number: 2022/02, Protocol No: E-87125). Academics completed online questionnaires sent to them and filled them out at their respective institutions. Participants were assured of confidentiality and informed that no answers were deemed right or wrong. Participation was voluntary, and no incentives were provided. Upon reviewing and approving the informed consent form, participants were instructed to answer basic demographic

questions and complete the scales provided. Verbal consent was obtained from all the participants.

Measures

LMX-7 Scale

The LMX-7 Scale, developed by Graen and Uhl-Bien in 1995, measures the quality of leader-member exchanges. Validity and reliability were established by Caliskan in 2015. This one-dimensional scale employs a five-point Likert-type format with seven items, ranging from 1 to 5 points. Scores indicate the level of manager-staff relationships, ranging from Very Low (7-14 points) to Very High (30-35 points). A higher score signifies a stronger and higher-quality connection between managers and subordinates. Cronbach's Alpha for the original scale was .85. Confirmatory Factor Analysis (CFA) demonstrated validity with CMIN=21.77, DF=9, p<.001, CMIN/DF=2.42, RMSEA=.05, CFI=.98, GFI=.98, and SRMR=.03. For this study, reliability was assessed with Cronbach's Alpha at .86.

Psychological Empowerment Scale

The validity and reliability study of Spreitzer's (1995) psychological empowerment scale was conducted by Surgevil et al. (2013). The scale comprises 12 statements and four sub-dimensions, graded on a 5-point Likert scale. While the sub-dimensions are self-evaluative, scores for each dimension can be obtained, and the total psychological empowerment score is obtained by aggregating all sub-dimension scores. High scores indicate a high perception of psychological empowerment. The original scale was deemed reliable based on results from the internal reliability analysis, as the factor dimensions in all constructs had internal reliability values above Cronbach α=0.70. Results from the DFA showed scale validity with CMIN=64.37, DF=40, p<.001, CMIN/DF=1.60, RMSEA=.03, CFI=.99, GFI=.97, and SRMR .01. For this study's reliability, Cronbach's Alpha value was .91.

Organizational Cynicism Scale

The thirteen-item scale, developed by Brandes et al. (1999), was adapted to Turkish culture by Karacaoglu and Ince (2012). As part of this adaptation, the organizational cynicism scale's three-dimensional structure, consisting of cognitive, affective, and behavioral dimensions, was reexamined. The dimensions were confirmed by the data collected from the Turkish sample. The study conducted an evaluation of the entire five-point Likert-type rating scale. The scale has a maximum score of 65 and a minimum score of 13. Its Cronbach Alpha Internal Consistency Coefficient is .91. The scale's validity was confirmed by the DFA analysis, with CMIN=111.45, DF=58, p<0.001, CMIN/DF=1.92, RMSEA=.04, CFI=.98, GFI=.96, and SRMR .04. The scale's reliability was also established, with a Cronbach's Alpha value of .93.

Organizational Commitment Scale

The Organizational Commitment Scale is widely used to measure employees' organizational commitment in both educational and business settings. The Turkish version of this scale, originally developed by Meyer et al. (1993), was adapted by Daglı et al. (2018). The scale contains three sub-dimensions -- affective commitment, continuance commitment, and normative commitment -- and a total of 18 items. For the purposes of this study, we considered the scores obtained from the entire scale. The maximum score achievable from the five-point Likert scale is 90, while its minimum score is 18. The Cronbach Alpha Internal Consistency Coefficient for the scale was computed as 0.88. The scale's validity was assessed based on DFA results that indicated CMIN=294.11, DF=108, p<.001, CMIN/DF=2.72, RMSEA=.06, CFI=.93 GFI=.92, and SRMR .07. The study's reliability was also evaluated, and Cronbach's Alpha was found to be .86.

Statistical Analysis

The data for this investigation was processed utilizing SPSS 25.0 (IBM SPSS Corp., Armonk, NY, USA) for data processing, statistical analysis and correlation testing, HAYES Process v4.1 for determining the roles of serial mediating variables, and AMOS 24.0 for confirmatory factor analysis.

The survey responses of 405 participants were evaluated to examine their distribution to the scales. Initially, frequencies

were tabulated, followed by an examination of skewness and kurtosis normality test and validity and reliability analyses of the scales. The normality analysis results for the scales used in this study (measured by skewness and kurtosis) indicate that the LMX-7 scale had a skewness value of -.389 and a kurtosis value of -.263, while the PE scale had a skewness value of -.575 and a kurtosis value of .354. As for the OCy scale, it had a skewness value of -.554 and a kurtosis value of .063, while the OC scale showed a skewness value of -.054 and a kurtosis value of 1.460. Tabachnick and Fidell (2013) indicated that skewness and kurtosis values between ±1.5 serve as indications of normality. The study employed parametric tests since the data exhibited normality with regard to distribution. Descriptive statistics, including means standard deviations, and correlations were analyzed to explore the data and relationships between variables. The study did not account for demographic factors such as gender, age, and department when testing the model. Regression tests demonstrated that these factors had little to no significant impact on outcome variables. Data analysis utilized HAYES bootstrap analysis to determine the mediating role.

Results

Recent studies have indicated that Structural Equation Modeling (SEM) is a suitable tool for testing mediation effects (Cheung & Lau, 2007). This study examined the serial mediating roles of psychological empowerment and organizational cynicism in the model using the bootstrapping method. The Bootstrap method efficiently decreases first-type errors in the use process and is particularly relevant for testing the mediation effects of experimental research with small sample sizes. This study employed the Bootstrap method to randomly select 5000 samples with 95% confidence intervals. The maximum likelihood method, a widely favored technique, was utilized to calculate the estimators.

Common method bias testing

The study collected data using four scales from the same individuals during the same period. Common method bias (CMB) concerns have been raised because correlations between two constructs were obtained from the same source. The scales differ in terms of their objectives and questions. Moreover, the scale's elements contain negative statements coded in reverse, which may also trigger CMB. CMB has been identified as a primary reason for inaccuracies in measurement (Podsakoff et al., 2012). Consequently, Harman's single-factor analysis (Harman, 1976) was employed to investigate CMB, which can arise from including multiple scales in the same survey and analyzing them simultaneously (Podsakoff et al., 2003). If the first factor of the scale varies by less than 50%, it is interpreted as the absence of CMB (Fuller et al., 2016; Podsakoff et al., 2003). In the analysis of the study, the variance value for one factor (27.376%) on the scale did not exhibit a significant change due to a CMB.

Descriptive statistics and bivariate correlations for the main variables

The study's variables were analyzed utilizing descriptive statistics and Pearson bivariate correlation (See Table 1). The average score for LMX was 23.67 (*Sd.*=6.03), 49.57 (*Sd.*=7.53) for PE, 44.80 (*Sd.*=10.39) for OCy., and 56.57 (*Sd.*=8.45) for OC. Pearson correlation coefficient enables pre-assessment of interdependent relationships between variables. As demonstrated in Table 1, there are significant and meaningful relationships between the variables. A highly significant positive correlation ($r_{(405)}$=.558, p< .01) was discovered between leader-member exchange (LMX) and organizational commitment (OC) in this study. Additionally, a moderately significant positive relationship ($r_{(405)}$=.326, p< .01) was found between LMX and OC. It was determined that there was a low level of positive correlation ($r_{(405)}$=.269, p< .01) between PE and OCy. Also, a low level of positive correlation ($r_{(405)}$=.166, p< .01) between PE and OC was observed. There was a moderately significant positive correlation ($r_{(405)}$=.362, p< .01) found between OCy and OC.

Table 1.
Descriptives statistics and bivariate correlations of variables

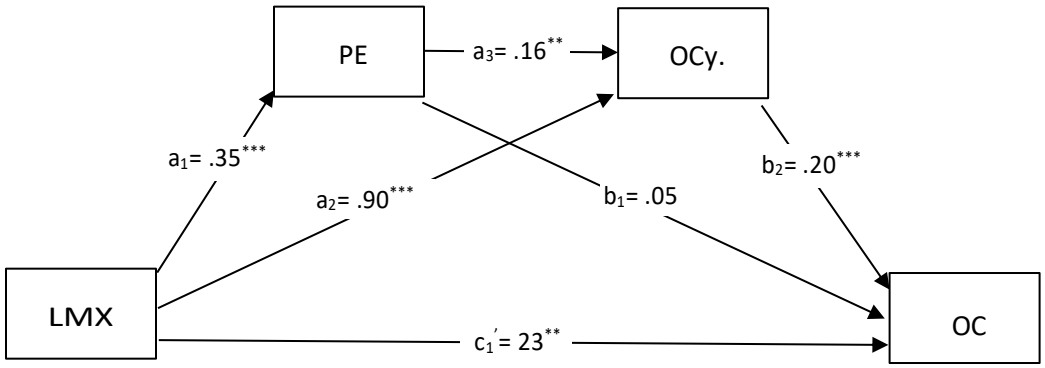
	M	*Sd.*	1	2	3	4
1. LMX	*23.67*	*6.03*	1			
2. PE	*49.57*	*7.53*	.285**	1		
3. OCy.	*44.80*	*10.39*	.558**	.269**	1	
4. OC	*56.57*	*8.45*	.326**	.166**	.362**	1

*Note: *p<.05, **p<.01, M=Mean, Sd.= Standard deviation, LMX=Leader-Member Exchange, PE=Phychological Empowerment, OCy.= Organizational Cynicism, OC=Organizational Commitment.*

Serial mediation effect testing

First, to reduce multiple linkages, all research variables underwent standardization before further analysis (Dearing & Hamilton, 2006). Then, the Hayes PROCESS macro (Hayes, 2013) was used to apply bootstrapping and obtain the bias-corrected confidence interval (CI). This was done to determine the serial mediating roles of psychological empowerment and organizational cynicism in the relationship between LMX and organizational commitment in academic settings. Model 6 of the PROCESS software, utilizing 5,000 resamples, was employed to conduct serial mediation analysis (refer to Figure 1). In addition, a detailed integrated model was developed to elucidate and anticipate the nature of academicians' relationships within the institution and their dedication to their workplace. This research extends the findings of previous studies employing the serial-mediated model. Figure 2 demonstrates the results of the serial mediating pathway model analysis, while Tables 2 and 3 present the mediation analysis findings.

As shown in Table 3 and Figure 2, researchers found that the indirect effect was 0.218, accounting for 47.72% (0.16) of the total effect. Additionally, a direct effect of 0.23 was observed in the relationship between relationship quality (LMX) and organizational commitment (OC). The 95% confidence interval ranged from 0.33 to 0.59. Specifically, the total indirect effect includes three different pathways. While LMX did not impact academics' dedication to the organization via psychological empowerment, it did have an effect through organizational cynicism and the sequential mediating roles of both psychological empowerment and organizational cynicism, as demonstrated by indirect consequences. Furthermore, indirect effects 2 and 3 accounted for 40.73% and 2.62% of the total effects, respectively. The 95% confidence intervals did not overlap with zero, which indicates that indirect effects 2 and 3 were significantly positive.



*p < .05;** p < .01;*** p < .001

Figure 2.
Serial multiple mediation pathway model predicting organizational commitment (OC)

Table 2.
The serial mediating role of PE and OCy. in relation between LMX and OC.

	PE (Mediator)				OCy. (Mediator)				OC (Dependent)			
	b	**se**	**β**	**%95 CI**	**b**	**se**	**β**	**%95 CI**	**b**	**se**	**β**	**%95 CI**
LMX	.35***	.06	.28***	[.239, .473]	.90***	.07	.57***	[.759, 1.049]	.23***	.07	.39**	[.084, .393]
PE					.16**	.05	.26**	[.049, .281]	.05	.04	.16	[-.052, .162]
OCy.									.01**	.00		[.003, .026]
	R^2 = .081, $F_{(0.772)}$=35.592, p=.000				R^2 = .325, $F_{(1.958)}$=96.744, p=.000				R^2 = .155, $F_{(2.230)}$=24.589, p=.000			

Notes: **p < .05;** p < .01;*** p < .001, LMX=Leader-Member Exchange, PE=Phychological Empowerment, OCy.= Organizational Cynicism, OC=Organizational Commitment, b = Unstandardised regression coefficients, , β = Standardised regression coefficients, se= Standard error, ***p<,001, %95 CI= %95 Confidence interval, R^2 = coefficients of determination, n=344 k=5000 Bootstrap sample.*

Table 3.
Bootsrap analysis of multiple mediation effects.

	Effect size	SE	Percantage of total effects	95% CI Lower limit	Upper limit
Total effects	0.457	0.066	100%	0.327	0.587
İndirect effects	0.238	0.079	52.08%	0.084	0.393
Total mediation effects	0.218	0.057	47.72%	0.106	0.334
LMX → PE → OC	0.020	0.021	4.37%	-0.024	0.059
LMX → OCy. → OC	0.187	0.082	40.73%	0.082	0.302
LMX → PE → OCy. → OC	0.012	0.006	2.62%	0.003	0.028

In Table 2, the evaluation was conducted on psychological empowerment and organizational cynicism, which acted as mediators between relationship quality (LMX) and organizational commitment. The findings indicated a significant indirect effect of relationship quality (LMX) on organizational commitment through psychological empowerment and organizational cynicism (b=.012, t=2.000, *p*<.005). Additionally, the study found that LMX has a direct and significant effect on organizational commitment when intermediaries are present (b=.238, t=3.030, *p*<.005). Psychological empowerment and organizational cynicism partially mediate the relationship between relationship quality (LMX) and organizational commitment.

When examining the non-standardized regression weights of the model, it was found that LMX explained psychological empowerment (b = 0.35), while organizational cynicism (b = 0.90) and organizational commitment (b = 0.23) (Figure 2 and Table 2). Based on the standardized regression weights, LMX had a greater impact on organizational cynicism (β = .57) compared to psychological empowerment (β = .28) and organizational commitment (β = .39). Psychological empowerment had stronger explanatory power for organizational cynicism (β = .26) than for organizational commitment (β = .16) (Table 2). Additionally, as indicated in Table 2, LMX significantly influenced psychological empowerment (b=.35, t=5.96, *p*=.000), organizational cynicism (b=.90, t=12.26, *p*=000), and organizational commitment (b=.23, t=3.03, P=.003). While the impact of psychological empowerment on organizational cynicism (b=.16, t=.05, *p*=.005) was significant, it did not have a significant effect on organizational commitment (b=.05, t=1.01, *p*>.05).

Discussion

This research examines the relationship between leader-member exchange (LMX) and organizational commitment among academics working in sports science faculties in Turkey. It also investigates the mediating role of psychological empowerment and organizational cynicism and how these relationships can be explained within an integrated model. While previous studies have largely confirmed the relationship between leader-member exchange and organizational commitment, this study contributes to the literature by providing a comprehensive treatment of the factors influencing organizational commitment.

For academic institutions, fostering quality relationships and fostering faculty commitment to their institutions are important in line with the general and specific objectives of higher education. High-quality communication, trust-based relationships, and institutional support contribute positively to the development of psychological empowerment. Employees who experience psychological empowerment generally exhibit higher job satisfaction and levels of organizational commitment, leading to better performance (Raub & Robert, 2013).

The analysis of the study indicates that when academics feel empowered and take on more active roles within their institutions, they are more likely to remain committed to their job tasks. This finding is consistent with numerous studies in the literature (Abdullah et al., 2015; Bhatnagar, 2005; Durrani et al., 2017; Leiter & Laschinger, 2006; Wall et al., 2005). It is observed that high relationship quality and psychological empowerment facilitate employee involvement in their work and enhance their self-perception of competence, thereby contributing to the meaningfulness of their work experiences. Nevertheless, it is important to note that psychological empowerment and LMX are fundamentally distinct variables (Harris et al., 2009). While psychological empowerment is associated with individual-level personal needs and internal motivations, LMX is more dependent on external factors and is defined as the exchange and support provided by supervisors (Liden et al., 2006). Empirical evidence supports the assertion that psychological empowerment has a positive impact on employees' organizational commitment (Aghaei & Savari, 2014; Avolio et al., 2004). Moreover, empirical evidence indicates that an individual's psychological state significantly affects outcomes such as change commitment, even in contexts where LMX is less important (Rizvi et al., 2020). In this context, the findings of the study underscore the significance of academic institutions

fostering psychological empowerment and ensuring that academics remain more dedicated to their professional responsibilities. Furthermore, external factors such as the quality of the relationship between the employee and their supervisor are seen to be effective in increasing employees' organizational commitment. Consequently, it is of paramount importance for leaders and managers to devise and implement effective strategies to empower their employees.

This study introduces a novel perspective to the existing literature by examining the mediating role of psychological empowerment and organizational cynicism in the relationship between leader-member exchange (LMX) and organizational commitment. The results indicate that psychological empowerment and organizational cynicism partially mediate the relationship between leader-member exchange (LMX) and organizational commitment. According to the findings, relationship quality not only directly promotes employee commitment but also indirectly influences commitment by increasing psychological empowerment and reducing cynical tendencies. This demonstrates the multifaceted impact of relationship quality on shaping organizational commitment. Firstly, the study by Jaiswal and Dhar (2016) suggests that low-quality leader-subordinate exchanges can negatively affect employee commitment levels. This finding underscores the complexity of the relationship between leader-member exchange (LMX) and organizational commitment, demonstrating the impact of LMX on commitment. Conversely, the study by Garg and Dhar (2016) indicates that employees' level of psychological empowerment strengthens the relationship between LMX and emotional commitment. This finding underscores the significant role of psychological empowerment in increasing employees' organizational commitment. These findings are consistent with those of Brunetto et al. (2010) and Liao et al. (2009), which indicate that relationship quality and psychological empowerment are important factors in promoting organizational commitment. Additionally, Durrani et al. (2017) indicate the importance of managers implementing practices aimed at empowering employees by delegating authority and providing greater autonomy, alongside efforts to minimize negative attitudes and behaviors. In conclusion, these studies provide an important perspective for understanding the complex relationship between relationship quality, psychological empowerment, and organizational commitment. In this framework, the development and implementation of strategies to empower employees are identified as a crucial step in increasing organizational commitment.

The findings of the study underscore the necessity of developing strategies that prioritize psychological empowerment and the significance of promoting ethical practices. Strong relationships established by employees with their leaders enhance organizational commitment while reducing organizational cynicism. In this context, it is crucial for managers to empower their employees and provide them with greater authority and autonomy to foster positive attitudes. However, adverse circumstances such as the transgression of ethical principles and organizational cynicism can diminish commitment and negatively impact workforce productivity. Consequently, the promotion of ethical practices and the conferral of greater authority and autonomy upon employees can be an efficacious strategy for augmenting commitment and mitigating organizational cynicism. Particularly among academics, the enhancement of trust and satisfaction within the institution can positively influence organizational effectiveness. The study results indicate that managers should prioritize the inculcation of ethical principles and the provision of authority and autonomy to employees. While these practices can facilitate the enhancement of commitment and workforce productivity, they may not realize their full potential in the absence of a reduction in organizational cynicism. Consequently, it is also important to address organizational cynicism, as these negative attitudes can have a detrimental impact on organizational effectiveness and employee commitment.

Conclusion and Recommendations

The intricate interplay between relationship quality, psychological empowerment, and organizational cynicism, as revealed by our study, underscores the necessity for leaders and managers within academic institutions to actively support their employees through effective psychological empowerment strategies. The pivotal role of employee empowerment in bolstering commitment to institutional goals underscores the importance of academic institutions investing in methodologies aimed at enhancing psychological empowerment. This investment may take the form of comprehensive leadership training initiatives and the implementation of programs designed to foster active employee participation.

Moreover, alongside efforts to bolster psychological empowerment, there is an equal need to cultivate an organizational culture grounded in ethical principles and practices while concurrently mitigating organizational cynicism. Research has consistently shown that cultivating robust relationships between employees and their leaders not only enhances organizational commitment but also serves to diminish organizational cynicism. In light of this, academic institutions must

take proactive measures to set ethical standards through the establishment of clear ethical codes and the enforcement of equitable workplace practices. Furthermore, the establishment of transparent communication channels and the promotion of supportive leadership practices are essential steps in reducing organizational cynicism within academic settings. By fostering an environment characterized by open communication and supportive leadership, institutions can effectively counteract the development of cynicism among employees.

In conclusion, the findings of our study underscore the critical importance of enhancing leadership strategies and psychological empowerment practices within academic institutions to cultivate a workforce characterized by heightened commitment and organizational effectiveness. It is of paramount importance to emphasise ethical practices and to afford employees greater authority and autonomy if this objective is to be achieved. The implementation of these recommendations has the potential to significantly enhance the working environments within academic institutions, thereby fostering a more dedicated and engaged workforce.

Etik Komite Onayı: Bu çalışma için etik komite onayı Kütahya Dumlupınar Üniversitesi'nden (Tarih: 17 Şubat 2022, Karar No: 2022/02, Protokol No: E-87125) alınmıştır.
Hasta Onamı: Çalışmaya katılan tüm katılımcılardan sözlü onam alınmıştır.
Hakem Değerlendirmesi: Dış bağımsız.
Yazar Katkıları: Fikir-M.U; Tasarım-M.U.; Denetleme-A.E., H.N.; Kaynaklar-M.U.; Veri Toplanması ve/veya İşlemesi-M.U., A.E.; Analiz ve/veya Yorum-M.U.; Literatür Taraması-M.U.; Yazıyı Yazan-M.U.; Eleştirel İnceleme-A.E., H.N.
Çıkar Çatışması: Yazarlar, çıkar çatışması olmadığını beyan etmiştir.
Finansal Destek: Yazarlar, bu çalışma için finansal destek almadığını beyan etmiştir.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Kutahya Dumlupinar University (Date: February 17, 2022, Decision Number: 2022/02, Protocol No: E-87125).
Informed Consent: Verbal consent was obtained from all the participants.
Peer-review: Externally peer-reviewed.
Author Contributions: Concept –M.U; Design-M.U.; Supervision-A.E., HN.; Resources-M.U; Data Collection and/or Processing-M.U., A.E.; Analysis and/or Interpretation-M.U.; Literature Search-M.U.; Writing Manuscript-M.U.; Critical Review-A.E.; Other-M.U., A.E., H.N.
Conflict of Interest: The authors have no conflicts of interest to declare.
Financial Disclosure: The authors declared that this study has received no financial support.

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ATATURK UNIVERSITY PUBLICATIONS

Research Article *Araştırma Makalesi* DOI: 10.62425/rses.1526877

Life Satisfaction and Subjective Well-Being on the Road to Happiness: An Application of Structural Equation Modeling

Mutluluğa Giden Yolda Yaşam Doyumu ve Öznel Zindelik: Bir Yapısal Eşitlik Modeli Uygulaması

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ABSTRACT

This study aims to examine the relationships between happiness, life satisfaction, and subjective vitality among student-athletes. Conducted using a correlational survey design, the research included a total of 400 students (149 female and 251 male; Mean age = 21.31 ± 2.32) enrolled in sports sciences programs across three different universities. The data collection tools utilized were the "Subjective Happiness Scale (SHS)," the "Subjective Vitality Scale (SVS)," and the "Life Satisfaction Scale (LSS)." The suitability of the data for analysis was assessed based on skewness and kurtosis values. Data analysis was performed using IBM AMOS V25 software (Chicago, USA), and the relationships between happiness, life satisfaction, and subjective vitality were tested through Structural Equation Modeling (SEM).
According to the results of the structural equation model, the path coefficients between vitality, life satisfaction, and happiness were found to be significant. In this context, life satisfaction explains 44% of subjective happiness, while subjective vitality accounts for 54% of. Based on this, it can be suggested that increasing individuals' levels of life satisfaction and subjective vitality may also enhance their levels of happiness.

Keywords: Student-athlete, subjective happiness and vitality, life satisfaction

ÖZ

Bu çalışma, sporcu öğrenciler arasında mutluluk, yaşam doyumu ve öznel zindelik arasındaki ilişkilerin ortaya konulması amacıyla gerçekleştirilmiştir. Araştırmada ilişkisel tarama yöntemi kullanılmış ve üç farklı üniversitede spor bilimleri alanında öğrenim gören toplam 400 öğrenci (149 kadın ve 251 erkek; Ortyaş = 21,31 ± 2,32) yer almıştır. Veri toplama aracı olarak "Öznel Mutluluk Ölçeği (ÖMÖ)", "Öznel Zindelik Ölçeği (ÖZÖ)" ve "Yaşam Doyumu Ölçeği (YDÖ)" kullanılmıştır. Verilerin analize uygunluğu çarpıklık ve basıklık değerleri üzerinden değerlendirilmiştir. Veriler, IBM AMOS V25 yazılımı (Chicago, ABD) kullanılarak analiz edilmiş ve mutluluk, yaşam doyumu ve zindelik arasındaki ilişkiler Yapısal Eşitlik Modeli (YEM) ile test edilmiştir. Yapısal eşitlik modeli sonuçlarına göre, zindelik ve yaşam doyumu ile mutluluk arasındaki yol katsayıları anlamlı bulunmuştur. Buna göre, yaşam doyumu, öznel mutluluğun %44'ünü, öznel zindelik ise öznel mutluluğun %54'ünü açıklamaktadır. Buradan hareketle, bireylerin yaşam doyumu ve öznel zindelik düzeylerinin artırılmasının, mutluluk düzeylerini de artırabileceği ifade edilebilir.

Anahtar Kelimeler: Öğrenci sporcu, öznel mutluluk ve zindelik, yaşam doyumu

Geliş Tarihi/Received 02.08.2024
Kabul Tarihi/Accepted 05.02.2025
Yayın Tarihi/Publication Date 25.03.2025

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Cite this article: Samoğlu, M.B., Yazıcı, Ö.F., Paktaş, Y., & İşbilir E. (2025) Life satisfaction and subjective well-being on the road to happiness: An application of structural equation modeling. *Research in Sport Education and Sciences, 27*(1), 12-23.

Introduction

For thousands of years, experts from various fields such as theology, philosophy, psychology, and medicine have endeavored to uncover the primary factors that influence human behavior. Their findings consistently point to a single underlying concept: happiness (Diener, 1984). Furthermore, human beings have consistently sought happiness and striven to achieve it since the advent of history (Gilman et al., 2000). Accordingly, happiness is regarded as a foundational ideal of life (Anic & Toncic, 2013). Consequently, the concept of happiness has remained a topic of interest and has been subjected to analysis from a variety of disciplinary perspectives, including those of art, philosophy, and psychology. The scope, components, and other aspects of happiness, which have become the subject of considerable interest, have been examined in depth, and the conditions necessary to provide more happiness have been investigated (Cuğ, 2015). Happiness is a key area of interest within the field of positive psychology, with a growing body of evidence indicating its importance for mental health (Sheldon & Lyubomirsky, 2004). In this context, happiness is frequently explored in conjunction with related concepts such as subjective well-being, psychological well-being, life satisfaction, and positive emotions (Tuzgöl-Dost, 2006). These interconnected dimensions collectively contribute to a deeper understanding of individuals' overall mental and emotional health.

Despite its ancient history, the concept of happiness remains elusive and challenging to define (Marar, 2004; Bülbül & Giray, 2011). Happiness is broadly characterized by the experience of positive emotions and the minimization or absence of negative ones (Bajaj et al., 2018). Conversely, the literature presents a multitude of perspectives on the definition of happiness. For example, Democritus, who is regarded as the "happiness philosopher," defined happiness as the tranquility of the soul (Özgen, 1997). Diener (1984) describes happiness as encompassing both the cognitive and emotional dimensions of human life. This perspective emphasizes the frequent experience of positive emotions like confidence, pride, joy, and excitement, alongside the infrequent occurrence of negative emotions such as fear, anxiety, anger, and hatred. Additionally, attaining significant satisfaction in various life domains, including family, work, and career, is viewed as a key indicator of happiness.

An individual's happiness is directly correlated with the fulfillment of psychological needs that influence their outlook and perception of their life. The extent to which these needs are met determines whether the individual experiences happiness or unhappiness (İlhan & Özbay, 2010). In this context, investigations have been conducted into the nature of happiness, its determinants, and the possibility of achieving permanent happiness (Lyubomirsky et al., 2005). Research in the literature indicates that subjective happiness is positively associated with factors such as positive self-assessment (Cheng & Furnham, 2003), psychological well-being (Liem et al., 2010), self-concept (Diener, 2000), and life satisfaction (Garcia & Siddiqui, 2009). On the other hand, subjective happiness shows a negative relationship with depressive symptoms (Chaplin, 2006).

Life satisfaction, which is believed to be a significant determinant of happiness, is a fundamental aspect that individuals must consider in order to achieve a sense of fulfillment and purpose in their lives. Life satisfaction, as a cognitive component of subjective well-being, represents an individual's overall evaluation of their life based on their own criteria and standards (Diener, 1984). It is described as the outcome of comparing personal expectations with actual life conditions (Haybron, 2004). Additionally, evaluating one's life positively based on personal standards is considered a key component of happiness (Diener et al., 1985). Essentially, life satisfaction serves as a measure of the general improvement in life quality (Veenhoven, 1996).

One of the elements contributing to this process is the concept of "wellness," which is considered to be related to happiness. According to self-determination theory, subjective vitality is a fundamental concept in positive psychology and serves as a key predictor of both subjective happiness and well-being (Akın, 2012). Subjective vitality represents a positive emotional state and manifests itself through subjective experiences such as being full of energy and a sense of vitality (Ryan & Frederick, 1997). According to another definition, wellness is defined as the effort of individuals to maintain a healthier and higher quality life by organizing their lives and adopting a holistic perspective on their whole life (W. Hoeger & S. Hoeger, 2012).

The term "wellness" can be defined as a process in which individuals make deliberate, conscious choices on a continuous basis to enhance the quality of their lives, rather than focusing on reaching a specific goal (Sulphey, 2014). Furthermore, there is a correlation between fitness and the mitigation of the effects of aging, the prevention of disease, and an enhanced sense

of self-worth (Pilzer, 2007). Subjective well-being is defined as a state of positive mental energy and refers to individuals who are lively, cheerful, stimulated, energetic, and dynamic. This state is derived from internal resources (Fini et al., 2010). Studies on subjective well-being reveal a negative relationship between this concept and factors such as depressive symptoms (Niemiec et al., 2006), internet addiction (Akın, 2012), anxiety, negative emotions, an external locus of control, and emotional instability (Ryan & Frederick, 1997). Furthermore, it has been linked to instability, physical pain (Ryan & Frederick, 1997), and psychological distress (Salama-Younes, 2011). Conversely, it has been associated with positive outcomes such as subjective happiness, social, emotional, psychological well-being, and life satisfaction (Akın, 2012).

Relationship between Happiness, Satisfaction with Life and Subjective Well-Being

The experience of positive emotions, such as hope, joy, and trust, on a frequent basis throughout one's life is indicative of a state of happiness. Conversely, the experience of negative emotions, such as sadness, hatred, despair, and anger, is indicative of a state of unhappiness. The term "happy" is used to describe individuals who are satisfied with their work, marriage, and health. Therefore, happy people differ from unhappy people in terms of their life experiences (Eryılmaz, 2011; Honça & Çetinkaya, 2017).

The extant literature indicates that a number of factors, including self-actualization, life satisfaction, positive body perception, positive affect, self-esteem, perceived physical competence, extroversion, and motivation, are positively correlated with subjective vitality (Balaguer et al., 2011; Ryan & Frederick, 1997). Subjective vitality plays a regulatory role in the mechanism of self-control, thus assisting individuals in identifying effective solutions to relational problems and in behaving in a manner that is not dependent on external controls (Ryan & Frederick, 1997). Furthermore, individuals with high levels of vitality demonstrate positive performance in various domains, including sense of worth, sensitivity, logical beliefs, identity, intellectual stimulation, self-care, eating habits, sports, stress management, job satisfaction, hobbies, forming friendships, and romantic relationships (Myers et al., 2000). Bostic, Rubio and Hood (2000) suggest that individuals with higher subjective vitality tend to be more energetic and attentive in their activities. Ryan and Frederick (1997) contend that individuals who maintain good physical fitness are more resilient to stress and experience better mental health, which in turn enhances their overall quality of life, leading to greater life satisfaction and subjective happiness.

In summary, a review of the general findings from studies on subjective happiness, life satisfaction, and subjective vitality highlights a link between life satisfaction and subjective vitality. This relationship could play a role in enhancing subjective happiness. The aim of this study is to examine the relationships among happiness, life satisfaction, and subjective vitality, with a particular focus on uncovering potential connections among university students. Given that university students represent the highest-risk group in terms of mental disorders in our country (Doğan, 2008). A number of studies have demonstrated that university students display a range of symptoms associated with psychological disorders (Koç & Polat, 2006). The influence of biological, psychological, and social changes can result in difficulties for students in academic, familial, and social contexts (Li et al., 2010). Such changes typically entail a challenging process and may negatively impact students' psychological well-being, leading to feelings of unhappiness (Gündüz, 2013). Moreover, a multitude of personal, social, academic, and career-related challenges encountered during the university years have the potential to negatively impact individuals' perceptions of happiness and life satisfaction (Özbay et al., 2012).

Every society in the world needs a young population with high levels of subjective well-being, whose basic needs are met and who experience happiness in their lives (Gündoğdu & Yavuzer, 2011). The university, where the youth of tomorrow will be shaped, constitutes an environment that induces stress and anxiety (Çağır & Gürgân, 2010). Therefore, during their university life, where they prepare for adulthood and their careers, it is important for university students to develop into individuals who can cope with their problems, engage in active participation, communicate effectively, be aware of factors that protect both their internal and external psychological health, maintain their well-being, establish fulfilling relationships in their careers and family lives, nurture hopes for the future, and utilize these for achieving their goals. This is significant not only for society but also for the individuals themselves (Gürgân, 2014).

As seen from the theoretical foundations and scientific research findings in the literature, happiness, vitality, and life satisfaction emerge as important areas to focus on in terms of individuals' ability to overcome the negative factors they encounter in life and adopt a more positive outlook. In the fast-paced flow of time, maintaining happiness despite the

challenges faced concerns all of humanity, and it is particularly relevant to student-athletes. Building on this significance, this research aims to explore the relationships between subjective happiness, life satisfaction, and vitality among student-athletes.

Methods

Research Model

This research utilized the relational survey method to examine the interrelationships between subjective happiness, life satisfaction, and subjective wellness among student-athletes. The purpose of the research models is to explore potential cause-and-effect relationships and the connections between these variables (Fraenkel et al., 2012). Structural equation modeling (SEM) will be used to test the relationships among happiness, life satisfaction, and wellness. SEM integrates factor analysis and regression analysis, allowing for a comparison between the predicted covariance matrix from the theoretical model and the observed data to assess its fit (Hox & Bechger, 1995). The study's model and hypotheses are outlined below.

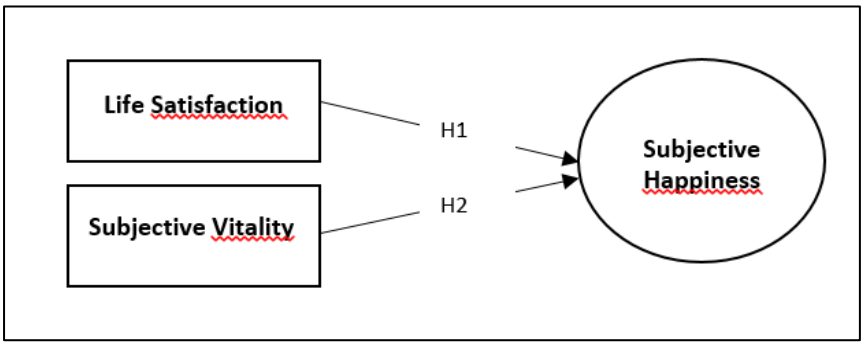

Figure 1. *Research model*

H1. Life satisfaction positively affects happiness.
H2. Subjective well-being positively affects happiness

Research Group

The study group consisted of a total of 400 university students (Mage = 21.31 ± 2.32), including 149 females and 251 males, who were sampled using the convenience sampling method. The students were enrolled in three different sports sciences faculties during the 2023-2024 academic year. The demographic characteristics of the research group are presented in the table below (Table 1).

Table 1.
Distribution of Demographic Information on the Research Group

Variables	Groups	N	%
Gender	Female	149	37.3
	Male	251	62.7
Class	1st grade	116	29.0
	2nd grade	125	31.3
	3rd grade	71	17.8
	4th grade	88	22.0

Data Collection

In the study, the data collection technique used was the survey method. The survey method involves asking the same set of questions to a large number of individuals either via phone, email, or in person (Büyüköztürk, et al., 2012). Before the implementation of the data collection tools, the necessary permissions were obtained, and then the tools were administered to the sample group both face-to-face and via Google Forms. Before each scale was filled out by the athlete, participation was based on voluntary consent, and the rules that needed to be followed were clearly outlined. The completed survey forms were reviewed to ensure the validity of the results. Forms with incomplete or incorrect responses, or those with repeated coding errors, were excluded from the study. The valid and accepted forms were coded and transferred to a computer environment for analysis, where the necessary statistical analyses were conducted, and the process was monitored.

Data Collection Tools

The Life Satisfaction Scale (LSS)

The Life Satisfaction Scale (LSS) is a tool designed to assess an individual's overall satisfaction with life. Initially developed by Diener et al. (1985) and later adapted to Turkish by Dağlı & Baysal (2016), it measures how individuals evaluate their life in terms of general satisfaction. The scale consists of five items, rated on a five-point Likert scale. The Cronbach's Alpha internal consistency coefficient of the scale was determined to be 0.88, and the test-retest reliability was found to be 0.97. There are no reverse-scored items, and the total score ranges from 5 to 35, with higher scores indicating greater life satisfaction.

The Subjective Vitality Scale (SVS)

The happiness levels of the student-athletes were assessed using the Subjective Well-Being Scale (SVS), originally developed by Ryan and Frederick (1997) and later adapted to Turkish by Akın et al. (2012). This scale uses a seven-point Likert format (1 = not valid at all, 7 = completely valid) and consists of seven items, with the second item being reverse scored. Scores range from a minimum of 7 to a maximum of 49, with higher scores indicating greater subjective well-being. The scale demonstrated a Cronbach's α reliability coefficient of .84, and the corrected item-total correlations ranged from .48 to .74.

The Subjective Happiness Scale (SHS)

The Subjective Happiness Scale (SHS) is a psychometric instrument designed to assess an individual's subjective well-being. Developed by Lyubomirsky and Lepper (1999) and later adapted into Turkish by Akın and Satıcı (2011), the scale uses a seven-point Likert format (1 = not happy at all, 7 = very happy) and includes four items. The fourth item is reverse scored due to its negative wording. The scale produces scores ranging from 4 to 28, with higher scores indicating higher subjective happiness. The scale demonstrated a Cronbach's α reliability coefficient of .86, with item-test correlations ranging from .55 to .76.

Data Analysis

After data collection, the data were imported into SPSS-23 and AMOS-23 for analysis. Descriptive statistics were used to examine participants' demographic characteristics. Skewness and kurtosis values were checked, confirming that the data met the assumptions for parametric testing as per Tabachnick and Fidell (2013) (Table 2). The internal consistency of the scales was evaluated using Cronbach's alpha. Structural equation modeling (SEM) was then used to test the causal relationships between the variables, which involved evaluating the measurement model, performing path analysis, and assessing the model's fit.

Ethics of the Research

Ethics committee approval was received for this study from the ethics committee of Gümüşhane University Scientific Research and Publication Ethics Board (Date: March 27, 2027, Decision Number: 78, Protocol No: E-95674917-108.99-245422. Verbal consent was obtained from all the participants.

Results

Table 2.
Distribution of Scale Scores (LSS-SVS-SHS)

Scales	Mean	Sd	Skewness	Kurtosis	C.Alpha
Life Satisfaction Scale (LSS)	2.74	0.81	-0.14	-0.43	0.84
Subjective Vitality Scale (SVS)	3.95	1.33	0.10	-0.27	0.91
Subjective Happiness Scale (SHS)	3.81	0.47	0.41	-0.34	0.85

The mean scores for the participants on the scales were as follows: LSS (2.74), SVS (3.95), and SHS (3.81), respectively. The skewness and kurtosis values ranged from -2 to +2, indicating that the data were normally distributed (George & Mallery, 2016). Additionally, the scales exhibited high to very high reliability.

Table 3.
Pearson Correlation Analysis Results for Scale Scores

	LSS	SVS	SHS
Life Satisfaction Scale (LSS)	1		
Subjective Vitality Scale (SVS)	0.49**	1	
Subjective Happiness Scale (SHS)	0.49**	0.61**	1

**p<.01

The Pearson correlation analysis revealed moderately positive and statistically significant relationships between the LSS, SVS, and SHS scores (p< .01).

Table 4.
Goodness of Fit Values for the Structural Equation Model

Model Fit Indices	Values	Reference Values
χ2/df	3.51	Excellent ≤ 3 ≤ **Good** ≤ 5
CFI	0.93	Excellent ≥ 0.95 ≥ **Good** ≥ 0.90
GFI	0.91	Excellent ≥ 0.95 ≥ **Good** ≥ 0.90
NFI	0.91	Excellent ≥ 0.95 ≥ **Good** ≥ 0.90
TLI	0.92	Excellent ≥ 0.95 ≥ **Good** ≥ 0.90
RMSEA	0.07	Excellent ≤ 0.05 ≤ **Good** ≤ 0.08

Notes: Chi-square (χ2), Degrees of freedom (df), Comparative fit index (CFI), Goodness fit index (GFI), Normalized fit index (NFI), Unscaled fit index (TLI), Root mean square error of approximation (RMSEA)

Upon evaluating the goodness of fit values for SEM, the initial results were as follows: χ^2/df = 3.82, CFI = 0.92, GFI = 0.89, NFI = 0.90, TLI = 0.91, and RMSEA = 0.084. Since the GFI and RMSEA values were near the threshold for acceptability, adjustments were made to improve these values and bring them within the desired range. After modifications, the re-evaluated model showed CFI = 0.93, GFI = 0.91, NFI = 0.91, TLI = 0.92, and RMSEA = 0.07, all of which fell within the acceptable fit range (Schermelleh-Engel et al., 2003; Sun, 2005; Iacobucci, 2010).

In the research, a two-stage approach was employed for the testing of structural equation models. Initially, the measurement models of the models were evaluated (Table 5, Figure 2), and subsequently, the structural models were assessed (Figure 3).

Table 5.
Testing the measurement model

Measure	Path	Faktor	β 0	β 1	S.E.	C.R.	*p*
LSS1	**<---**	LSS	0.76	1.30	0.13	10.30	**<.01**
LSS2	**<---**	LSS	0.77	1.14	0.11	10.33	**<.01**
LSS3	**<---**	LSS	0.79	1.35	0.13	10.51	**<.01**
LSS4	**<---**	LSS	0.75	1.11	0.11	10.26	**<.01**
LSS5	**<---**	LSS	0.54	1			
SVS1	**<---**	SVS	0.76	0.79	0.04	19.10	**<.01**
SVS2	**<---**	SVS	0.84	0.98	0.04	22.84	**<.01**
SVS3	**<---**	SVS	0.72	0.87	0.05	17.31	**<.01**
SVS4	**<---**	SVS	0.79	0.89	0.04	20.20	**<.01**
SVS5	**<---**	SVS	0.73	0.82	0.05	17.77	**<.01**
SVS6	**<---**	SVS	0.60	0.67	0.05	13.29	**<.01**
SVS7	**<---**	SVS	0.89	1			
SHS1	**<---**	SHS	0.85	1.05	0.06	18.65	**<.01**
SHS2	**<---**	SHS	0.84	1.07	0.06	18.42	**<.01**
SHS3	**<---**	SHS	0.59	0.77	0.06	12.11	**<.01**
SHS4	**<---**	SHS	0.81	1			
SEM							
SHS	<---	SVS	0.50	0.54	0.06	8.29	**<.01**
SHS	<---	LSS	0.29	0.44	0.09	5.02	**<.01**

LSS: Life satisfaction scale, SVS: Subjective vitality scale, SHS: Subjective happiness scale, β0: Standard coefficients, β1: Non standard coefficients.

As evidenced in Table 5, the path coefficients associated with all items pertaining to life satisfaction, subjective vitality, and subjective happiness were found to be statistically significant.

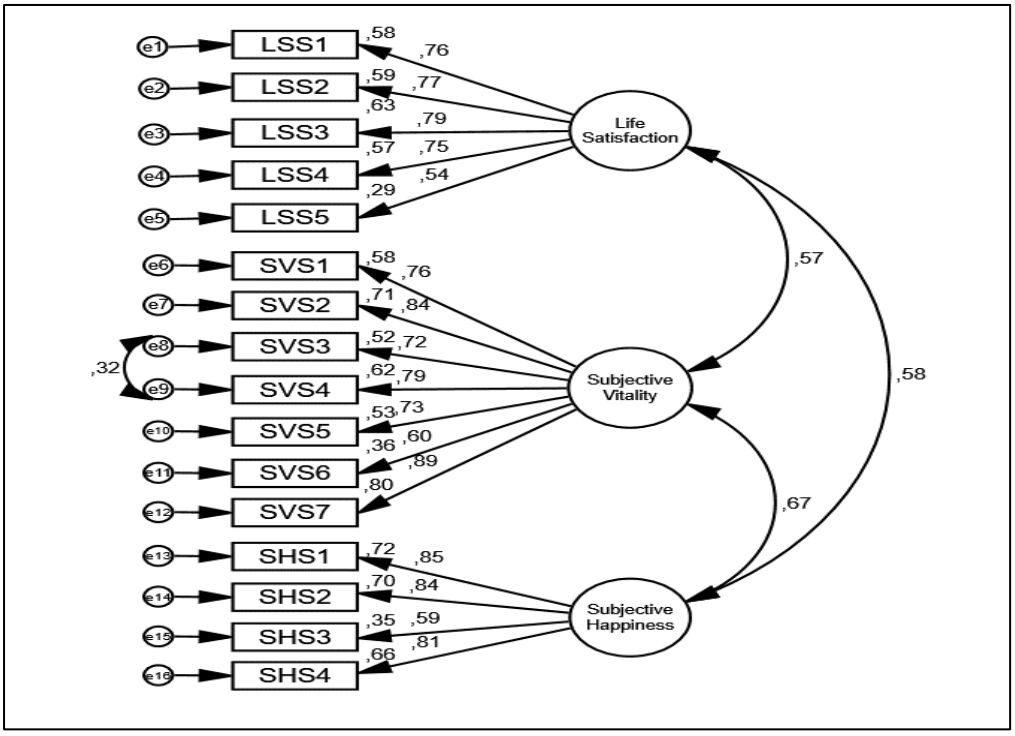

Figure 2. *Standardized path coefficients*

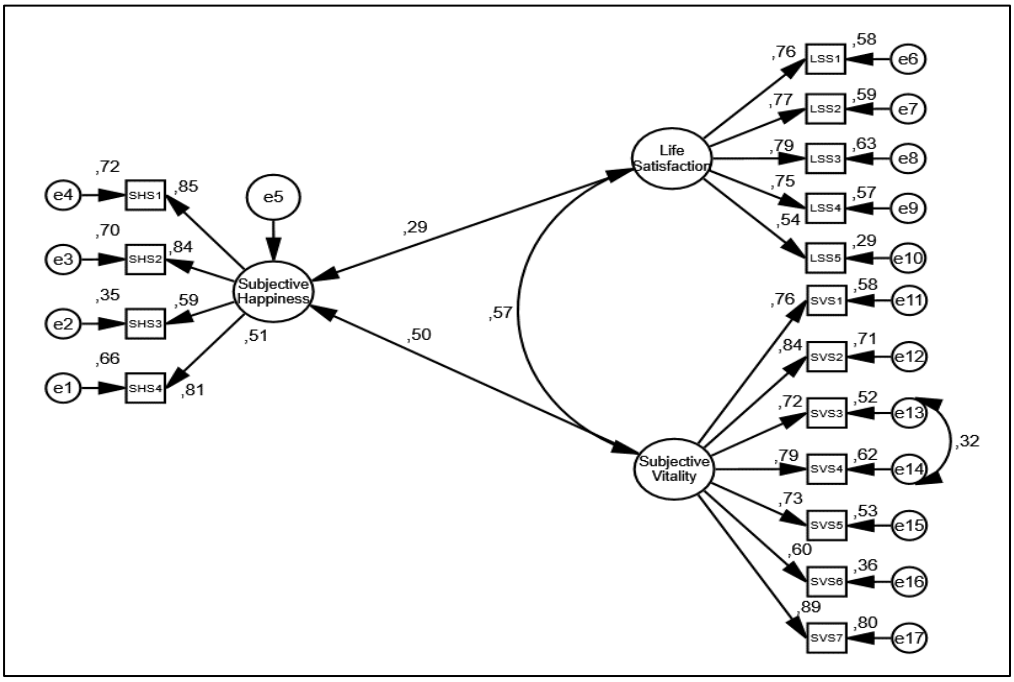

Figure 3. *Path Analysis of the Relationship between SHS-LSS-SVS*

The factor loadings and results from the model assessing the relationships between subjective happiness, subjective vitality, and life satisfaction are displayed in Figure 2. The SEM results show a statistically significant path coefficient between vitality and happiness (β1 = 0.54, *p* = .01), confirming hypothesis H1. Additionally, the path coefficient between life satisfaction and happiness was also significant (β1 = 0.44, *p* = .01), supporting the confirmation of hypothesis H2. These findings suggest that both life satisfaction and subjective vitality have a positive impact on, and are significant predictors of, subjective happiness.

Discussion

The aim of this study was to assess a theoretically grounded model that could enhance the quality of life for young individuals, who represent the future generation. The research focused on exploring the relationships between life satisfaction, subjective fitness, and subjective happiness among student-athletes enrolled in sports science programs. The findings indicated that both life satisfaction and subjective fitness directly influence subjective happiness and serve as important predictors of happiness.

This study found that life satisfaction is a significant predictor of subjective happiness among students in the Faculty of Sport Sciences, thus confirming the initial hypothesis of the study. Similarly, research by Nedim-Bal and Gülcan (2014) on university students from different academic disciplines identified a strong positive relationship between happiness and life satisfaction. Likewise, Özavci et al., (2022) observed a significant positive association between these variables in their study on private sector employees. In their study with university students living in Pakistan, Malik and Sajjad (2022) found significant positive relationships between life satisfaction and happiness. A substantial body of domestic and international literature has documented a positive correlation between happiness and life satisfaction (Chui & Wong, 2016; Demir & Murat, 2017; Gundelach & Kreiner, 2004; Garcia & Siddiqui, 2009). A synthesis of the findings from the present study with those from the existing literature suggests that life satisfaction plays a significant role in subjective happiness among students engaged in athletic pursuits.

Another outcome of the present study is that subjective fitness has a positive and significant impact on subjective happiness, thereby substantiating the second hypothesis. The study conducted by Uzunbacak & Akçakanat (2018) demonstrated that subjective fitness has a positive and significant effect on subjective happiness, and that subjective fitness positively and significantly predicts happiness. The study indicates that subjective fitness accounts for 27.1% of the variation in subjective happiness. Tunçkol's (2015) study demonstrates that fitness is a significant predictor of happiness, explaining

20% of the variance in happiness among participants. In another study (Yazıcı, 2015), it was demonstrated that there is a positive correlation between subjective happiness and subjective fitness. These findings demonstrate a significant correlation between fitness and happiness, indicating that as one variable increases, the other tends to do so in a corresponding manner. Individuals who experience a sense of physical and psychological vigor, pleasantness, and energy tend to exhibit higher levels of subjective happiness. Individuals with a high sense of subjective well-being are better able to cope with stressful situations and experience greater energy and vigor (Ryan & Frederick, 1997), which may lead to increased levels of subjective happiness (Akın & Akın, 2015). In other studies in the literature, the relationship between happiness and subjective fitness (Govindji & Lindley, 2007) and the positive and significant effect of subjective fitness on subjective happiness (Dolunay-Cuğ, 2022; Köse et al., 2019) have been demonstrated. As can be seen, the results of the current research support these findings and contribute to the existing literature on the subject.

Conclusion and Recommendations

The study concluded that subjective fitness and life satisfaction are significant predictors of subjective happiness, and that life satisfaction and subjective fitness play an important role in the subjective happiness of student athletes. These findings underscore the necessity of interventions aimed at enhancing subjective fitness and life satisfaction to promote individual and social well-being. Given the influence of subjective fitness and life satisfaction on subjective happiness, it is evident that these variables should be prioritized to enhance the quality of life of individuals. Research and practice initiatives in this domain will facilitate individuals' ability to lead happier and more fulfilling lives.

These findings contribute substantially to the existing literature on sports sciences, particularly for students engaged in the study of sports sciences. The subjective happiness, life satisfaction, and subjective vitality of young people, who are the future guarantors of the Turkish society, are of great importance for the continuity of healthy generations in terms of spiritual, social, emotional, intellectual, environmental, physical, and professional aspects. In this context, it is imperative to establish support mechanisms at both the individual and institutional levels to enhance the subjective happiness of students. Schools can facilitate the implementation of healthy life programs and psychological support services. Educational programs on life satisfaction and subjective vitality can be conducted for students in schools and universities. At the individual level, students can be directed to personal development seminars, which can prove beneficial for their overall well-being.

Future studies could benefit from exploring these relationships across different cultures and demographic groups to gain a more comprehensive understanding of the factors that influence subjective happiness, subjective vitality, and life satisfaction. This approach allows for a more nuanced understanding of the universality of these variables and their effects in different contexts. It is proposed that the aforementioned topics be associated with different independent variables. This research was conducted using quantitative data, and thus, the integration of qualitative data may provide a different perspective on the subject. Additionally, this research was conducted exclusively with sports science students, which could be considered a research limitation. It is recommended that such studies be generalized by applying them to university students enrolled in other departments or even to smaller study groups.

Etik Komite Onayı: Bu çalışma için etik komite onayı Gümüşhane Üniversitesi Bilimsel Araştırma ve Yayın Etiği Kurulu'ndan (Tarih: 27 Mart 2024, Sayı No:2024/3 Protokol No: E-95674917-108.99-245422 alınmıştır.
Hasta Onamı: Çalışmaya katılan tüm katılımcılardan sözlü onam alınmıştır.
Hakem Değerlendirmesi: Dış bağımsız.
Yazar Katkıları: Konsept – MBS., ÖFY; Tasarım - MBS., ÖFY., YP., Eİ; Denetim - MBS ÖFY., YP., Eİ; Kaynaklar - ÖFY., YP., Eİ; Veri Toplama ve/veya İşleme - MBS., ÖFY; Analiz ve/veya Yorum - ÖFY., YP; Literatür Taraması - YP., Eİ; Yazma - MBS., ÖFY., YP., Eİ; Eleştirel İnceleme – MBS., Eİ; Diğer – Eİ
Çıkar Çatışması: Yazarlar, çıkar çatışması olmadığını beyan etmiştir.
Finansal Destek: Yazarlar, bu çalışma için finansal destek almadığını beyan etmiştir.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Gümüşhane University Scientific Research and Publication Ethics Board (Date: March 27, 2027, Decision Number: 78, Protocol No: E-95674917-108.99-245422.
Informed Consent: Verbal consent was obtained from all the participants.
Peer-review: Externally peer-reviewed.
Author Contributions: Concept - MBS., ÖFY; Design - MBS., ÖFY., YP., Eİ; Supervision - MBS ÖFY., YP., Eİ; Resources - ÖFY., YP., Eİ; Data Collection and/or Processing - MBS., ÖFY; Analysis and/or Interpretation - ÖFY., YP; Literature Search - YP., Eİ; Writing Manuscript - MBS., ÖFY., YP., Eİ; Critical Review - MBS., Eİ; Other – Eİ
Conflict of Interest: The authors have no conflicts of interest to declare.
Financial Disclosure: The authors declared that this study has received no financial support.

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ATATÜRK ÜNİVERSİTESİ YAYINLARI
ATATURK UNIVERSITY PUBLICATIONS

Research Article *Araştırma Makalesi* DOI: 10.62425/rses.1527333

Investigation into Emotional Intelligence, Social and Emotional Loneliness and Digital Game Addictions of Mid-Adolescent Students

Orta Ergenlik Dönemindeki Öğrencilerinin Duygusal Zeka, Sosyal ve Duygusal Yalnızlık ile Dijital Oyun Bağımlılıklarının İncelenmesi

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ABSTRACT

The research was conducted to examine the emotional intelligence, social and emotional loneliness and digital game addictions of mid-adolescent students between the ages of 10-14. The research-designed personal information form, the "Social and Emotional Loneliness Scale" (SELSA) developed by DiTommaso et al. (2004) and adapted to Turkish by Çeçen (2007), and the "Trait Emotional Intelligence Questionnaire – Adolescent Short Form" (TEIQue-ASF) developed by Petrides and Furnham (2000) and adapted into Turkish by Ergin (2017) were used to collect data. Additionally, the "Digital Game Addiction Scale" (GAS) developed by Lemmens et al. (2009) and adapted into Turkish by Irmak and Erdoğan (2015) was utilized. The analysis of the data was performed in computer environment with SPSS-25 statistical package programs. Skewness and kurtosis tests were performed to determine the distribution of the data. Descriptive statistics were applied to normally distributed data, t-test was used for independent groups, and simple linear Pearson correlation analysis and multiple regression test were performed to determine the relationship between variables. In conclusion, it was founded that as the digital game addiction of middle-adolescent students increased, social and emotional loneliness increased and that emotional intelligence (5.4%) was at an explanatory level in predicting digital game addiction.

Keywords: Digital game, loneliness, emotional intelligence, students

ÖZ

Araştırma, 10-14 yaş aralığındaki ortaokul öğrencilerinin duygusal zeka, sosyal ve duygusal yalnızlık ile dijital oyun bağımlılıklarını incelemek amacıyla yapılmıştır. Araştırmacılar tarafından hazırlanan kişisel bilgi formu, DiTommaso ve ark. (2004) tarafından geliştirilen ve Çeçen (2007) tarafından Türkçeye uyarlanan "Sosyal ve Duygusal Yalnızlık Ölçeği" (SELSA) ve Petrides ile Furnham (2000) tarafından geliştirilen ve Ergin (2017) tarafından Türkçeye uyarlanan "Kişilik Duygusal Zekâ Ölçeği – Ergen Kısa Formu" (TEIQue-ASF) veri toplamak amacıyla kullanılmıştır. Ayrıca, Lemmens vd. (2009) tarafından geliştirilen ve Irmak ile Erdoğan (2015) tarafından Türkçeye uyarlanan "Dijital Oyun Bağımlılığı Ölçeği" (GAS) kullanılmıştır. Verilerin analizi, SPSS-25 istatistiksel paket programı ile bilgisayar ortamında gerçekleştirilmiştir. Verilerin dağılımını belirlemek için çarpıklık ve basıklık testleri yapılmış, normal dağılıma sahip verilere tanımlayıcı istatistikler uygulanmış, bağımsız gruplar için t testi kullanılmış ve ölçekler arasındaki ilişkiyi belirlemek için basit doğrusal Pearson korelasyon analizi ve çoklu regresyon testi yapılmıştır. Sonuç olarak, orta ergen öğrencilerinin dijital oyun bağımlılığı arttıkça sosyal ve duygusal yalnızlığın arttığı ve duygusal zekanın (%5,4) dijital oyun bağımlılığını açıklamada anlamlı bir yordayıcı olduğu belirlenmiştir.

Anahtar Kelimeler: Dijital oyun, yalnızlık, duygusal zeka, öğrenci

Geliş Tarihi/Received	02.08.2024
Kabul Tarihi/Accepted	21.02.2025
Yayın Tarihi/Publication Date	25.03.2025

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Cite this article: Güler, B. (2025). Investigation into emotional intelligence, social and emotional loneliness and digital game addictions of mid-adolescent students. *Research in Sport Education and Sciences, 27*(1), 24-34.

Introduction

Emotions have an important role in the control of human life as a social being. Emotions play a critical role in enabling individuals to understand themselves, set goals, evaluate alternatives, predict future outcomes, make decisions, and effectively execute actions, including the ability to respond quickly in decision-making processes (Damasio, 1994). In addition to emotions in controlling human life, the concept of emotional intelligence emerges when it comes to analyzing behavior and determining the underlying causes. Emotional intelligence is defined as an individual's ability to control their impulses, regulate their mood, empathize, motivate themselves, and endure difficulties (Goleman, 1995). Emotional intelligence has been defined as the ability to recognize both one's own emotions and the emotions of others, as well as to use these emotions in social relationships (Cornell, 2003). While emotions and emotional intelligence play a pivotal role in personal and social interactions, the lack of emotional and social connections can lead to negative feelings such as loneliness.

As a social being, humans need to interact and coexist with others to maintain an orderly life. Loneliness arises in people who have problems in establishing relationships with people. Loneliness is a feeling that arises when rejected or misunderstood by other people, unable to find friends or partners to carry out the activities that one wants to do, and (Rook, 1984). Weiss (1973) categorizes loneliness into two types. One is social and the other one is emotional loneliness. Social loneliness is due to the lack of social relations. Emotional loneliness, on the other hand, is a type of loneliness that results from a person's lack of closeness or attachment to another person. The consequences of loneliness can have a significant impact on a person's mental and physical health. Chronic loneliness has been linked to increased stress, depression, and even cardiovascular problems. Efforts to combat loneliness often involve improving social skills, expanding social networks, and fostering deeper emotional connections with others. However, one of the factors contributing to the rise of loneliness in modern times is the increasing reliance on digital tools. While digital devices simplify tasks, they also encourage social isolation by absorbing individuals for long hours. This can lead to a disconnection from real-life interactions and further contribute to feelings of loneliness (Magid et al., 2024).

One of the reasons that push people to loneliness is digital tools that develop rapidly and enter our lives quickly. It can be said that digital devices not only make our lives easier, but also make people lonelier by taking hold of them for hours. Today, the computer field, which affects every segment of society, has brought the concept of digital games to children's lives as an innovation (Erboy et al., 2010). The influence of digital games has spread globally, affecting people of all ages and cultures. With the rapid advancement of technology, digital games have become a prominent part of modern entertainment, captivating individuals in various regions. This widespread influence has led to a significant shift in how people spend their leisure time, as more and more individuals are drawn into the immersive experiences offered by these games. The amount of time spent on digital games can make individuals addicted over time. Digital game addiction can be defined as individuals' incessant playing games, the game becoming an integral part of their life, not fulfilling their responsibilities in real life and preferring the game to other activities (Griffiths, 2002). People may have psychological problems such as loneliness and may have low social relationships and competence in their lives. It is highly likely that they can play digital games to meet their needs that they cannot meet in real life and to get rid of the negative mood (Caplan, 2003). Therefore, individuals who experience emotional loneliness may prefer to play digital games in a virtual environment instead of interacting with people face to face in order to meet their unmet needs in real life (Liu & Peng, 2009).

When the literature is investigated, there are different studies on emotional intelligence, social and emotional loneliness, and digital game addiction (Kim et al., 2009; Irmak & Erdogan, 2016; Lemmens et al., 2011; Mentzonı et al., 2011; Kubey et al., 2001; Jeong et al., 2017). These studies often explore the individual effects of these factors, yet few have integrated them to analyze their interconnectedness. Emotional intelligence, for instance, has been linked to both the social and emotional aspects of loneliness, suggesting that people with lower emotional intelligence may experience more intense feelings of loneliness. Moreover, while digital game addiction has been studied in isolation, its relationship with emotional and social factors such as loneliness has not been comprehensively explored. Therefore, there is a significant gap in the literature regarding the combined impact of these variables, particularly in the context of middle adolescence, where social and emotional development is particularly crucial. In this direction, the aim of the study is to examine the relationship between emotional intelligence, social and emotional loneliness and digital game addiction of students participating in

recreational activities in middle adolescence.

Methods

Research Pattern

In the study, both the descriptive research method and the relational research design, which are among the quantitative research methods, were used together. The descriptive research method aimed to provide an overall view of the data after it was collected and to better understand the relationships between variables (Büyüköztürk et al., 2008). The relational research design, on the other hand, aimed to examine the relationships between two or more variables in line with the purpose of the study. The combination of these two research designs enabled the analysis of the data in a broader context and facilitated the testing of the study's hypotheses. While the descriptive method provided a detailed presentation of the participants' characteristics, the relational design helped identify potential relationships between these characteristics (Tenenbaum & Driscoll, 2005). Thus, the use of both designs together ensured a more comprehensive approach to the research.

Study Group

The study group of the research consists a total of 568 students of whom 285 girls and 253 boys (Mage=12.07 ±1.07), between the ages of 10-14, who study in schools affiliated to the Ministry of National Education in Tokat between 2021-2022 academic year. Convenience sampling refers to a sampling method that involves selecting individuals who are easily accessible, located in the immediate vicinity, and willing to participate, without covering a specific region (Erkuş, 2009).

Data Collection

A personal information form, "Social and Emotional Loneliness Scale" (SELSA), “Trait Emotional Intelligence Questionnaire – Adolescent Short Form” (TEIQue-ASF) and the “Digital Game Addiction Scale” (GAS) were used to collect data.

Social and Emotional Loneliness Scale (SELSA)

The Social and Emotional Loneliness Scale (SELSA), developed by DiTommaso et al. (2004), was later adapted to Turkish by Çeçen (2007). The scale is a Likert-type, self-report instrument consisting of 15 items, where respondents indicate their level of agreement on a 7-point scale, ranging from 1 = Strongly Disagree to 7 = Strongly Agree, allowing for a nuanced assessment of emotional and social loneliness. The scale consists of three dimensions: family, romantic, and social. The social dimension is represented by social relationships, while the emotional dimension is formed by romantic relationships and family relationships. Specifically, the family relationships dimension is measured by items 1, 4, 8, 11, and 12, the romantic relationships dimension by items 3, 6, 10, and 14, and the social relationships dimension by items 2, 5, 7, 9, and 13. Additionally, items 2, 3, 5, 6, 8, 9, 11, 12, and 14 are reverse-coded. The Cronbach's alpha values for the scale were found .74 for social loneliness, .83 for romantic loneliness and .77 for family loneliness.

Trait Emotional Intelligence Questionnaire – Adolescent Short Form” (TEIQue-ASF)

The Emotional Intelligence Trait Scale-Adolescent Short Form (TEIQue-ASF), developed by Petrides and Furnham (2000), is a 7-point Likert scale designed to assess emotional intelligence in adolescents. The Turkish adaptation of the scale was carried out by Ergin (2017), with responses ranging from 1 (strongly disagree) to 7 (strongly agree). This measurement tool consists of 4 subscales—Well-being, Self-control, Sociability, and Emotionality—and includes 15 items in total. Items 2, 4, 6, 7, and 9 are reverse-coded. The internal consistency reliability of the instrument was assessed using Cronbach's alpha coefficient. The Cronbach's alpha values were found to be .77 for the Well-being factor, .70 for Self-control, .69 for Sociability, .65 for Emotionality, and .78 for the overall scale.

Digital Game Addiction Scale (GAS)

The adaptation of the Game Addiction Scale (GAS), developed by Lemmens et al. (2009), to Turkish was carried out by Irmak and Erdoğan (2015) to assess participants' levels of digital game addiction. The GAS is a unidimensional scale consisting of 7 items. Participants were asked to rate the items on a 7-point Likert scale. The Cronbach's alpha coefficient for the GAS was 0.72, and the three-week test-retest correlation was 0.80. The scale does not include any reverse-coded items, and higher scores indicate an increased risk of digital game addiction.

Data Collection Process

The data collection process of the study was carried out by following the necessary steps to allow participants to respond to the measurement tools within the scope of the research. First, voluntary participants for the study were identified and selected according to the appropriate sampling criteria. Participants were informed about the purpose of the study and confidentiality principles, and their written consent was obtained. No questions regarding personal identity information were asked from the students who voluntarily participated and filled out the informed consent form, as the principle of confidentiality was respected. During the data collection process, each participant was administered 3 scale forms and personal information forms. The scales were presented to the participants in a face-to-face setting, and the required responses for each scale were collected. The data collection process was carried out in accordance with ethical rules and with due consideration for participants' privacy. Ethical approval for the study was obtained from the Scientific Research and Publication Ethics Committee of Tokat Gaziosmanpaşa University with the decision dated 23.05.2023 and E-54589112-824.99-2484357. Verbal consent was obtained from all the participants.

Data Analysis

The analysis of the appropriate data obtained from the sample group was conducted using the SPSS-25 statistical software. Before analyzing the data, the skewness and kurtosis values, which indicate the normal distribution of the data, were examined to determine whether the conditions for parametric tests were met. It was found that these values were within the acceptable range of -2 and +2, indicating that the data followed a normal distribution. Therefore, in addition to descriptive analyses, independent samples t-test, Pearson's correlation analysis for detecting relationships between the scales, and multiple regression analysis were applied (Tabachnick & Fidell, 2015). Furthermore, a significance level of p = .05 was considered for all analyses.

Results

Table 1

Distribution of Scale Scores (SELSA, TEIQue-ASF, GAS) (n:568)

Scales		M	SD	Skewness	Kurtosis
	Family	2.81	1.41	.588	-.389
	Romantic	4.32	.99	-.814	1.428
SELSA	Social	3.09	1.40	.286	-.642
	Total	3.41	.87	.156	.159
	Well-being	4.33	1.01	-.686	.814
	Self-control	4.04	1.70	-.074	-.920
TEIQue-ASF	Sociability	3.39	1.48	.286	-.391
	Emotionality	4.33	1.35	-.264	-.336
	Total	4.09	0.86	-.562	1.449
GAS		2.03	0.81	0.58	1.19

(SELSA) *Social and Emotional Loneliness Scale*
(TEIQue-ASF) *Trait Emotional Intelligence Questionnaire – Adolescent Short Form*
(GAS) *Digital Game Addiction Scale*

Table 1 presents the descriptive statistics for the scales used in the study. Tt can be observed that the highest mean score in the Social and Emotional Loneliness Scale (SELSA) is in the Romantic dimension (M= 4.32), while the lowest mean score is in the Family dimension (M= 2.81). For the TEIQue-ASF, the highest mean scores are found in the Well-Being and Emotionality dimensions (M= 4.33), and the lowest mean score is in the Sociability dimension (M= 3.39). The overall mean score for the GAS scale is M= 2.03. Additionally, it was determined that the skewness and kurtosis values for each dimension of the scales fall between -2 and +2, indicating that the data is normally distributed.

Table 2
Comparison of SELSA, TEIQue-ASF and GAS Scores by Gender

Scales		Gender	n	*M*	SD	df	t	*p*
SELSA	Family	Male	283	2.70	1.32	566	-1.92	.056
		Female	285	2.92	1.49			
	Romantic	Male	283	4.33	1.00	566	.154	.878
		Female	285	4.32	.98			
	Social	Male	283	3.14	1.32	566	.862	.389
		Female	285	3.04	1.47			
	Total	Male	283	3.39	.86	566	-.513	.608
		Female	285	3.43	.88			
TEIQue-ASF	Well-being	Male	283	4.26	1.06	566	-1.73	.084
		Female	285	4.41	.95			
	Self-control	Male	283	4.18	1.74	566	2.01	**.044***
		Female	285	3.90	1.66			
	Sociability	Male	283	3.29	1.49	566	-1.64	.102
		Female	285	3.49	1.45			
	Emotionality	Male	283	4.26	1.44	566	-1.28	.202
		Female	285	4.40	1.25			
	Total	Male	283	4.05	.93	566	-.977	.329
		Female	285	4.12	.79			
GAS		Male	283	2.23	.87	566	6.13	**.000****
		Female	285	1.82	.70			

***p<0.01. *p<0.05*
(SELSA) Social and Emotional Loneliness Scale
(TEIQue-ASF) Trait Emotional Intelligence Questionnaire – Adolescent Short Form
(GAS) Digital Game Addiction Scale

The statistical significance of mean scores for the three scales in the study was tested using an independent samples t-test. According to the analysis results, it was found that there were no significant differences in the SELSA mean scores based on gender. However, there was a statistically significant difference in the TEIQue-ASF mean scores, specifically in the Self-Control dimension [$t_{(566)}$ = 2.01, p<.05]. In this dimension, male participants had higher mean scores than female participants. Additionally, there was a significant gender difference in the mean scores of the GAS [$t_{(566)}$ = 6.13, p<.01], with female participants having higher mean scores than male participants.

Table 3
Comparison of SELSA, TEIQue-ASF and GAS Scores According to Playtime

Scales		Playtime	n	*M*	SD	df	t	*p*
SELSA	*Family*	Daytime	279	2.74	1.33	566	-1.24	.214
		Nighttime	289	2.88	1.48			
	Romantic	Daytime	279	4.42	.895	566	2.18	**.029***
		Nighttime	289	4.24	1.07			
	Social	Daytime	279	3.23	1.39	566	2.38	**.018***
		Nighttime	289	2.95	1.40			
	Total	Daytime	279	3.46	.828	566	1.42	.154
		Nighttime	289	3.36	.907			
TEIQue-ASF	Well-being	Daytime	279	4.39	.990	566	1.16	.244
		Nighttime	289	4.29	1.03			
	Self-control	Daytime	279	4.17	1.66	566	1.82	.069
		Nighttime	289	3.91	1.74			
	Sociability	Daytime	279	3.36	1.49	566	-.505	.614
		Nighttime	289	3.42	1.46			
	Emotionality	Daytime	279	4.33	1.39	566	-.032	.975
		Nighttime	289	4.33	1.30			
	Total	Daytime	279	4.13	.885	566	1.08	.279
		Nighttime	289	4.05	.839			
GAS		Daytime	279	1.86	.724	566	-.4.91	**.000****
		Nighttime	289	2.19	.873			

***p<0.01. *p<0.05*
(SELSA) Social and Emotional Loneliness Scale
(TEIQue-ASF) Trait Emotional Intelligence Questionnaire – Adolescent Short Form
(GAS) Digital Game Addiction Scale

An independent samples t-test was conducted to test whether there were significant differences in the mean scores of participants on the SELSA, TEIQue-ASF, and GAS scales based on the time they played games. The analysis results revealed that participants' mean scores on the SELSA scale were significantly different in the Romantic [$t_{(566)}$ = 2.18, p<.05] and Social [$t_{(566)}$ = 2.38, p<.05] dimensions. In both of these dimensions, participants who reported playing games during the day had higher mean scores. There were no statistically significant differences in participants' mean scores on the TEIQue-ASF based on the time they played games (p>.05). Additionally, there was a significant difference in the mean scores of participants on the GAS based on game-playing time [$t_{(566)}$ = -4.91, p<.05], with participants who reported playing games during the day having lower mean scores than those in the other group (Table 3).

Table 4

Correlation Results as to SELSA, TEIQue-ASF and GAS

Factors		1	2	3	4	5	6	7	8	9	10
1.Family	R	1									
		568									
2.Romantic	r	.002	1								
	p	.968									
3.Social	r	.309	.229	1							
	p	.000	.000								
4.SELSA Total	r	.707	.505	.792	1						
	p	.000	.000	.000							
5.Well-being	r	-.282	-.116	-.191	-.300	1					
	p	.000	.006	.000	.000						
6.Self-control	r	-.220	-.031	-.135	-.204	.345	1				
	p	.000	.454	.001	.000	.000					
7. Sociability	r	.097	.011	.073	.096	.177	-.047	1			
	p	.021	.795	.083	.023	.000	.265				
8. Emotionality	r	-.225	-.124	-.287	-.323	.461	.389	.030	1		
	p	.000	.003	.000	.000	.000	.000	.471			
9. TEIQue-ASF Total	r	-.257	-.102	-.208	-.289	.810	.662	.416	.693	1	
	p	.000	.015	.000	.000	.000	.000	.000	.000		
10.GAS Total	r	.182	-.044	.046	.106	-.055	-.045	.211	-.053	.012	1
	p	.000	.298	.275	.011	.191	.280	.000	.203	.781	

Pearson correlation analysis was conducted to test the relationship between the total scores and subscale mean scores of the scales used in the study. The analysis results revealed a statistically significant negative relationship between the SELSA and its subscales and the well-being and emotionality subscale mean scores of the TEIQue-ASF (p<.05). Additionally, a negative and significant relationship was found between the total score of SELSA and all subscales of the TEIQue-ASF, except for the sociability subscale. The relationship between participants' mean scores on the GAS and SELSA was statistically significant and positive. No statistically significant relationship was found between the mean scores of the TEIQue-ASF and GAS (p>.05).

Table 5

Multiple regression analysis results between SELSA and GAS

Variable	B	Standart Error $_B$	β	t	*p*	Binary r	Partial r
Constant	1.888	0.167	-	11.316	.000	-	-
Family	0.106	0.025	0.182	4.183	.000	0.182	0.173
Romantic	-0.036	0.035	-0.044	-1.030	.303	-0.044	-0.043
Social	0.000	0.026	-0.001	-0.012	.990	0.046	-0.001
R= 0.187		R^2= 0.035					
$F_{(3,564)}$= 6.846		P= .000					

According to the results of the multiple linear regression analysis conducted to predict digital game addiction based on the SELSA subscales, the binary and partial correlations between the predictor and criterion variables were examined. It was found that there is a positive and weak correlation between the Family subscale and GAS (r=0.18), which decreases to r=0.17 when other variables are controlled. The three variables used explain 3.5% of the total variance in GAS. According to the standardized regression coefficients (β), the relative importance of the predictor variables on GAS is in the order of

Family, Romantic, and Social. The t-test results for the significance of the coefficients indicated that the Family variable is a significant predictor of GAS.

Table 6
Results of Multiple Regression Analysis between TEIQue-ASF and GAS

Variable	B	Standard Error $_B$	β	t	*p*	Binary r	Partial r
Constant	1.955	0.166	-	11.754	.000	-	-
Well-being	-0.069	0.039	-0.086	-1.789	.074	-0.075	-0.073
Self-control	0.002	0.022	0.004	0.077	.939	0.003	0.003
Sociability	0.126	0.023	0.227	5.412	.000	0.222	0.222
Emotionality	-0.013	0.029	-0.022	-0.458	0.647	-0.019	-0.019
R= 0.232		R^2= 0.054					
$F_{(4,563)}$= 7.982		P= .000					

The results of the multiple linear regression analysis conducted to predict digital game addiction based on the TEIQue-ASF subscales show that the binary and partial correlations between the predictor and criterion variables were examined. A positive and weak correlation was found between Sociability and GAS (r=0.22), which remained the same (r=0.22) when other variables were controlled. The four variables used explain 5.4% of the total variance in GAS. According to the standardized regression coefficients (β), the relative importance of the predictor variables on GAS is in the order of Sociability, Well-Being, Emotionality, and Self-Control. The t-test results for the significance of the coefficients indicated that Sociability is a significant predictor of GAS, while the other variables do not have a significant effect.

Discussion

The primary aim of this study is to compare students' levels of emotional intelligence, social and emotional loneliness, and digital game addiction based on various variables and to examine the relationships between these variables; the findings obtained have been discussed in line with the study's hypotheses. The average scores obtained by the students from the scales used in the study were compared based on the gender variable. According to the results, statistically significant differences were found between male and female students in the TEIQue-ASF self-control sub-dimension and GAS. It can be suggested that male students exhibit higher self-control, indicating their ability to manage emotions, control negative feelings and impulses, adapt to changes in life, and prepare for challenges. The average SELSA scores of the participants do not show significant differences based on gender. These findings align with the results of a study conducted by Ekinci, Yalçın, and Ayhan (2019) in the literature.

It was seen that the evaluations of mean and standard deviation scores obtained from the students' SELSA-S, TEIQue-ASF, GAS and factors were between 1 and 5 for all factors, and the average score was 3. According to the total scores of the scale, it was observed that the social and emotional loneliness scores and emotional intelligence scores were above the average, while the digital game addiction scores were below the average. The family factor (SELSA) scores were below average and the other factors were above average (Table 1). This finding can be interpreted as that students experience more romantic loneliness and their digital game addiction levels are low. In secondary school students (Guvendi et al., 2019), it was reported that adolescents were in the risky group for digital game addiction, that is, their average scores are high.

The mean scores of the students participating in the study were compared against gender variable. According to the results obtained, a statistically significant difference was found between male and female students in the Self-control factor (TEIQue-ASF) and the GAS scores ($p<0.05$). Men were found to be more self-controlled, to control their emotions, manage their negative emotions and impulses, as well as adapt to changes in life and be ready for difficulties. In addition, no significant difference was found among SELSA scores. Similarly, Ekinci et al. (2019) concluded in another study that there was no significant difference between gender and loneliness. Some studies (Akagündüz, 1997; Tan, 2000; Eren, 1994)

emphasized that there was no relationship between gender and loneliness. It has been observed that men are more addicted to digital games. Dursun and Eraslan-Çapan's (2018) study revealed that gender significantly predicted digital game addiction in favor of men. Again, there are studies in the literature showing that boys are more addicted to digital games than girls (Horzum, 2011; Li & Wang, 2013; Şahin & Tuğrul, 2012; Güvendi et al., 2019; Şahin et al., 2021; Chiu et al., 2004; Griffiths & Meredith, 2009). In the study among university students conducted by Satılmış (2021), it was reported that men were more addicted to the Internet than women. Karaaslan (2015) stated in his research that boys were more prone to digital games than girls because they were more intertwined with technology. In terms of cultural structure, it is understood that girls spend more time as well as have more responsibilities at home. Thus, it can be said that boys' addiction increases considering that they have a wider range of opportunities in reaching digital games.

The playtime is an important factor that increases game addiction (Lee & Kim, 2017). When the research findings were evaluated according to the playing time, a significant difference was found in Romantic (SELSA) and Social (SELSA) factors and GAS scores ($p<0.05$). While the average scores were found higher in the Romantic and Social factors among those who play games during the day, and in the digital game addiction the average score was found higher among those who play games at nighttime. (Table 3). In the literature, there are not many studies examining digital gaming addiction and loneliness in terms of playtime. It can be said that those who play games during the day experience loneliness in their romantic and social relationships, while those who play games at night are more addicted to digital games. It can be due to the fact that the child who follows a daytime education spends more time playing digital games at night. In addition, it can be said that children who play games during the day do not spare enough time for their romantic and social relationships and spend most of their time on games, so they distance themselves from the aforementioned relationships and drift into loneliness. Kılıç (2020), on the other hand, similarly stated in his study that children who play digital games at night have more digital game addiction than children who play during the day, and differently, they have a higher level of loneliness in their social and romantic relationships. By Ekinci et al. (2021), it was determined that there was a positive and low relationship between digital game addiction and loneliness.

When the correlations between SELSA, TEIQue-ASF, and GAS were examined, SELSA had a negative ($r=-.289$) relationship with TEIQue-ASF and a positive ($r=.106$) relationship with GAS. A positive correlation was found between GAS and TEIQue-ASF, but this was not significant (Table 4). This means that while social and emotional loneliness increases, digital game addiction increases and emotional intelligence decreases. When evaluated at the level of factors, it is seen that the relations between TEIQue-ASF (Well-being-Self-control-Emotionality) and SELSA (family-romantic-social) are negative. Studies supporting the research findings have emphasized that social and emotional loneliness increases as digital game addiction increases (Kılıç, 2020), and internet addiction levels increase as individuals' loneliness levels increase (Durualp and Çiçekoğlu, 2013). Again, studies have shown that excessive internet use is associated with high levels of social and emotional loneliness (Moody, 2001). Ançel et al. (2014) revealed in their research that there was a negative and significant relationship between problematic internet use and TEIQue-ASF scores. In the literature, there is a body of research showing the negative relationship between problematic internet use and TEIQue-ASF (Far et al., 2014), and there are studies showing that problematic internet use negatively affects emotional intelligence (Parker et al., 2008; Mesgarani et al., 2013). When the scores of emotional and social loneliness in predicting digital game addiction were examined, it was found that there was a low-level significant relationship (Table 5). When the correlations between SELSA factors (predictive variable) and GAS (predicted/criteria) were examined, it was seen that there was a positive and low correlation ($r=0.18$) between "Family" and GAS. According to the t-test results regarding the significance of the regression coefficients, it was revealed that the family factor was an important predictor of the SELSA. SELSA with all its factors explains 3.5% of the total variance in GAS. Anlı (2018) reported that the contribution of loneliness in social relationships and loneliness in emotional relationships to the internet addiction was significant, while loneliness in family relationships was insignificant and explained 11% of the total variance in digital game addiction. According to the results of the regression analysis, it was observed that emotional intelligence predicted digital game addiction at a low level (Table 6). The t-test for the significance of the regression coefficients showed that sociability plays an important role in predicting digital game addiction, and all factors explained 5.4% of the total variance in GAS. It can be said that 5.4% of digital game addiction is explained by emotional intelligence. Dursun and Eraslan-Çapan (2018) revealed in their study that psychological needs predict 11% of the variance of digital game addiction.

As a result, students in middle adolescence experience loneliness in their social and emotional relationships above average. In addition, it was observed that emotional intelligence scores were above the average and digital game addiction

scores were below the average. 3.5% of digital game addiction is explained by social and emotional loneliness and 5.4% by emotional intelligence. As social and emotional loneliness increases, digital game addiction also increases. It has been observed that children who play games at night are more addicted to digital games.

Recommendation

Families need to be more controlled in this regard and to impose some restrictions on digital gaming. Accordingly, families should show the necessary attention and care so that students do not feel weak in social and emotional loneliness. In addition, school administrators and teachers have great responsibilities for the effective operation of this process. It is recommended that they shed light on these problems and create awareness by organizing seminars, projects, information meetings and regular trainings. A larger sample group, different variables and different analysis methods can be suggested for future research.

Etik Komite Onayı: Bu çalışma için etik komite onayı Tokat Gaziosmanpaşa Üniversitesi'nden (Tarih: 23 Mayıs 2023, Karar No: 78, Protokol No: E-704 00699-000-2300160224) alınmıştır.
Hasta Onamı: Çalışmaya katılan tüm katılımcılardan sözlü onam alınmıştır.
Hakem Değerlendirmesi: Dış bağımsız.
Yazar Katkıları: Fikir: B.G; Tasarım: B.G; Denetleme: B.G; Kaynaklar: B.G.; Veri Toplanması ve/veya İşlemesi: B.G; Analiz ve/ veya Yorum: B.G; Literatür Taraması: B.G.; Yazıyı Yazan: B.G.; Eleştirel İnceleme: B.G.

Çıkar Çatışması: Yazarlar, çıkar çatışması olmadığını beyan etmiştir.
Finansal Destek: Yazarlar, bu çalışma için finansal destek almadığını beyan etmiştir.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Tokat Gaziosmanpaşa University (Date: May 23, 2023, Decision Number: 78, Protocol No: E-70400699-000-2300160224).
Informed Consent: Verbal consent was obtained from all the participants.
Peer-review: Externally peer-reviewed.
Author Contributions: Concept: B.G; Design: B.G; Supervision: B.G; Resources: B.G.; Data Collection and/or Processing: B.G.; Analysis and/or Interpretation: B.G; Literature Search: B.G.; Writing Manuscript: B.G.; Critical Review: B.G.
Conflict of Interest: The authors have no conflicts of interest to declare.
Financial Disclosure: The authors declared that this study has received no financial support.

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ATATÜRK ÜNİVERSİTESİ YAYINLARI ATATURK UNIVERSITY PUBLICATIONS

Research Article *Araştırma Makalesi* DOI:10.62425/rses.1545935

Development and Validation of the Attitude Scale towards Indoor Football (Astroturf)

Halı Saha Futbol Tutum Ölçeğinin Geliştirilmesi ve Geçerlilik Çalışması

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ABSTRACT

Indoor football (astroturf football) is a popular sport, particularly among men. This study aims to develop a valid and reliable measurement tool to assess the attitudes of individuals playing indoor football. For this purpose, an item pool was initially created. During the development process, relevant literature was reviewed, observations were made of individuals playing indoor football, and expert opinions were consulted to formulate the statements. Based on expert feedback, necessary eliminations, mergers, and revisions were made to the item pool. The final 36-item form was administered to 491 participants, and the data were analyzed using Exploratory Factor Analysis (EFA). Based on the EFA results, Confirmatory Factor Analysis (CFA) was conducted on the resulting structure. EFA results indicated a two-factor structure consisting of 18 items. The first factor, labeled "Interest," included 11 items, while the second factor, labeled "Discipline," comprised 7 items. These two factors together explained 59.139% of the total variance. The two-factor structure derived from the EFA was confirmed by the CFA. The CFA results indicated that the model met good and acceptable fit indices. Reliability analyses of the scale and its subdimensions were performed, and the stability coefficient was calculated. The internal consistency coefficients of the scale were .941 for the Interest dimension, .825 for the Discipline dimension, and .921 for the overall scale. The stability coefficients were .913 for Interest, .782 for Discipline, and .921 for the total score. As a result, a valid and reliable two-dimensional measurement tool was developed to assess the attitudes of individuals playing indoor football.

Keywords: Indoor football, attitudes towards indoor football, interest in indoor football, discipline in indoor football

ÖZ

Halı saha futbolu özellikle erkek bireyler arasında yaygın olarak görülen bir spor branşıdır. Çalışmanın amacı halı saha futbolu oynayan bireylerin tutum seviyelerini tespit etmeyi amaçlayan geçerli ve güvenilir bir ölçme aracı geliştirmektir. Bu amaçla önce madde havuzu oluşturulmuştur. Madde havuzunun oluşturulması sürecinde ilgili literatür taranmış, halı saha futbolu oynayan bireyler gözlenmiş ve uzman görüşüne de başvurarak madde havuzunu oluşturacak önermeler geliştirilmiştir. Önerme listesindeki maddelerle ilgili uzman görüşleri de dikkate alınarak gerekli eleme, birleştirme ve düzeltmeler yapılmıştır. Bu şekilde oluşturulan 36 maddelik form 491 bireye uygulanmış, ortaya çıkan veriler sayesinde Açıklayıcı Faktör Analizi (AFA) yapılmıştır. AFA sonuçlarına göre ortaya çıkan yapı Doğrulayıcı Faktör Analizi (DFA) ile analiz edilmiştir. AFA sonucunda ölçeğin 18 maddeden oluşan iki faktörlü bir yapıya sahip olduğu tespit edilmiştir. Birinci faktörde 11, ikinci faktörde yedi madde bulunmuştur. Birinci faktör ilgi, ikinci faktör disiplin olarak tanımlanmış olup, bu iki faktörün toplam varyansın % 59.139'unu açıkladığı anlaşılmıştır. AFA sonucunda ortaya çıkan iki faktörlü yapı DFA ile doğrulanmıştır. DFA sonuçlarına göre ortaya çıkan yapının model uyum kriterlerini iyi uyum ve kabul edilebilir uyum düzeyinde karşıladığı tespit edilmiştir. Geliştirilen ölçek ve alt boyutları ile ilgili olarak güvenirlik analizleri yapılmış, kararlılık katsayısı hesaplanmıştır. Ölçeğin hesaplanan iç tutarlılık katsayıları ilgi boyutu için .941, disiplin boyutu için .825, toplamı için .921'dir. Ölçeğin kararlılık katsayıları ise ilgi boyutu için .913, disiplin boyutu için .782, toplamı için .921'dir. Sonuçta halı saha futbolu oynayan bireylerin halı saha futboluna yönelik tutum düzeylerini belirlemede kullanılacak iki boyutlu geçerli ve güvenirliği kanıtlanmış bir ölçme aracı geliştirilmiştir

Anahtar Kelimeler : Halı saha futbolu, halı saha futboluna yönelik tutum, halı saha ilgisi, halı saha futbolunda disiplin

Geliş Tarihi/Received 09.09.2024
Kabul Tarihi/Accepted 21.02.2025
Yayın Tarihi/Publication Date 25.03.2025

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Cite this article: Yazıcı, M., Öz, R., & Bahar, H.H. (2025). Development and validation of the attitude scale towards indoor football (Astroturf). *Research in Sport Education and Sciences, 27*(1), 35-44.

Introduction

Sports contribute significantly to individuals' physical, mental, emotional, and social development. It enhances knowledge, skills, and leadership abilities, offering individuals opportunities for self-discovery and discipline. The concept of physical activity, established with the first human movements, not only serves as an indicator of vitality but also encompasses a comprehensive framework that includes all bodily functions. The process by which humans have come to understand their corporeal structure and acquire in-depth knowledge thereof has enabled a better comprehension of the effects of physical activities on the organism; consequently, over time, physical activity has secured an indispensable role in the field of health (Ağırbaş et al., 2021).

Additionally, sports play a critical role in helping individuals cope with psychological and physiological challenges. Internationally, sports promote friendship and peace while also positively contributing to national economies. A successful sports experience can increase self-confidence (Tatlısu & Kan, 2023). The media's portrayal of sports, individuals' efforts to cope with stress, stay fit, and the achievements in international sports have made sports a significant part of daily life and societal morale. These factors highlight the importance of sports in contributing to societal dynamics (Başer, 1986; Açıkada & Ergen, 1990; Sunay & Saracaloğlu, 2003).

The global significance of sports has transformed it into a crucial sector, emphasizing the importance of athletes, clubs, and countries' success. In this context, athletes' success depends on performing sports in the healthiest and most efficient manner (Bayraktar & Kurtoğlu, 2009). Football plays a crucial role in fostering a healthy and high-performance sports culture. It not only captures widespread attention but also encourages athletes to use creativity to overcome their opponents (Özüak & Çağlayan, 2019). This offers individuals an opportunity to gain practical skills that can be applied not only in football but also in everyday life.

Football has become a focal point in various societies throughout history and has evolved into an essential aspect of daily life (Erdoğan, 2008). With millions of licensed players worldwide, football remains the most popular sport (Aşçı, 2009). Its growing presence in sports continues to captivate large audiences (Göksel et al., 2016). Research shows that football is not just a game but also a professional sport that offers an exciting viewing experience and has significant commercial value. As a continually expanding and evolving form of entertainment, football has emerged as a major industry, exciting millions of fans around the world. Football's global popularity is characterized by emotional expression, passion, and support from dedicated fans, who follow and cheer for their clubs with great hope (Ali, 2013; Yapıcıoğlu, 2002; Acar et al, 2008).

Football functions as a system with its own unique communication mechanisms and institutions, providing entertainment, power, joy, and national pride (Koçer, 2012; Kuyucu, 2014). Additionally, it contributes to the formation of individual identities and fosters interactions between different social identities. Recognized as a global industry, football attracts millions of enthusiasts (Singh &Lamba, 2019).

Football encompasses a series of mechanisms and institutions that function with their own unique communication system and language (Talimciler, 2006). Football is a globally significant sport, offering individuals not only entertainment but also experiences of power, strength, sorrow, joy, national pride, and identity formation. In addition to contributing to the development of personal identities, football facilitates the interaction and encounter of different social identities (Talimciler, 2008). Furthermore, football is widely recognized as a global industry, attracting millions of passionate fans (Göksel & Serarslan, 2015).

Today, football is a sport played by millions of licensed athletes and followed by an even larger audience. It also stands out as a physical activity in which people participate during their leisure time. Football is generally considered a game, and it is widely acknowledged that it has positive impacts on the physical and mental health of young people (Öcalan, 2005).

As a result of the enormous interest in football, scholars and private entrepreneurs in the sports field have made various plans and innovations in this industry. Football is not only enjoyable to watch but also to play. However, with increasing urbanization, access to and utilization of sports fields have become more difficult due to the decreasing availability of open spaces suitable for sports activities. At this point, indoor football fields, or astroturf fields, have emerged. These fields are

covered with a special surface and surrounded by wire fences, designed specifically for playing football.

Artificial surfaces have been developed as a solution that offers durability, versatility, and ease of maintenance, while also being suitable for indoor facilities. The lighting of fields and the use of synthetic surfaces in sports facilities have significantly increased playing hours and the revenues generated. Compared to natural grass, artificial surfaces are more resistant to seasonal weather conditions, offering continuous use (Drakos et al., 2013). Most of these facilities are operated by private entrepreneurs.

Astroturf fields have become a popular option for sports enthusiasts to engage in activities like playing football several times a week. In Turkey, astroturf fields are often the first choice for amateur athletes when they want to play football. These facilities have not only contributed to the widespread practice of the sport but also provided a more accessible environment for sports lovers, enhancing the overall football-playing experience.

Astroturf fields are typically preferred by individuals who wish to spend their free time playing football after work, especially in the evening hours. Today, these fields have become indispensable spaces for football, thanks to the improved facilities they offer (Dogar & Aydinoglu, 2019). The reasons for the popularity of astroturf fields include the following:

- Work-related stress: The intense work schedules lead individuals to astroturf fields in the evening to relax and engage in physical activity.

- Increased urbanization and reduced physical activity spaces: As urbanization increases, the availability of suitable spaces for sports decreases, thus raising the importance of astroturf fields.

- Increased use of technology and reduced social interaction: The growing dependence on technology has led to a decline in social interaction, and astroturf fields provide a social environment to balance this effect.

- The demand for safe and comfortable facilities: As society becomes more aware, the demand for safe and comfortable spaces for sports has grown, making astroturf fields a preferred option (Dogar & Aydinoglu, 2019).

These factors are critical in enhancing the functionality of astroturf fields and influencing individuals' preferences for sports activities.

This study identifies a gap in the availability of a measurement tool to assess the attitudes of individuals playing indoor football. Currently, there is no scale in the existing literature that can be used to evaluate the attitudes of indoor football players. Therefore, this research is expected to fill this gap in the literature and make a meaningful contribution to the field.

The aim of this research is to develop a valid and reliable measurement tool to systematically assess the attitude levels of individuals who play indoor football. The scale to be developed will be used to deeply understand and evaluate the attitudes of indoor football players toward their sports activities. This scale aims to provide comprehensive information regarding individuals' perceptions, motivations, experiences, and overall attitudes toward indoor football, thus offering a valuable tool for researchers and sports managers. Consequently, this study not only aims to develop a measurement tool but also to serve as a foundational resource for understanding general attitudes toward indoor football, thereby making a significant contribution to the academic literature.

Methods

Research Model

This study is a scale development study. Following the guidelines proposed by DeVellis & Thorpe (2021), key steps in the scale development process include defining the behaviors to be assessed, generating an item pool, selecting a measurement method, consulting with experts, administering the scale to a sample group, conducting item analysis, and finalizing the scale based on the results. These steps ensure that the developed scale is both reliable and valid.

Data were collected from 491 participants, including university students and individuals from different age groups who had the potential to play indoor football. The initial 55-item list was piloted on 129 individuals, and after expert review and necessary revisions, the item list was reduced to 36 items.

Item Pool Development

During the scale development process, the attitudes and behaviors related to indoor football, which the scale would focus on, were first identified. The determination of these behaviors was based on a review of the relevant literature, interviews with individuals playing indoor football, and observations related to the game. Within this scope, the behaviors observed before, during, and after the game were identified, and a list of statements was created. The determined statements focused on attitudes and behaviors toward indoor football. Initially, a draft list of 55 items was developed and, as De Vellis (2017) suggested, was administered to 129 individuals for a pilot study. Based on the feedback from the pilot test and expert opinions, the list of 55 items was reduced to 36 items after necessary eliminations, mergers, and revisions. This draft form consisting of 36 items was administered to 491 participants, and the collected data were analyzed using Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) to finalize the scale.

Data Collection

The data were collected from volunteers using written forms. The participants mainly consisted of university students, but individuals with the potential to play indoor football were also included. Also, Ethical Committee Approval for this study was taken from Erzincan Binali Yıldırım University Human Research Health and Sports Science Ethics Committee with a decision dated 29 March 2024 and numbered 03/11. Verbal consent was obtained from all the participants.

Data Analysis

EFA was conducted to determine the structure of the draft scale. The theoretical structure identified through EFA was then tested using CFA. Cronbach's Alpha was calculated to determine the internal consistency of the scale, and test-retest methodology was used to assess the stability coefficient. The analyses related to EFA were conducted using a statistical package program for social sciences. Bartlett's Test was used to determine whether the data followed a multivariate normal distribution, and the correlation coefficients were examined to assess the linear relationship. CFA analyses were performed using the AMOS software.

Results

EFA Findings: In this context, the suitability of the data for factor analysis was assessed (Karagöz, 2017). For this evaluation, correlation matrices in the dataset were examined, and the results of Bartlett's Test of Sphericity and the Kaiser-Meyer-Olkin (KMO) test were calculated (Table 1). Bartlett's test determines whether the data come from a multivariate normal distribution. A high test result increases the likelihood that the results are significant (Tavşancıl, 2002). The null hypothesis (H0) of "the correlation matrix is an identity matrix" should be rejected through Bartlett's test. The analysis results showed that H0 was rejected ($X^2 = 5366.567$, df = 153, $p < .001$), confirming that the data followed a multivariate normal distribution. The KMO test measures the adequacy and size of the sample. A value of 0.90 or above is considered very high (Sharma, 1996; Tavşancıl, 2002). The analysis results indicated that the sample size for this study was excellent (KMO = .932).

Table 1.
KMO and Bartlett's Test Results

Kaiser-Meyer-Olkin (Sample Adequacy):		.932
Bartlett's Test of Sphericity Approx.	X^2	5366.57
	df	153
	Sig.	.000

For the developed scale, it is recommended that the difference between two high loadings be at least .01. Items with high loadings on two or more factors are classified as overlapping items and can be excluded from the scale (Büyüköztürk, 2024). According to the analysis results, items with a difference of .1 or less on multiple factors were considered overlapping items. These items were removed from the scale one by one, and the analyses continued. As a result, the number of items in the

scale was determined to be 18. The eigenvalue graph of the Indoor Football Attitude Scale (IFAS) is shown in Figure 1. The eigenvalue is a key coefficient in deciding the number of factors and calculating the variance explained by each factor. In factor analysis, factors with an eigenvalue of one or greater are considered (Büyüköztürk, 2024).

Upon examining Figure 1, it was observed that there were two factors with an eigenvalue greater than one. After removing the overlapping items from the draft scale, the remaining 18-item scale formed a two-factor structure. It was concluded that the two-factor structure of the scale was appropriate. The two-factor structure explained 59.158% of the total variance. The first factor explained 38.02% of the total variance, while the second factor explained 21.119% of the total variance.

Figure 1. Factor Line Graph

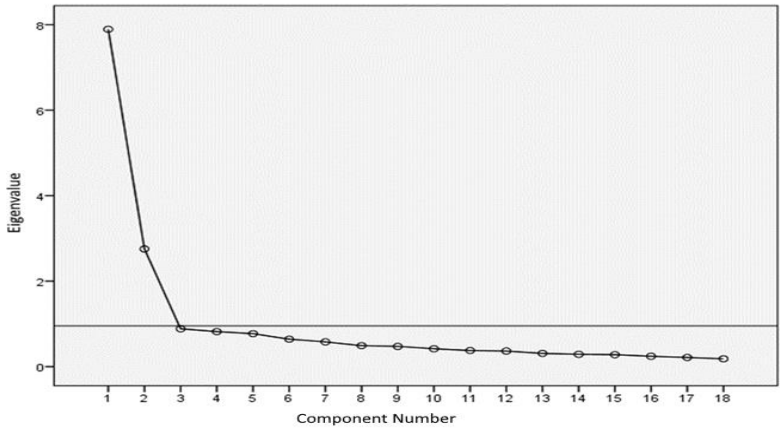

Figure 1. *Factor Line Graph*

Table 2.
Rotated Component Matrix

Component		Item No	New Item No	Statements
Factor 1	Factor 2			
.859		5	1	Playing football always makes me happy.
.834		2	2	I have a great passion for football.
.813		10	3	I am always excited to play football.
.800		6	4	Time flies when I play football.
.791		12	5	I always try to find opportunities to join matches.
.781		3	6	Playing football increases my adrenaline.
.768		9	7	Playing football boosts my self-confidence.
.764		7	8	Playing football is good for my mental health.
.748		8	9	Football helps me cope with stress.
.744		1	10	I cannot imagine a life without football.
.665		4	11	Playing football improves my physical health.
	.773	24	12	Football players' communication with teammates is important.
	.764	26	13	Football should follow game rules.
	.750	25	14	Leadership in football games is important.
	.726	23	15	Warming up for at least 10 minutes before playing is necessary.
	.702	33	16	The cleanliness of the playing area is crucial.
	.674	35	17	Wearing appropriate uniforms is essential.
	.479	16	18	Shower facilities at the end of the match are important.

Explained total variances: First factor = 38.020, Second factor = 21.119, Total = 59.139
Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalization

The factor loadings of the 18 items and their distribution across factors are shown in Table 2. The factor loadings of items in the first factor range from .859 to .665, while the loadings in the second factor range from .773 to .479. A factor loading of 0.45 or higher is considered a good criterion for item selection (Büyüköztürk, 2024). The scale, consisting of 18 items in total, explained 59.139% of the variance, with the first factor explaining 38.020% and the second factor explaining 21.119%. Considering the items in the relevant factors, the first factor was named "Interest" and the second factor "Discipline."

Table 3.
Internal Consistency and Stability Coefficients of the Scale

Scale	Item Count	Cronbach's Alpha (N=491)	Stability Coefficient (3-4 weeks, N=50)
Interest	11	.941	.913
Discipline	7	.825	.782
Total	18	.921	.921

The internal consistency and stability coefficients of the scale are shown in Table 3. The internal consistency coefficient for the Interest dimension was calculated as .941, for the Discipline dimension as .825, and for the entire scale as .921. Additionally, the test-retest method was used to determine the stability coefficient. For this purpose, the 18-item scale was administered to 50 individuals with a 3–4-week interval. Based on the results of both administrations, the stability coefficients were calculated as .91 for the Interest dimension, .78 for the Discipline dimension, and .92 for the total score. These results indicate that the scale and its subdimensions are highly reliable (Tavşancıl, 2002; Karagöz & Bardakçı, 2020).

CFA Results

Confirmatory Factor Analysis (CFA) was conducted to test the validation of the scale structure. The results for the goodness-of-fit indices of the 18-item, two-factor scale formed based on Exploratory Factor Analysis (EFA) are presented in Table 4, while the Path Diagram is shown in Figure 2.

Table 4.
Model Fit Criteria (Karagöz, 2017, p. 466; Erkorkmaz et al., 2013) and CFA Results

Model Fit Criterion	Good Fit	Acceptable Fit	Index	Result
CMIN/SD (X^2/df)	0-3	3-5	3.595	Acceptable Fit
AGFI	.90-1.00	.85-.90	.871	Acceptable Fit
GFI	.90-1.00	.85-.90	.901	Acceptable Fit
CFI	.95-1.00	.90-.95	.936	Acceptable Fit
NFI	.95-1.00	.90-.95	.913	Acceptable Fit
NNFI (TLI)	.95-1.00	.90-.95	.925	Acceptable Fit
RFI	.95-1.00	.90-.95	.899	Acceptable Fit
IFI	.95-1.00	.90-.95	.936	Acceptable Fit
RMSEA	.00-.05	.05-.08	.073	Acceptable Fit
RMR	.00-.05	.05-.10	.044	Good Fit
PNFI	.95-1.00	.50-.95	.782	Acceptable Fit
PGFI	.95-1.00	.50-.95	.069	Acceptable Fit
SRMR	0≤SRMR≤0.05	0.05≤RMSEA≤0	.045	Good Fit

The calculated fit values for the scale were found to meet the good and acceptable fit criteria specified in the literature (Karagöz, 2016, p. 974; Karagöz, 2017, p. 466; Hu & Bentler, 1999; Tabachnick & Fidel, 2015; Kline, 2015). According to the CFA results, the X^2/df value was less than 5 and significant (X^2/df = 3.595, $p < .01$), indicating that the model meets the acceptable fit criteria. The RMSEA value is used to measure the approximate fit of the model to the population. Values of .06 or less are considered to indicate good fit, while values between .08 and .06 suggest acceptable fit standards (Hu & Bentler, 1999). The RMSEA value (.073) falls within the acceptable fit range. The Comparative Fit Index (CFI = .936), Incremental Fit Index (IFI = .936), Adjusted Goodness-of-Fit Index (AGFI = .871), and Non-Normed Fit Index (NNFI = .925) were all within acceptable limits. Additionally, the RMR (.044) and SRMR (.045) indices met the good fit criteria. In summary, the calculated CFA results for the scale were found to meet both the good and acceptable fit criteria.

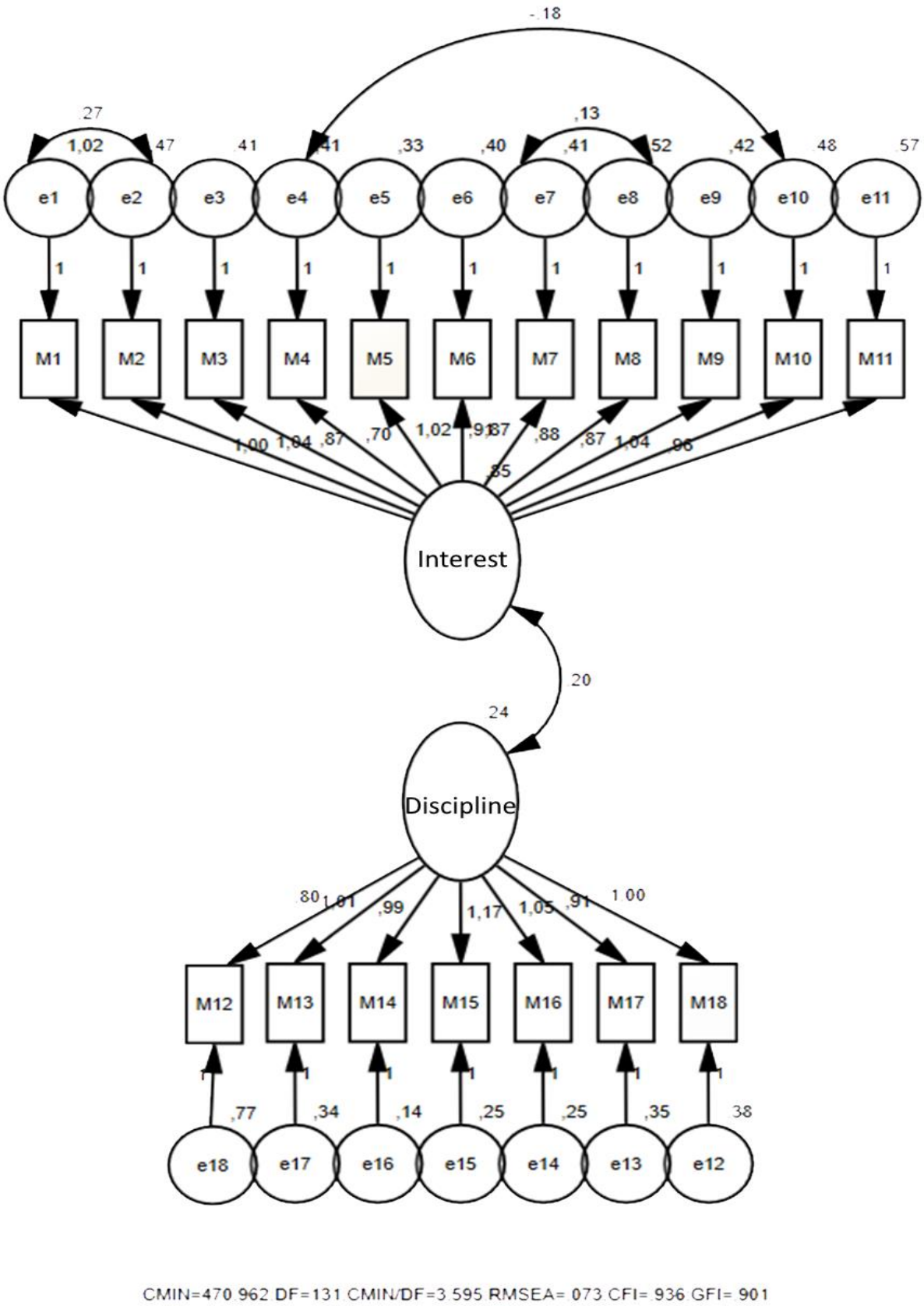

Figure 2. *Path Diagram for the Attitude Scale towards Indoor Football*

Discussion, Conclusion and Recommendations

The aim of this study was to develop a current, reliable, and valid attitude scale to evaluate the attitudes of individuals playing indoor football (astroturf football). To achieve this, attitudes and behaviors related to indoor football were first identified. This process involved reviewing relevant literature, consulting with field experts, interviewing individuals who play indoor football, and observing their behaviors before, during, and after the game. A list of 55 items was generated based on these findings, and, following pilot study results and expert feedback, the list was refined, merged, and reduced to form a draft scale of 36 items.

The 36-item draft scale was administered to 491 participants, and EFA was conducted on the results. Based on the EFA results, the 36-item draft was transformed into an 18-item, two-dimensional structure. The first dimension included 11 items, while the second dimension consisted of seven items. The two-factor, 18-item structure of the scale was validated using CFA. The CFA results indicated that the scale met the acceptable and good fit criteria (Karagöz, 2016, p. 974; Karagöz, 2017, p. 466; Hu & Bentler, 1999; Tabachnick & Fidel, 2015; Kline, 2015).

The internal consistency and stability coefficients for the developed scale and its subdimensions were calculated. The internal consistency coefficients were .94 for the Interest dimension, .83 for the Discipline dimension, and .92 for the entire scale. Stability coefficients for the test-retest method were calculated. The 18-item scale was administered to 50 participants at intervals of three to four weeks. Based on the data obtained, stability coefficients were calculated as .91 for the Interest dimension, .78 for the Discipline dimension, and .92 for the entire scale.

Higher scores on the scale indicate higher levels of attitude towards indoor football, while lower scores reflect lower levels of attitude towards the sport.

Etik Komite Onayı: Bu çalışma için etik komite onayı Erzincan Binali Yıldırım Üniversitesi İnsan Araştırmaları Sağlık ve Spor Bilimleri Etik Kurulundan 29 Mart 2024 tarih ve 03/11 sayılı karar ile alınmıştır.
Katılımcı Onamı: Çalışmaya katılan tüm katılımcılardan sözlü onam alınmıştır.
Hakem Değerlendirmesi: Dış bağımsız.
Yazar Katkıları: Fikir; M.Y.; Tasarım; R.Ö.; Denetleme; H.H.B.; Kaynaklar; M.Y., R.Ö., H.H.B.; Veri Toplanması ve/veya İşlemesi; M.Y., R.Ö.; Analiz ve/ veya Yorum; H.H.B.; Literatür Taraması; M.Y., R.Ö.; Yazıyı Yazan; M.Y., R.Ö., H.H.B.; Eleştirel İnceleme; H.H.B.
Çıkar Çatışması: Yazarlar, çıkar çatışması olmadığını beyan etmiştir.

Ethical Committee Approval: Ethical Committee Approval for this study was taken from Erzincan Binali Yıldırım University Human Research Health and Sports Science Ethics Committee with a decision dated 29 March 2024 and numbered 03/11.
Informed Consent: Verbal consent was obtained from all the participants.
Peer-review: Externally peer-reviewed.
Author Contributions: Concept; M.Y.; Tasarım; R.Ö.; Design; H.H.B.; Resources; M.Y., R.Ö., H.H.B.; Data Collection and/or Processing; M.Y., R.Ö.; Analysis and/or Interpretation; H.H.B.; Literature Search; M.Y., R.Ö.; Writing Manuscript; M.Y., R.Ö., H.H.B; Critical Review; H.H.B.
Financial Disclosure: The authors declared that this study has received no financial support.

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Appendix: 1

HALI SAHA FUTBOL TUTUM ÖLÇEĞİ (HSFTÖ)- Indoor Soccer Attitude Scale (HSFTÖ)

Madde Numarası	**Aşağıda halı saha futbolu ile ilgili önermeler verilmiştir. Lütfen her cümleyi dikkatle okuduktan sonra size en uygun olan birisini işaretleyiniz. Lütfen sadece bir seçeneği işaretleyiniz.** **Teşekkür ederiz.**	Kesinlikle katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle katılıyorum
1	Futbol oynamak beni her zaman mutlu eder.	(1)	(2)	(3)	(4)	(5)
2	Futbola karşı büyük bir tutkum var.	(1)	(2)	(3)	(4)	(5)
3	Futbol oynamak için her zaman heyecanlıyım.	(1)	(2)	(3)	(4)	(5)
4	Futbol oynarken zamanın nasıl geçtiğini anlamıyorum.	(1)	(2)	(3)	(4)	(5)
5	Maçlara katılmak için fırsat bulmaya çalışırım.	(1)	(2)	(3)	(4)	(5)
6	Futbol oynamak adrenalinimi yükseltir.	(1)	(2)	(3)	(4)	(5)
7	Futbol oynamak, özgüvenimi artırır.	(1)	(2)	(3)	(4)	(5)
8	Futbol oynamak, zihinsel sağlığıma iyi geliyor.	(1)	(2)	(3)	(4)	(5)
9	Futbol oynamak, stresle başa çıkmama yardımcı olur.	(1)	(2)	(3)	(4)	(5)
10	Futbolsuz bir yaşam düşünemiyorum.	(1)	(2)	(3)	(4)	(5)
11	Futbol oynamak fiziksel sağlığımı geliştirir.	(1)	(2)	(3)	(4)	(5)
12	Futbol oyuncuların takım arkadaşları ile iletişimi önemlidir.	(1)	(2)	(3)	(4)	(5)
13	Futbol oynarken oyun kurallarına uyulmalıdır.	(1)	(2)	(3)	(4)	(5)
14	Futbol oyununda takım liderliği önemlidir.	(1)	(2)	(3)	(4)	(5)
15	Futbol oynamadan önce en az 10 dakika ısınma hareketleri yapılmalıdır.	(1)	(2)	(3)	(4)	(5)
16	Fiziki mekân temizliği çok önelidir.	(1)	(2)	(3)	(4)	(5)
17	Futbol oynarken uygun forma ve giysiler giymek gerekir.	(1)	(2)	(3)	(4)	(5)
18	Maç sonunda duş imkânı çok önemlidir.	(1)	(2)	(3)	(4)	(5)

Interest: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11; Discipline: 12, 13, 14, 15, 16, 17, 18
No reverse-coded items are present.

Appendix: 2

Scoring of the Scale

The highest possible average score for the subdimensions of the scale is 5.00, while the lowest is 1.00. A higher average score indicates a stronger attitude towards the respective dimension, whereas a lower score reflects a weaker attitude. The cut-off points for evaluation, calculated based on the obtained average scores, are presented in the table below. Accordingly, an average score between 4.20 and 5.00 indicates a very high level of attitude, 3.40 and 4.19 represents a high level, 2.60 and 3.39 corresponds to a moderate level, 1.80 and 2.59 signifies a low level, and 1.00 and 1.79 reflects a very low level of attitude.

Average	Assessment
1.00-1.79	Very Low
1.80-2.59	Low
2.60-3.39	Moderate
3.40-4.19	High
4.20-5.00	Very High

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ATATURK UNIVERSITY PUBLICATIONS

Research Article *Araştırma Makalesi* DOI: 10.62425/rses.1549779

Investigating the Relationship between Sport Engagement and Intention to Quit Smoking

Spora Bağlılık İle Sigarayı Bırakma Niyeti Arasındaki İlişkinin İncelenmesi

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ABSTRACT

Sports are a positive phenomenon for people of all ages in terms of mental, physical, and spiritual health. Smoking can have a negative impact on the aforementioned health issues. Based on these considerations, the study's goal was to investigate the relationship between commitment to sports and intention to quit smoking, and the relational screening model was employed to this end. The research group consisted of 248 individuals determined by convenience sampling method. The “Sport Engagement Scale (SES)” and the "Intention to Quit Smoking Scale (IQSS)" were used in the study. To examine demographic characteristics, the T-test and ANOVA tests were used in the data analysis. The relationship between the scales was also assessed using the Pearson correlation test. The study's findings revealed that participants' average scores on both sport engagement and its factors, as well as their intention to quit smoking, were close to high. The t-test and ANOVA test results revealed significant differences in the variables of gender, health effects of smoking, weekly sports day, the years of smoking, and the years of doing sports. It was determined that there were positive and significant relationships between the scores of intention to quit smoking and te overall score of sport engagement scale and its "vigor and absorption" factors.

Keywords: Sports, engagement, quitting smoking

ÖZ

Spor, her yaştan birey için zihinsel, fiziksel ve ruhsal açıdan faydalı bir olgudur. Sigara kullanımı ise bahsi geçen sağlıklı durumlar için olumsuz sonuçlar ortaya çıkarabilmektedir. Bu düşüncelere istinaden çalışmada, spora bağlılık ile sigarayı bırakma niyeti arasındaki ilişkinin incelenmesi amaçlanmış ve bu amaç bağlamında ilişkisel tarama modeli kullanılmıştır. Araştırma grubu, kolayda örnekleme yöntemiyle belirlenen 248 bireyden oluşmuştur. Araştırmada “spora bağlılık ölçeği” ile “sigarayı bırakma niyeti ölçeği” kullanılmıştır. Verilerin analizinde, demografik özellikleri değerlendirmek için, T-Testi ve ANOVA testi uygulanmıştır. Ayrıca ölçekler arasındaki ilişki, pearson korelasyon testi ile değerlendirilmiştir. Araştırma bulgusu, katılımcıların hem spora bağlılık ve alt boyutlarından hem de sigarayı bırakma niyetinden aldıkları puan ortalamalarının yükseğe yakın olduğunu göstermiştir. T-testi ve ANOVA testi sonuçlarına göre cinsiyet, sigaranın sağlığa zararlı olup olmadığı, spor yapılan gün sayısı, sigara içilen yıl ve spor yapılan yıl değişkenlerinde anlamlı farklılıklar olduğu görülmüştür. Sigarayı bırakma niyeti ile spora bağlılık ölçeğinin geneli ve “dinç olma/odaklanma” alt boyut puanları arasında pozitif yönlü, anlamlı ilişkiler olduğu belirlenmiştir.

Anahtar Kelimeler: Spor, bağlılık, sigarayı bırakma

Geliş Tarihi/Received 13.09.2024
Kabul Tarihi/Accepted 21.01.2025
Yayın Tarihi/Publication Date 25.03.2025

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Cite this article: Gayretli, Z., Caz, Ç., Zengin, S. & Özdemir, Ö. (2025) Investigating the relationship between sport engagement and intention to quit smoking. *Research in Sport Education and Sciences, 27*(1), 45-53.

Introduction

Sports promote social unity and integrity while also improving individual well-being. Organizing and encouraging sporting activities helps society become healthier, more active, and happier (Yetim, 2000). These components of athletics benefit people's physical health, as well as their personal growth and societal obligations. According to İnal (2000), participating in sports can lead to improved health, balance, and societal benefits. Commitment is defined as a high-level emotion that relates to a person, an idea, an institution, or another entity's attachment to something greater than themselves, as well as the obligation they must fulfill towards this. In the context of this description, commitment can alternatively be defined as an individual's desire to associate with a goal, an ideology, a community, or a value system and maintain this connection.

It is quite true that sports are closely related to social life and that interest in different branches of sports varies today. Tendencies towards sports are generally shaped in line with the interests, curiosities and abilities of individuals (Tükenmez, 2009). It is observed that young adults who regularly participate in sports activities generally have lower levels of anxiety (Ashdown-Franks et al., 2017). Adult athletes share the same motives as children and adolescents, such as a healthy lifestyle and social integration, but they are less concerned with technical growth strength. As a result, the adequacy of these programs designed to meet the needs of the individual is a critical factor in determining individual engagement and continuity in sports or physical activities (Roberts, 2001).

People who enjoy athletics participate in activities that help them enhance their athletic performance and make them happy. Athletes participate in sports with confidence, effort, and a dynamic stance. This is described as completely participating in sports while in a pleasant attitude (Lonsdale et al., 2007). Álvarez et al. (2009) found that sports engagement can be exhibited through various characteristics, including enthusiasm, confidence, effort, and dedication. People learn to bond and be bonded from the moment they are born. The bonding process, which begins in the womb, continues with bonding impulses resulting from changing needs throughout life. There are three characteristics of bonding: Addiction begins with intense feelings of desire, then continues with occasional loss of control, and is finally characterized by the inability to resist the addictive substance (Shaffer et al., 2000). It is known that sports have many positive benefits. However, there are some habits, attitudes and behaviors that can have negative health consequences which smoking plays a key role in.

Affecting health and causing health problems, smoking is recognized as a public health problem (Fiore, 1992). Smoking is a very popular habit around the world. There are currently over one billion smokers in the world. According to Bilir, Doğan, and Yıldız (2000), smoking is a prevalent habit in our country and a major public health issue. It is the biggest cause of diseases and health problems globally (Karlıkaya et al., 2006). The most important thing smokers can do to protect their health is to quit smoking. When you quit smoking, your risk of developing smoking-related diseases decreases, and if you do develop a disease, the rate at which it progresses slows down (Godtfredsen & Prescott, 2011). Most smokers try to quit without help, and a significant number return to smoking within a short time (Hughes et al., 1992).

It has been demonstrated that social learning plays an essential part in smoking habit, and that providing a good example for young people by not smoking and encouraging them to quit smoking is helpful in avoiding smoking initiation and encouraging smoking cessation. When the influence of family members and the influence of the social environment, such as peer pressure and peer competition, emotional instability experienced by adolescents during mental development, and behavioral characteristics such as imitating others are combined, the smoking habit in young people grows. The fact that smoking rates rise with age implies that young people should be warned before they begin smoking. To prevent children from starting to smoke, families, schools, and friends also need to be educated. Reducing the number of illnesses and deaths caused by smoking requires reducing the number of times you start smoking, delaying the age at which you start smoking, and increasing rates of quitting smoking. Adolescents should be made aware of smoking as early as possible, and the media should value tobacco prevention education programs for adolescents, who we consider to be at high risk (Çolakoğlu, 2005). Teachers, especially physical education teachers, who play an important role in society in preventing smoking have an important responsibility because tobacco consumption and sports are incompatible (Pekşen et al., 2005).

Sedentary lifestyle, malnutrition and irregular sleep, and smoking have all begun to pose major health risks. To mitigate

the effects of these unfavorable outcomes, the prevalence of sports participation should rise, as should the rate of quitting smoking. Based on these considerations, the study's goal is to investigate the relationship between people's engagement to sports and their intention to quit smoking.

Methods

Study Model

In the current study, the relational research model (Büyüköztürk, 2015) was used to determine the change between two or more variables in quantitative research. The aim was to demonstrate the relationship between engagement in sports and intention to quit smoking.

Study Group

A total of 248 people, sampled through "convenience sampling" method, participated in the study, 165 (66.5%) of whom were male and 83 (33.5%) were female. Introductory information of the participants are presented in Table 1. Ethics Committee approval was received for this study from the ethics committee of Yozgat Bozok University (Date: July 17, 2024, Decision Number: 16/17). Also verbal consent was obtained from all the participants.

Table 1.
Introductory information of the participants

Variables	Category	n	%
Gender?	Male	165	66.5
	Female	83	33.5
Do you think smoking is harmful to your health?	Yes	236	95.2
	No	12	4.8
How many days a week do you exercise?	1-2 day(s)	131	52.8
	3-4 days	86	34.7
	5-7 days	31	12.5
How many years have you been smoking?	1-5 year(s)	158	63.7
	6-10 years	47	19.0
	11 years and more	43	17.3
How many years have you been doing sports?	1-5 year(s)	95	38.3
	6-10 years	68	27.4
	11 years and more	85	34.3
Total		248	100

Data Collection Tools

In the current study, "Introductory Information Form", "Sport Engagement Scale" and "Intention to Quit Smoking Scale" were used to collect the data.

Sport Engagement Scale (SES): The Sport Engagement Scale, developed by Guillen and Martinez-Alvarado (2014) and adapted into Turkish by Kayhan et al., (2020), consists of 2 factors (vigor and absorption) with 10 items. The score that can be obtained from the scale ranges 10 to 70. The scale items are rated on a 7-point Likert scale (1= Hardly Ever,… 7= Almost Always). There are no reverse item(s).

Intention to Quit Smoking Scale (IQSS): Söyler and Yorulmaz (2024) devised a scale with a single factor and eight items. The scale's 5-point Likert-type evaluation produces a score ranging from 8 to 40. There is no reverse item on the scale. Increasing scores indicate a higher intention to quit smoking, whilst declining values indicate a lower want to quit smoking.

Data Collection

In this study, where the survey method was used, data were collected via Google Forms. A total of 248 participants were included in the study within the scope of the purpose of the study.

Data Analysis

The data analysis showed that the skewness and kurtosis coefficients were appropriate for the parametric test approach (Table 2). In addition, Cronbach Alpha internal consistency coefficients for the measuring instruments were computed. T-tests and ANOVA tests were used to determine whether there were significant differences in participants' engagement in sports and intention to quit smoking based on various demographic characteristics, and the Tukey HSD test was used to explain the differences between the groups. Finally, the Pearson correlation test was used to assess the relationship between the measures.

Results

Table 2.
Distributions of Scores for Sports Engagement and Intention to Quit Smoking (n=248)

Scale and Factors	Item	Min.	Max.	Mean	SD	Skewness	Kurtosis	Cronbach Alpha
Vigor	7	14.00	49.00	6.01	8.03	-1.259	1.065	.936
Absorption	3	5.00	21.00	5.47	4.17	-.633	-.429	.843
Sport Engagement (Total)	10	19.00	70.00	5.84	11.57	-1.012	.416	.942
Intention to Quit Smoking (Total)	8	8.00	40.00	3.90	9.83	-.949	-.245	.950

When the scores of engagement to sports and intention to quit smoking were examined, it was determined that the participants' mean scores from both engagement to sports and its factors and intention to quit smoking were close to high. In addition, the skewness and kurtosis values also show that the data were normally distributed (Table 2).

Table 3.
T-Test Results by Gender and Health Effects of Smoking

	Male (n=165)		Female (n=83)			
Scale and Factors	**Mean**	**SD**	**Mean**	**SD**	**t**	***p***
Vigor	42.46	7.08	41.30	9.65	.970	.334
Absorption	16.80	4.05	15.65	4.33	2.058	**.041***
Sport Engagement (Total)	31.63	10.12	30.37	9.25	.949	.344
Intention to Quit Smoking (Total)	59.26	10.55	56.95	13.32	1.376	.171
	Yes (n=236)		**No (n=12)**			
Scale and Factors	**Mean**	**SD**	**Mean**	**SD**	**t**	**p**
Vigor	42.24	7.84	38.66	11.03	1.109	.290
Absorption	16.48	4.11	15.00	5.25	1.204	.230
Sport Engagement (Total)	31.82	9.31	19.16	12.34	4.514	**.000***
Intention to Quit Smoking (Total)	58.73	11.34	53.66	15.33	1.129	.282

p<.05*

The t-test analysis for independent samples revealed a significant difference (*p<.05*) between male and female participants in the "absorption" of sports engagement. Furthermore, examining the variable "health effects of smoking" revealed a substantial difference (*p<.05*) in overall sports engagement. (Table 3).

Table 4.
ANOVA test results by weekly sports day, years of smoking and years of doing sports

Scale and Factors	1-2 day(s) (1) (n=131)		3-4 days (2) (n=86)		5-7 days (3) (n=31)		*Weekly Sports Day*		
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**	**F**	***p***	**Significance**
Vigor	41.30	8.46	42.33	7.32	44.58	7.70	2.175	.116	---
Absorption	15.71	4.34	16.54	3.95	19.00	2.88	8.259	**.000***	3>1,3>2,3>2>1
Sport Engagement (Total)	57.02	12.14	58.88	10.73	63.58	10.05	4.205	**.016***	3>1
Intention to Quit Smoking (Total)	30.12	10.15	31.29	9.98	35.54	6.58	3.895	**.022***	3>1
Scale and Factors	**1-5 year(s) (1) (n=158)**		**6-10 years (2) (n=47)**		**11 years and more (3) (n=43)**		***Years of Smoking***		
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**	**F**	***p***	**Significance**
Vigor	43.05	7.91	36.82	7.92	44.18	6.11	14.016	**.000***	1>2,3>1>2,3>2
Absorption	17.24	3.82	13.55	4.45	16.48	3.81	15.867	**.000***	1>2,1>3>2,3>2
Sport Engagement (Total)	60.30	11.15	50.38	11.48	60.67	9.39	15.949	**.000***	1>2,3>1>2,3>2
Intention to Quit Smoking (Total)	33.67	8.80	23.42	9.87	30.65	9.04	23.313	**.000***	1>2,1>3>2,3>2
Scale and Factors	**1-5 year(s) (1) (n=95)**		**6-10 years (2) (n=68)**		**11 years and more (3) (n=85)**		***Years of Doing Sports***		
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**	**F**	***p***	**Significance**
Vigor	38.86	9.26	43.79	6.04	44.28	6.74	13.617	**.000***	3>2>1,2>1,3>1
Absorption	15.21	4.36	17.25	3.45	17.09	4.21	6.726	**.001***	2>3>1,2>1,3>1
Sport Engagement (Total)	54.07	13.03	61.04	8.75	61.37	10.34	12.227	**.000***	3>2>1,2>1,3>1
Intention to Quit Smoking (Total)	29.20	10.78	30.20	10.49	34.25	7.19	6.714	**.001***	3>1,3>2,3>2>1

p<.05*

The ANOVA test results regarding the participants' weekly sports days, years of smoking and years of sports are shown in Table 4. Accordingly, significant differences (*p<.05*) were determined in the number of days the participants spent sports and the intention to quit smoking and factors of engagement to sports and absorption factor when the participants' years of smoking and years of doing sports were examined, significant differences (*p<.05*) were found in both sport engagement and its factors and intention to quit smoking. In general, it was determined that the participants' average sports engagement scores and smoking cessation intention scores were high (Table 4).

Table 5.
Relationship Between Sports Engagement and Intention to Quit Smoking (n=248)

		Vigor	Absorption	Sport Engagement (Total)	Intention to Quit Smoking (Total)
Vigor	r	1			
	p				
Absorption	r	.775**	1		
	p	.000			
Sport Engagement (Total)	r	.974**	.899**	1	
	p	.000	.000		
Intention to Quit Smoking (Total)	**r**	**.476****	**.390****	**.471****	1
	p	**.000**	**.000**	**.000**	

p<.01**

Positive and significant correlations were found between participants' intention to quit smoking, the overall sport engagement scale, and the "vigor/absorption" factors scores (*p<.01*). These findings suggest that as people's dedication to sports grows, so does their intention to quit smoking (Table 5).

Discussion and Conclusion

According to the research results, it was determined that there was a significant difference in the "absorption" factor of engagement to sports between male and female participants, but there was no significant difference in "vigor" and "total scale" scores. This is because sports have a global aspect, and when done within a discipline, it is assumed that gender is not a distinguishing feature and that it stems from a commitment to sports. According to the variable of health effects of smoking, there was a significant difference in the overall score of sports engagement, but no significant difference was discovered between the variables of "vigor," "absorption," and the intention to quit smoking. This is assumed to be due to smokers' inability to recognize the risks of smoking, and that smoking allows them to relax psychologically and feel good. When the literature is studied, one study indicated no significant differences in the "dedication and absorption" factors of sport engagement, but significant discrepancies were identified in favor of men in the "vigor" factor (Koç & Koç, 2023). In a study analyzing university students' commitment to athletics in terms of several characteristics, no significant differences were discovered in the gender variable (Albay et al., 2022). In the study of alpine skiers, no significant difference was discovered in terms of gender (Fawver et al., 2020). Kelecek and Göktürk (2017) found that female football players were more committed to sports. Similarly, research of recreational runners found that female athletes scored higher than men on the "absorption" factor of sport engagement (Uzgur et al., 2021). While no significant difference was found between the total score average of the scale and the “dedication and absorption” factors according to the gender variable, a significant difference was found in favor of men in the “vigor” (Özgün et al., 2021). In the study conducted by Sivrikaya and Biricik (2019), when the factors of athletes’ sport engagement were examined according to their gender, it was determined that female athletes had higher commitment to sports than male athletes. In the study conducted by Gülen et al. (2021), it was determined that the levels of commitment to sports of taekwondo athletes did not differ according to gender and age. Similarly, in the study conducted by Uluç and Akçakoyun (2021) on Bocce athletes, no significant difference was determined in the overall sport engagement and its sub-scales of "vigor, dedication, absorption". Kusan et al. (2024), on the other hand, found no statistically significant difference in terms of the total score and sub-scale total scores of sport engagement among table tennis athletes according to gender. Similarly, in the study of Eski and Yılmaz (2024), it was concluded that the total scores and sub-scale mean scores of the participants' sport engagement scale did not differ significantly according to gender. However, in the study conducted by Aykora and Dinçer (2022) to examine the sports commitment levels and academic success levels of undergraduate students, they concluded that the sports commitment levels of female students were higher than those of male students.

Similarly, Arıkan and Akoğuz-Yazıcı (2022) revealed in their study that the gender differences of athletes created a difference in commitment to sports and that this difference was in favor of men. Çakır (2022) revealed that a significant difference was found between gender and engagement to sports. In the study conducted by Caz and Bardakçı with students of the faculty of sports sciences, it was determined that scores from sport engagement and its factors did not show significant differences according to gender (Caz & Bardakçı, 2023). In another study, gender was examined against sport engagement and its factors, but no significant difference was found (Güney et al., 2021).

According to results obtained from the findings of other studies, significant differences were found between the number of days participants did sports weekly and the “intention to quit smoking", “sport engagement” and the “absorption”, but no significant difference was found in “vigor”, which shows that as people increase their time doing sports and turn to sports, they may move away from negative behaviors, and at the same time, their commitment to sports is likely to increase day by day. Significant differences were found in both the commitment to sports and its factors and the intention to quit smoking when the participants' years of smoking and years of doing sports were examined. This can happen because smoking has a significant impact on people's immune systems over time, and the harmful compounds in cigarettes cause people to become addicted to them, making it difficult to quit smoking. We observe that it becomes increasingly difficult for those who have made sports a way of life to avoid them as time passes, and that people cannot stop up sports even if they occasionally reach a point where they can injure people if they participate in them excessively. Sports and health specialists have discovered that sedentary people, in particular, should view sports as a necessary component of good living and aging, and should engage in sports on a regular basis, as long as they do not overdo it. The findings in this context support this viewpoint and can be used to explain why people's engagement with sports is affected by the amount of time they spend performing sports. Finally, the data collected from the participants revealed that average scores for people's engagement to sports and intention to quit smoking were high. This situation can be thought to be due to the fact that the participants are people who are closely interested in sports and that these people actually intend to quit smoking without revealing problems such as smoking negatively affecting their lives or health problems. When the literature is examined, Uzgur et al. (2021) found no statistically significant difference between the variables of smoking and alcohol use, licensed athletic history and sports commitment levels, while they found statistically significant relationships according to the variables of the number of days run per week, running history, weekly running distance and perceived general health status. In the study conducted by Arıkan and Akoğuz-Yazıcı (2022), it is seen that years of doing sport has an effect on engagement to sports, both in the total score and in the dedication and absorption factors. Similarly, in the study conducted by Güney et al. (2021), a significant difference was found in the results obtained by the participants in the levels of commitment to sports according to the active sports age. In the study conducted by Caz and Bardakçı (2023), it was determined that the average scores of the sports commitment scale of non-smoking students were significantly higher than those of smoking students. While the average scores of non-smoking students were higher in "vigor", no difference was found between the average scores of smoking and non-smoking students in "absorption". When examined according to the number of weekly sports activities, Caz and Bardakçı (2023) reported that the students' general average scores of the sports commitment scale showed a significant difference, and as the number of days students did sports increased, their levels of sports commitment also increased significantly. Similarly, they found that the students' mean scores of "vigor" factor showed a significant difference, and as the number of days students did sports increased, their vigor levels also increased significantly. It was determined that the students' absorption mean scores showed a significant difference according to their weekly sports day. It was determined that the absorption mean scores of the students who did sports 3-4 days and 5-7 days a week were significantly higher than those who did not do sports at all and those who did sports 1-2 days a week. Özgün et al. (2021) did not determine a statistically significant relationship as a result of the correlation analysis conducted to determine the relationship between the factors of the sport engagement scale according to the sports age variable.

Discussion and Recommendations

When sports commitment and intention to quit smoking were examined, it was determined that the participants' mean scores from both sports commitment and its sub-dimensions and intention to quit smoking were close to high. This finding shows that the participants do sports and act on the principle of continuity in sports. In addition, the fact that their intention to quit smoking is also high is a positive sign in terms of health. The variable of whether smoking is harmful to health was examined and it was seen that there was a significant difference in the overall sports commitment. This finding shows that the idea that smoking is harmful to health has gained more importance. It was determined that there were positive and significant relationships between the participants' intention to quit smoking and the scores of the sports commitment scale and the sub-dimension "being vigorous/focused". These findings show that the intention to quit smoking will also increase/increase with the increase/increase in sports commitment. In the current study, sports commitment and intention to quit smoking were examined. In this context, examining the existing concepts and other variables will add value to the literature. Similarly, studies can be conducted with different sports branches or different age groups or different occupational groups to examine the effects of related concepts on individuals. In addition, it is recommended to carry out activities that will support the role of sports in increasing the intention to quit smoking and to facilitate the transition of individuals to healthy lifestyles and to offer these opportunities to them.

Etik Komite Onayı: Bu çalışma için etik komite onayı Yozgat Bozok Üniversitesi'nden (Tarih: 17 Temmuz 2024, Karar No: 16/17) alınmıştır.
Katılımcı Onamı: Çalışmaya katılan tüm katılımcılardan sözlü onam alınmıştır.
Hakem Değerlendirmesi: Dış bağımsız.
Yazar Katkıları: Fikir- Ç.C.; Tasarım- Z.G. Ç.C.; Denetleme- Ç.C.; Kaynaklar- S.Z., Ö.Ö.; Veri Toplanması ve/veya İşlemesi- Z.G., Ç.C., S.Z., Ö.Ö.; Analiz ve/ veya Yorum- Ç.C.; Literatür Taraması- Z.G., S.Z.; Yazıyı Yazan- Z.G., Ç.C.; Eleştirel İnceleme- Ç.C., S.Z.
Çıkar Çatışması: Yazarlar, çıkar çatışması olmadığını beyan etmiştir.
Finansal Destek: Yazarlar, bu çalışma için finansal destek almadığını beyan etmiştir.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Yozgat Bozok University (Date: July 17, 2024, Decision Number: 16/17).
Participant Consent: Verbal consent was obtained from all the participants.
Peer-review: Externally peer-reviewed.
Author Contributions: Concept– C.C.; Design- Z.G., C.C.; Supervision- C.C.; Resources- S.Z., O.O.; Data Collection and/or Processing- Z.G., C.C., S.Z., O.O.; Analysis and/or Interpretation- C.C.; Literature Search-Z.G., S.Z.; Writing Manuscript- Z.G., C.C.; Critical Review- C.C., S.Z.
Conflict of Interest: The authors have no conflicts of interest to declare.
Financial Disclosure: The authors declared that this study has received no financial support.

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ATATURK UNIVERSITY PUBLICATIONS

Research Article *Araştırma Makalesi* DOI: 10.62425/rses.1550434

Investigation of the Effects of Air Alert III Exercises on Some Physical Parameters in Midi Girls Volleyball Players

Air Alert III Egzersizlerinin Midi Kiz Voleybolcularda Bazi Fiziksel Parametrelere Etkisinin İncelenmesi

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ABSTRACT

This study aims to examine the effect of modified Air Alert III exercises, a jump training program in basketball, on vertical jump, agility and balance performance in middle school female volleyball players. Sixteen 13-year-old female athletes, including 8 in the experimental group and 8 in the control group, participated after completing at least three years of regular volleyball training. The Air Alert III program applied to the experimental group includes exercises where the types and rest periods between sets remain constant, but the number of repetitions and sets reduced by 50%. The program continued for 15 weeks, while the control group maintained their regular training routine. Statistical analyses, performed using SPSS 25.0, show differences between the pre-test and post-test results of the groups, assessed using the Two-Way ANOVA. The significance level set at $p<.01$. When the values between the two groups were analyzed, significant differences were observed in the vertical jump, agility test, and left foot balance parameters between the Air Alert III group and the control group ($p<.01$). However, no significant difference was found in the right foot balance parameter ($p>.01$). These findings indicate that the Air Alert III program serves as an alternative training method for enhancing vertical jump, agility, and balance in volleyball players.

Keywords: Volleyball, vertical jump, balance, agility, air alert III

ÖZ

Bu çalışma; Basketbol branşında sıçrama programı olan Air Alert III egzersizlerinin modifiye edilerek midi kız voleybolcularda dikey sıçrama, çeviklik ve dengeye olan etkisinin incelenmesi amacıyla yapılmıştır. Katılımcılar 13 yaşında en az üç yıl düzenli olarak voleybol antrenmanlarına katılan 16 (8 çalışma-8 kontrol) kız sporcudan oluştu. Çalışma gurubuna Air Alert III programı uygulandı. Uygulanan antrenman programında, egzersiz türü ve setler arası dinlenme süreleri sabit tutulurken, modifiye olarak tekrar sayısı ve set sayısı %50 azaltıldı. Program on beş hafta uygulandı. Kontrol grubu ise rutin antrenmanlarına devam etti. İstatistiki Analiz SPSS 25.0 ile yapıldı. Gurupların ön testleri ve son testleri arasındaki farklar Two-Way ANOVA ile değerlendirildi. İstatiksel anlamlılık düzeyi $p<.01$ olarak kabul edildi. İki grup arasındaki değerler analiz edildiğinde zamansal olarak Air Alert III ve kontrol grubu arasında dikey sıçrama, çeviklik testi ve sol ayak denge parametrelerinde anlamlı farklılıklar tespit edildi ($p<.01$). Fakat sağ ayak denge parametresinde ise anlamlı farklılıklar tespit edilmedi ($p>.01$). Araştırma sonucunda Air Alert III programının voleybolcularda dikey sıçrama, çeviklik ve denge gibi özelliklerin geliştirilmesinde kullanılabilecek alternatif bir program olduğunu gösterdi.

Anahtar Kelimeler: Voleybol, dikey sıçrama, denge, çeviklik, air Alert III.

Geliş Tarihi/Received 15.09.2024
Kabul Tarihi/Accepted 17.01.2025
Yayın Tarihi/Publication Date 25.03.2025

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Cite this article: Acak,M., Şanal A., Altunhan. A. & Açak. M.Z. (2025). Investigation of the effects of air alert III exercises on some physical parameters in midi girls volleyball players. *Research in Sport Education and Sciences, 27*(1), 54-60

Introduction

The ultimate goal of team sports and their athletes involves enhancing performance through systematic training (Van Mierlo & Van Hooft, 2020). The most popular team sports, which are included in the Olympic Games (e.g., football, basketball, volleyball), require different skills but share significant similarities, benefiting from improvements in physical performance (Khlifa et al., 2010; Sedano et al., 2011; Daşkesen et al., 2024).

Volleyball, a team sport played and watched by people from various backgrounds today, combines explosive movements, which occur in both vertical and horizontal directions, with short recovery periods, making it an intense anaerobic sport (Gabbett & Georgief, 2007). Volleyball also involves versatile movements that include 250 to 300 explosive jumps repeatedly performed during a match (Tramel et al., 2019). It has been found that elite players execute over 40,000 spikes annually (Sarvestan et al., 2020). This highlights the importance of implementing training programs that aim to enhance physical performance, focusing on high-intensity actions like jumping and serving (Ramirez-Campillo et al., 2020). In volleyball, maintaining balance, which is crucial for landing after spikes and blocks without contacting the net, contributes to overall performance. Today, volleyball, which has become a sport requiring quick decision-making and fast-paced play at all levels, emphasizes the need for athletes to remain physically ready.

Plyometric training, which is an effective method for improving vertical jump height in volleyball players, has been supported by several studies (Silva et al., 2019; Ramirez-Campillo et al., 2021). A study conducted by Idrizovic et al. (2018) showed significant improvements of 16.9% in block jumps, which were achieved in young female volleyball players (average age 16.6) who underwent plyometric training, compared to a control group following a traditional training program. Another study by Mackala et al. (2020) demonstrated a 7% improvement in the drop jump test after a 4-week plyometric training intervention, which was applied to high school female volleyball players. While plyometric training, which can last between 4 and 12 weeks, leads to positive effects on physical performance in volleyball players (Idrizovic et al., 2018; Valades Cerrato et al., 2018), the frequency of training, which involves two or more sessions per week, has been reported to result in significant improvements in vertical jump height (Ramirez-Campillo et al., 2021). Silva et al. (2019) indicated that plyometric training, applied for six weeks (Martel et al., 2005; Sheikh & Hassan, 2018; Yoo et al., 2010) or twelve weeks (Velickovic et al., 2017; Gjinovci et al., 2017; Radu et al., 2015; Turgut et al., 2016), led to more favorable outcomes when volleyball players trained two to three sessions per week. Based on these results, it is evident that conducting at least three plyometric training sessions per week significantly impacts athletes' performance. Air Alert III, which is a jump training program designed to improve vertical jump performance in basketball players, consists of six exercises performed three days a week over 15 weeks. Reports indicate that when applied to basketball players, this program improved their jumping ability by 20 cm (Tukel T. Air Alert: How to Jump Increase. http://www.Airalert.com 2024).

Although plyometric training, which is widely used in volleyball, offers numerous benefits, there is limited scientific information regarding its potential impact on different performance components. This study intends to modify the Air Alert III training program, which has been shown to have positive effects on basketball players, and to examine its effects on specific physical parameters in middle school female volleyball players.

Methods

Research Methodology

The study employed a Static Group Pre-test-Post-test design, which is one of the experimental methods. In this design, there are two groups that differ in terms of intervention, with one receiving the treatment while the other does not. Prior to the implementation, both groups undergo the same tests, which are then repeated after the intervention for the experimental group (Büyüköztürk et al., 2024). The sample chosen for the study consists of participants selected through convenience sampling, which is a method that allows researchers to quickly access participants from environments or communities that are easily reachable (Gravetter & Forzanı, 2012). Power Analysis 3.1.9.7 was used to determining the sample size, it has been calculated that a confidence interval of over 0.80 and a margin of error of 0.10 should be taken into account to ensure representativeness. The sample size calculation indicated that two groups of at least eight participants would be sufficient for this study. The study included athletes in the Midi Girls Volleyball category, who underwent a modified Air Alert III exercise program to assess its effects on specific physical parameters such as vertical jump height and lower body strength. Informed parental consent was obtained from all participants' families before the study. Athletes who did not provide consent, those unwilling to participate, and male athletes were excluded to maintain the study's homogeneity. thics committee approval was received for this study from the ethics committee of Çanakkale Onsekiz Mart University (Date: 2024, Decision Number: 11/17, Protocol No: 2024-YÖNP-0564). Verbal consent was obtained from all the participants.

Research Design

Data collection involved measuring the athletes' height and weight using a standardized stadiometer and digital scale. Additionally, the Vertical Jump Test, Illinois Agility Test, and Flamingo Balance Test were conducted in accordance with standardized protocols. After the assessments, the athletes were randomly divided into two groups of 8 participants. One group was assigned as the experimental group and underwent a 15-week modified Air Alert III training program. The control group continued their regular volleyball training. Prior to testing, the athletes performed self-directed warm-up exercises. All tests were completed in a single day, with a 3-minute rest interval between each test to minimize fatigue.

Height and Weight Measurement: The height and weight measurements, which were conducted before the start of the study, involved participants who had signed consent forms (Günay et al., 2017).

Vertical Jump Test: In this test, which assesses jump height, the participant stands sideways next to a wall. Chalk or ink is applied to the fingertips so that the highest point reached during the jump can be marked. The difference between the reach height and the jump height is recorded in centimeters. Each athlete performed two trials per test, with a 1-minute rest between trials, and the best score was recorded to ensure reliability.

Agility (Illinois) Test: The test involves a track that consists of a series of 10-meter lengths and cones placed 3.3 meters apart, requiring participants to make sharp 180º turns and complete slalom runs. Two electronically timed photocell gates, which are placed at the start and finish lines, measure the completion time. Participants receive explanations and a warm-up session before the test, after which they perform two trials, with the better result being recorded (Miller et al., 2006; Hazır et al., 2010).

Flamingo Balance Test: The test, which uses a stopwatch and a wooden balance beam, measures the ability of participants to maintain balance while standing on one leg. The athlete focuses on a fixed point 5 meters away and the errors made during the test are counted. The average error count from three tests is recorded as the score (Jakobsen et al., 2011).

Air Alert III: This exercise program, designed for individuals seeking to improve their jump height, is an enhanced version of Air Alert II, which includes an additional exercise. The program consists of a 15-week cycle, alternating between single and double weeks. Athletes who adhere to this program report improvements of 10-25 cm in their jump height (Tukel, 2024).

Exercises Performed by the Air Alert Group

The list of exercises, which was prepared using the video titled “How To Jump Higher - The 9 Steps of Air Alert” from Tukel’s (2024) YouTube channel, is detailed below (https://www.airalert.com/en/jump-training-online?slg=step-9-cooling-down; January 17, 2024).

1.Leaps ups, which can be performed with or without a rope, involve the athlete starting from a ¼ squat position and jumping at least 8-10 inches. 2.*Calf Raises*, which require the athlete to stand on one leg, are performed by pushing up on the toes and returning to the starting position slowly. 3.*Step Ups* involve placing one foot on a box, jumping as high as possible, switching feet, and repeating the movement in rapid succession. 4.*Thrust Ups*, which are performed with feet shoulder-width apart, involve jumping as high as possible without allowing the heels to touch the ground. 5.*Burnouts* involve quick, small jumps without bending the knees, with feet kept shoulder-width apart. 6.*Squat Jumps* involve holding a basketball at chest level and performing a squat jump, with the final jump being the highest possible (Table 1).

Modified Air Alert III Training Program Applied to the Experimental Group

The exercise plan, which spans 15 weeks, is divided into single and double weeks. During single weeks, training takes place on Mondays, Wednesdays, and Fridays, while in double weeks, training occurs on Tuesdays, Wednesdays, and Thursdays (https://www.airalert.com/en/jump-training-online?slg=step-9-cooling-down; January 17, 2024). **In the training program applied to the experimental group, which includes the Air Alert III exercises, the types of exercises and rest periods between sets are maintained as constant, **but the number of repetitions and sets is reduced by 50% (Table 1).

Data Analysis

SPSS 25 (IBM SPSS Corp., Armonk, NY, USA) software was used for data analysis. Initially, the normality of the data was assessed using the Shapiro-Wilk test. As a result, the data showed normal distribution. Descriptive statistics for the measurements included mean and standard deviation. Differences between the pre-tests and post-tests of both the Air Alert III group and the control group were analyzed using the Paired-Sample T-Test. The statistical significance level was set at $p<.01$.

Table 1.
Modified Air Alert III Training Program

Week	Type of Exercise	Repetitions	Sets	Rest Time Between Sets
1	1-2-3-4-5-6	10-5-5-7-50-7	1-1-1-1-1-2	2mn- 25sec-2mn-1mn-1mn-2 mn
2	1-2-3-4-5-6	10-7-7-10-100-10	2-1-1-1-1-2	2mn- 25sec-2mn-1mn-1mn-2 mn
3	1-2-3-4-5-6	12-10-7-12-150-10	2-1-1-1-1-2	2mn- 25sec-2mn-1mn-1mn-2 mn
4	1-2-3-4-5-6	15-12-10-15-100-15	2-1-1-1-1-2	2mn- 25sec-2mn-1mn-1mn-2 mn
5	1-2-3-4-5-6	12-15-10-17-125-12	2-1-1-1-1-2	2mn- 25sec-2mn-1mn-1mn-2 mn
6	1-2-3-4-5-6	25-17-12-20-150-15	2-1-1-1-1-2	2mn- 25sec-2mn-1mn-1mn-2 mn
7	1-2-3-4-5-6	15-20-12-25-150-12	2-1-1-1-1-3	2mn- 25sec-2mn-1mn-1mn-2 mn
8	1-2-3-4-5-6	25-22-15-30-100-12	2-1-1-1-2-3	2mn- 25sec-2mn-1mn-1mn-2 mn
9	1-2-3-4-5-6	25-25-15-35-150-15	2-1-1-1-2-3	2mn- 25sec-2mn-1mn-1mn-2 mn
10	1-2-3-4-5-6	20-25-17-40-125-15	3-1-1-1-2-3	2mn- 25sec-2mn-1mn-1mn-2 mn
11	1-2-3-4-5-6	25-15-17-45-130-15	3-2-1-1-2-3	2mn- 25sec-2mn-1mn-1mn-2 mn
12	1-2-3-4-5-6	35-17-20-50-150-15	2-2-1-1-2-3	2mn- 25sec-2mn-1mn-1mn-2 mn
13	---	---	---	---
14	1-2-3-4-5-6	15-15-20-15-125-10	2-1-1-1-1-2	2mn- 25sec-2mn-1mn-1mn-2 mn
15	1-2-3-4-5-6	50-25-10-50-250-25	2-2-1-1-2-3	2mn- 25sec-2mn-1mn-1mn-2 mn

Mn: minute, sec: second, Note: The numbers in the Exercise Type column indicate the identification of the exercises used in the training program. Details on the exercises corresponding to these numbers can be found in the section "Exercises Performed by the Air Alert Group" in the Materials and Methods part.

Results

Tablo 2.
Distribution of Physical Characteristics for the Air Alert III and Control Groups

	Air Alert III Group (n=8) x̄±Sd	Control Group (n=8) x̄±Sd
Age (Year)	13.0±0.0	13.0±0.0
Height (cm)	158.62±7.19	154.50±9.19
Body Weight(kg)	50.87±3.44	51.50±5.07
BMI (kg/m^2)	20.80±1.89	21.69±2.59

Cm: centimeter, kg: kilogram, m^2: square meter

As shown in Table 2, it is observed that the mean height of the participants in the Air Alert III group was 158.62±7.19 cm, their mean body weight was 50.87±3.44 kg, and their mean body mass index (BMI) was 20.80±1.89 kg/m². In the control group, the mean height was 154.50±9.19 cm, mean body weight was 51.50±5.07 kg, and mean BMI was 21.69±2.59 kg/m².

Table 3.
Comparison of Pre-Test and Post-Test Results between the Air Alert III and Control Groups

Variable		Pre-Test x̄±Sd	Post-Test x̄±Sd	ES	F	*p*
Vertical Jump (VJ)	AAG	33.25±4.74	41.62±4.74	.839	67.513	.000*
	CG	28.75±3.45	30.00±3.02			
Illionis Agility Test	AAG	21.14±1.26	20.09±0.91	.941	206.678	.000*
	CG	22.38±1.68	22.18±1.66			
Flamingo Balance (Right)	AAG	3.12±1.24	1.00±1.19	.429	9.763	.008
	CG	3.37±0.51	2.50±0.53			
Flamingo Balance (Left)	AAG	3.62±0.74	1.25±0.70	.596	19.175	.001*
	CG	4.00±0.75	3.37±1.06			

*= p<.01, ES: Effect Size, AAG: Air Alert III Group, CG: Control Group.

As shown in Table 3, significant differences were found between the pre-test and post-test results in the Air Alert III group (p<.01). The observed changes in vertical jump performance indicate a positive increase in the mean vertical jump height for the Air Alert III group. In the Illinois agility test, participants completed the test in a shorter time. Moreover, in the Flamingo balance test, participants demonstrated fewer error scores on both the right and left foot. In contrast, when examining the control group's pre-test and post-test data, no significant differences were identified in the assessed parameters (p>.01).

Discussion

This study, aiming to investigate the effects of the Air Alert III exercise program on specific physical parameters of young female volleyball players, focused on participants who had engaged in regular volleyball training for three years, practicing three days per week. The findings indicate significant improvements in vertical jump, agility, and balance for the Air Alert III group over the 15-week period.

In volleyball, the key to success revolves around scoring points, which requires teams to execute effective spikes and blocks. For these techniques to be efficient, the ability of athletes to perform vertical jumps holds critical importance. Previous studies, such as those by Lidor and Ziy (2010), highlighted how vertical jump performance serves as a significant component in volleyball success. This explains why much of the research in the field has concentrated on enhancing vertical jump abilities in volleyball athletes (Silva et al., 2019). Over time, various methods have been tried to develop jumping skills, with plyometric exercises being the most commonly used today (Markovic, 2007). Research on vertical jumping shows that, following a four-week plyometric training program conducted on female players under the age of 14, an improvement of 3.9 cm in vertical jump was observed (Martel et al., 2005). In players under the age of 15, a six-week regular plyometric training program conducted on a gym floor resulted in a 9.2% improvement in vertical jump. Similarly, a 12-week plyometric training protocol conducted on female players under 17 led to a 16.9% increase in block jumps (Lehnert et al., 2009). For players under 22 years, a 12-week plyometric training program yielded a 27.6% improvement in the same test (Gjinovci et al., 2017). Given that most previous studies employed plyometric jump training, it becomes evident that alternative methods are required for enhancing vertical jump abilities. With this in mind, the Air Alert III method, which has been more commonly applied in basketball-related studies (Maravi Aredo, 2018), was selected. However, its relevance in volleyball remains crucial, as vertical jumping constitutes a fundamental factor for success in this sport.

The results suggest that there were significant differences between the pre-test and post-test scores in the Illinois agility test for the Air Alert III group. Although primarily focused on jump training, the Air Alert III program incorporates fast leg movements, necessitating a rapid contraction-relaxation cycle in the muscles. This cycle eventually leads to physiological adaptations that enhance agility. In a prior study, one group participated in plyometric exercises, while another engaged in skill-based exercises. The findings revealed that the plyometric group showed greater improvements in agility and speed compared to the skill-based group (Gjinovci et al., 2017). When considering this perspective, jump training appears to be more effective for agility development than skill-based training. According to a systematic review, various methods of plyometric training had positive effects on agility and speed in volleyball players (Turgut et al., 2016; Lehnert et al., 2009; Hrženjak et al., 2016; Markovic, 2007; Özgül, 2018; Velickovic et al., 2017).

Another significant finding suggests that the Air Alert III exercise program positively impacted balance. Limited research has explored the effects of plyometric exercises on balance (Silva et al., 2019). One study, which involved one group performing a plyometric training program and another engaging in dynamic stabilization and balance exercises, revealed that both groups showed similar results (Myer et al., 2006). From this, it can be inferred that plyometric exercises contribute to balance improvement. Additionally, other studies on volleyball players have demonstrated that plyometric exercises positively influence balance (Kanbak & Dağlıoğlu, 2020). Further supporting evidence comes from studies in the literature (Eylen et al., 2018; Sabin & Alexandru, 2015; Kim & Park, 2016; Makhlouf et al., 2018).

The Air Alert III program has been introduced into the literature as an alternative plyometric training method, and research on this topic is still in its nascent stages. Existing studies indicate that the program increases individuals' vertical jump power while having no significant effect on explosive power (Maravi Aredo, 2018; Barrote, 2022). Furthermore, another study reported that the Air Alert program enhances jumping ability (Strelnikova & Melnyk, 2024). However, there is a notable lack of studies investigating the effects of the Air Alert III program on balance, highlighting the significance of our research in addressing this gap. Additionally, while the Air Alert program has predominantly been applied to basketball players in prior studies, our research focuses on its effects on volleyball players (Maravi Aredo, 2018; Barrote, 2022).

Conclusion and Recommendations

The Air Alert III program, based on the findings, can be considered an alternative method for improving vertical jump, agility, and balance in volleyball players. Given that vertical jump is one of the essential components of success in volleyball, the Air Alert III program presents a valuable addition to the literature as a method distinct from plyometric training. However, the limitation of this study lies in the need for further research to generalize these findings. Future studies could include a plyometric exercise group in addition to the Air Alert III and control groups. Comparing these three groups would provide insights into which method is more effective, offering valuable contributions to the literature.

Etik Komite Onayı: Bu çalışma için etik komite onayı Çanakkale Onsekiz Mart Üniversitesi'nden (Tarih: 2024, Karar No: 11/17, Protokol No:2024-YÖNP-0564) alınmıştır.
Hasta Onamı: Çalışmaya katılan tüm katılımcılardan sözlü onam alınmıştır.
Hakem Değerlendirmesi: Dış bağımsız.
Yazar Katkıları: Fikir-; MA, Tasarım-; AŞ, Denetleme-; MA, AA, Kaynaklar-AŞ, AA, MA, Veri Toplanması ve/veya İşlemesi; MA, AŞ Analiz ve/ veya Yorum-; AŞ,ZA, Literatür Taraması-;ZA,AA Yazıyı Yazan-;AŞ,MA Eleştirel İnceleme-AA,ZA.
Çıkar Çatışması: Yazarlar, çıkar çatışması olmadığını beyan etmiştir.
Finansal Destek: Yazarlar, bu çalışma için finansal destek almadığını beyan etmiştir.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Çanakkale Onsekiz Mart University (Date: 2024, Decision Number: 11/17, Protocol No: 2024-YÖNP-0564).
Informed Consent: Verbal consent was obtained from all the participants.
Peer-review: Externally peer-reviewed.
Author Contributions: Concept -;MA Design-;AŞ Supervision-; MA,AA, Resources-; AŞ, AA, MA, Data Collection and/or Processing-; MA,AŞ, Analysis and/or Interpretation-; AŞ, ZA, Literature Search-; ZA, AA, Writing Manuscript-; AŞ, MA, Critical Review-; AA, ZA.
Conflict of Interest: The authors have no conflicts of interest to declare.
Financial Disclosure: The authors declared that this study has received no financial support.

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ATATÜRK ÜNİVERSİTESİ YAYINLARI ATATURK UNIVERSITY PUBLICATIONS

Research Article *Araştırma Makalesi* DOI: 10.62425/rses.1543259

The Scale of Observing the Opponent in Sport: Validity and Reliability Study

Sporda Rakibi Gözlem Ölçeği: Geçerlik ve Güvenirlik Çalışması

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ABSTRACT

This study aimed to develop a valid and reliable measurement tool, the Scale of Observing the Opponent in Sport (SRAS), to identify focal points athletes consider when observing their competitors. Combining qualitative and quantitative steps, the scale's development included focus group interviews, essay writing, expert review (Lawshe technique), assumption analyses, and exploratory and confirmatory factor analyses. The initial 36-item pool was expanded to 46 items based on expert feedback, and a 5-point Likert-type (5=Always, 1=Never) trial form was administered to 508 active athletes. Exploratory Factor Analysis (EFA) revealed a 4-factor, 30-item structure, subsequently confirmed through Confirmatory Factor Analysis (CFA) on 491 observations. Factors were named based on literature review: "Tactics-Strategy" (n=6, α=.86), "Communication" (n=5, α=.73), "Technical-Physical" (n=11, α=.92), and "Image" (n=8, α=.86). The overall scale demonstrated high reliability (α=.93), and the explained variance ratio was 55.941%. Despite abundant research on athlete motivation, the lack of instruments measuring critical observation factors underscores this study's significance. The SRAS fills this gap, providing a valid and reliable tool to assess observation levels in active athletes, potentially contributing to performance enhancement strategies and talent identification.

Keywords: Observation, opponent, athlete, validity, reliability

ÖZ

Bu araştırmanın amacı, sporcuların rakiplerini gözlemlerken dikkate aldıkları özellikleri belirleyerek odak noktalarını tespit eden geçerli ve güvenilir bir ölçme aracı geliştirmektir. Lawshe tekniği ile hazırlanan ölçeğin aday formunda niteliksel adımlar kapsamında odak grup görüşmeleri ve kompozisyon yazdırma, niceliksel adımlar kapsamında sayıltı analizleri ile geçerlik ve güvenirlik analizlerine yer verilmiştir. Uzman görüşleri sonrası 36 maddelik madde havuzu 46 maddeye ulaşmış ve 5'li Likert tipi (5=Her Zaman, 1=Hiçbir Zaman) denemelik form 508 aktif sporcuya uygulanmıştır. Açımlayıcı Faktör Analizi (AFA) ile 4 faktörlü 30 maddelik yapı elde edilmiş ve 491 gözlem ile Doğrulayıcı Faktör Analizi (DFA) uygulanmıştır. Faktör isimlendirmeleri literatür ışığında yapılmış, Cronbach alfa iç tutarlık katsayıları; "Taktik-Strateji" (n=6) için .86, "İletişim" (n=5) için .73, "Teknik-Fiziksel" (n=11) için .92 ve "İmaj" (n=8) için .86, ölçeğin tamamı için .93 olarak hesaplanmıştır. Açıklanan varyans oranı %55.941'dir. Sporcu motivasyonu üzerine birçok çalışma yapılmış olmasına rağmen, gözlem yaparken hangi faktörlerin önemli olduğunu ölçen bir çalışmaya rastlanmaması bu çalışmanın önemini vurgulamaktadır. Bu araştırma, sporcu gözleminde dikkate alınması gereken faktörleri belirlemeyi amaçlamaktadır. Elde edilen sonuçlar, Sporda Rakibi Gözleme Ölçeği'nin (SRGÖ) geçerli ve güvenilir olduğunu kanıtlamıştır

Anahtar Kelimeler: Gözlem, rakip, sporcu, geçerlik, güvenirlik

Geliş Tarihi/Received: 03.09.2024
Kabul Tarihi/Accepted: 18.02.2025
Yayın Tarihi/Publication Date 25.03.2025

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Cite this article: Kara, N.Ş., Kara, M., & Öğraş, E.B. (2025). The scale of observing the opponent in sport: validity and reliability study. *Research in Sport Education and Sciences,27*(1), 61-76

Introduction

Sport is widely recognized as a complex phenomenon encompassing a range of positive and negative emotions, including competition, excitement, success, and failure. From the perspective of athletes, sport represents a mental, physical, and tactical endeavor aimed at competing and achieving victory. Conversely, for spectators, sport is often viewed as an artistic process that elicits excitement and engagement. In a broader context, sport is a scientific formation, developed and sustained through disciplines such as anatomy, orthopedics, physiology, biomechanics, and psychology (Fişek, 1985). Sport is further characterized by its creation of a complex, multi-layered network involving competition, support, conflict resolution, and the establishment of new connections, resulting in a wide array of interpersonal relationships (Izquierdo, & Anguera, 2021). Within the emotionally charged context of sport, athletes employ various strategies to achieve success, one of which may involve observing the behavior and performance of their opponents. Both athletes and coaches can potentially glean valuable insights about their opponents through careful observation.

Observation plays a crucial role in our perception of the world around us. Athletes, like all individuals, engage in both voluntary and involuntary observation. In the realm of sports, particularly at the professional level, opponent observation is a critical determinant of performance. Athletes must instantaneously react to stimuli from both central and peripheral vision to effectively observe their opponents (Asar et al., 2022). The capacity to accurately perceive and interpret opponent movements is essential in dynamic sports where player interactions are contingent upon opponent behavior and situational context (Sands et al., 2017). However, coaches and athletes may prioritize different aspects when observing their opponents. Professional and expert athletes rely on perceiving their opponents' body kinematics for precise predictions, whereas expert observers, such as coaches, focus more on the opponent's initial positioning (Makris & Urgesi, 2015). This discrepancy may stem from coaches' greater emphasis on technical and tactical dimensions. The ability to observe movement encompasses concepts related to observing a person or a similar model, either live or via video, who successfully executes the desired motor skill (Neuman & Gray, 2013). Beyond these factors, athletes may glean valuable insights from observing an opponent's attitude and behavior before and after competition, reactions to the opponent and referee, facial expressions, relationships with their environment, and popularity. In essence, the athlete engages in a process of connecting with and analyzing their opponent. All of these facets can be considered as vital to an athlete's success as physical training. Indeed, most athletes exhibit a strong desire to know their opponents and their characteristics in advance. This underscores the importance of gathering information about opponents through observation. It evokes Heider's attribution theory, which posits that individuals attribute their success or failure to four factors: ability, effort, luck, and task difficulty. These factors can be examined through three dimensions: locus of control (internal or external), stability (permanent or variable), and controllability (controllable or uncontrollable). Athletes tend to attribute success or failure to specific situations. For athletes, factors beyond an opponent's technical and tactical attributes, such as deceptive tactics, physical characteristics, and mental state, can offer crucial clues about their own potential for success. Therefore, an athlete who fails to gather sufficient information about their opponent through observation may encounter obstacles on their path to victory.

The purpose of observation extends beyond merely focusing on the opponent's visible characteristics. In competitive sports, opponents may employ deceptive tactics or conceal their movements to mislead observers, thereby reducing available information and increasing the likelihood of prediction errors (Urgesi et al., 2011). Consequently, misleading behavior in observation can be considered commonplace. Understanding both prosocial (e.g., congratulating the opponent) and antisocial (e.g., feigning injury) behaviors of opponents is crucial in sports contexts (Kavussanu et al., 2006). The social environment, including opponents, significantly influences athletes' goal setting, strategy selection, emotion management, and self-reflection at various performance stages (Sakalidis et al., 2022). Anticipating opponents' movements is a vital skill in sports. Research suggests that combining visual-perceptual training with motor practice of observed patterns can enhance an athlete's ability to read opponents, particularly in striking sports (Brenton et al., 2019). Furthermore, in sports with frequently changing opponents, adaptability in visual search behavior is associated with skill level, emphasizing the importance of adjusting to different adversaries (Rosker & Rosker, 2021).

The observation of opponents in sports encompasses a complex interaction of visual cues, body kinematics, and social dynamics, all of which significantly impact athletes' performance and decision-making processes. A comprehensive understanding and analysis of opponents' behaviors enable athletes to enhance their strategic planning, anticipation skills, and overall performance in competitive settings. The Scale of Observation of Opponents in Sport (SRAS), developed to address

this need, plays a crucial role in advancing athlete success. A review of the existing literature reveals that both athletes and coaches employ various strategies to observe their competitors. However, it has been identified that there is a lack of a standardized measurement tool that assesses the specific characteristics of opponents that athletes focus on and the levels at which these observations occur. Addressing this gap in sport psychology provided the primary motivation for the present study. Accordingly, the objective of this research is to develop a valid and reliable instrument to identify the factors that athletes prioritize when observing their opponents, as well as to determine which aspects are given more or less attention.

Methods

This study aimed to ascertain the factors that athletes prioritize when observing their competitors, specifically delineating which features are given greater emphasis and which are less underscored. To achieve this, the study endeavors to construct a valid and reliable measurement instrument. An ordinal summation scaling approach, anchored in subject responses, was employed for this purpose. The present study, in which the scaling approach through graduated sums was used among the approaches based on subject responses, was conducted as a basic research. This approach facilitates the extraction of inferences from the participants' responses, enabling a more nuanced comprehension of their observational focus. Within the context of this foundational research, the ranked sums scaling method was utilized to evaluate the athletes' responses. This approach allowed the athletes not only to furnish responses but also to interpret the inferences derived from these responses. The respondent-centered scaling approach, as elucidated by Crocker (2012), was adopted as a benchmark, utilizing ranked sums based on subject responses to ensure a rigorous appraisal of the observed features. Ethics committee approval for this study was obtained from Hatay Mustafa Kemal University, Social and Human Sciences Scientific Research and Publication Ethics Committee (July 04, 2024, Decision No: 07, Issue No: 02). Written consent was obtained from all the participants.

Participants

This investigation, designed to identify the factors prioritized by active athletes when observing their competitors, utilized two distinct study groups. Exploratory factor analysis (EFA) was conducted on the first group, comprising 508 observations from active athletes, to explore and establish the targeted measurement model. Initial data collection for the EFA occurred in July 2024, with voluntary participation from active athletes. Following assumption analyses, the number of valid observations was reduced to 494. The descriptive statistics of these volunteer participants, prior to hypothetical analyses, included: 255 women and 253 men, 296 individual athletes and 212 team athletes, with experience levels ranging from 1-3 years (178 athletes), 4-6 years (101 athletes), 7-9 years (92 athletes), to 10 or more years (137 athletes).

Confirmatory factor analysis (CFA) was subsequently conducted on a second set of observations from 491 active athletes in August 2024, along with assessments of convergent and divergent validity, to further substantiate the construct validity of the scale. The development of the scale form involved meticulous application of various procedural steps to ensure its robustness and accuracy.

Scale Development and Formation of the Candidate Scale Form

The following stages outline the process undertaken to develop the trial and final versions of the scale, incorporating feedback from both experts and athletes.

Stage 1 (Focus Group Interview): This study employed the convenience sampling method, a qualitative research technique that involves selecting participants based on their accessibility and availability to the researcher (Andrade, 2021). Within this framework, focus group interviews were conducted with two distinct groups: five academicians who are experts in the field of scale development, and 20 active athletes. The interviews took place in June 2024, during times that were mutually convenient for all participants. The primary focus of these interviews was to discuss the development of the item pool and the structure of the Likert scale.

Stage 2 (Printing Composition for Target Audience Athletes): To enhance the reliability and validity of the item pool, 35 active athletes (individual and team athletes) were asked to provide written essays on the characteristics they consider when observing their competitors. These essays were analyzed and converted into structured items.

Stage 3 (Literature Review): A comprehensive literature review was conducted to identify relevant studies, such as the "Small Muscle Motor Skills Observation Form" (Toran, 2011) and the "Observational Collective Competence Scale in Sport" by Şenel et al., to provide additional evidence and support for the study. The item pool, developed through qualitative steps,

was then re-evaluated by active athletes and experts and refined into appropriate sentence-based items.

Stage 4 (Content Validity Ratio (CVR) Analysis of the Scale): Following the completion of the relevant phases, the item pool and candidate scale form were finalized. To ensure clarity and applicability, the candidate scale form was read aloud to 10 active athletes, and their feedback was collected. Based on their input, a 36-item trial form was developed. Subsequently, the candidate scale form was distributed to 11 expert academicians for evaluation, both online and in written form. Two key criteria were employed in this evaluation: "Representativeness," which assessed the alignment of the scale items with the theoretical framework, and "Comprehensibility," which evaluated how easily the target audience could understand the items. The experts were requested to provide feedback for both the "Representativeness" and "Comprehensibility" criteria using a 3-point scale: 3 (Good), 2 (Should be improved), and 1 (Bad), along with any additional suggestions or opinions. The form utilized the Lawshe technique for content validity ratio (CVR) calculation, aiming to produce a value within the range of -1 (absolute rejection) to +1 (absolute acceptance), indicative of the degree of agreement among experts regarding the relevance and clarity of each item. The formula for calculating the CVR is presented in Equation 1. The CVR is calculated using the following formula:

CVR=Nu/(N/2) – 1(Equality.1)

Nu represents the number of experts who rated the item as "good." while N represents the total number of experts who evaluated the item. This formula generates a CVR value that ranges from -1 to +1:

A CVR of +1 indicates unanimous agreement among the experts that the item is "good."

A CVR of 0 indicates that only half of the experts rated the item as "good."

A CVR of -1 indicates unanimous agreement that the item is "bad."

If an item receives a CVR of 0 or a negative value, it does not meet the content validity criteria and should be removed from the scale (Ayre & Scally 2014; Lawshe, 1975; Wilson, et al., 2012). In the context of this study, the critical CVR value for 11 experts, at a significance level of α=0.05 was determined to be 0.699 (Lawshe, 1975). This means that items with a CVR below 0.699 did not meet the required content validity threshold. Based on expert feedback, two items failed to meet the content validity criterion (CVR < 0.699). One item was recommended for removal based on expert opinions. Thirteen new items were suggested and added to the trial form. As a result, the initial 36-item form was revised to a 46-item trial form after the expert evaluation and content validity analysis. In addition to the CVR assessment, the experts were also consulted regarding the most appropriate Likert scale format. The consensus was that a 5-point Likert scale (5: Always, 4: Frequently, 3: Occasionally, 2: Rarely, 1: Never) would be the most suitable for this study.

Stage 5 (Administration of the Trial Form to the Target Audience): Following expert review and CVR analysis, the finalized 46-item, 5-point Likert trial form was administered to 508 active athletes through both face-to-face and online methods.

Stage 6 (Exploratory Factor Analysis (EFA) & Confirmatory Factor Analysis (CFA)): The 508 collected observations underwent preliminary assumption analyses to ascertain their suitability for factor analysis. These analyses included checks for missing data, adequacy of the observation set, outliers, multicollinearity, factorability of the correlation matrix (R), normality, and linearity. Subsequently, hypothesis analyses were conducted separately for two distinct sets of observations.

Data Analysis

This study employed exploratory and confirmatory factor analyses as quantitative methods to identify the characteristics athletes consider when observing their competitors and the relative importance of these factors. To evaluate scale reliability, Cronbach's alpha internal consistency values and composite reliability values were calculated. Additionally, preliminary analyses were performed to assess the data's suitability for factor analysis, including determining the number of factors and their loading values.

Regarding sample size adequacy for exploratory factor analysis (EFA), various recommendations exist. Krichbaum et al. (2011) suggest a minimum of 125 participants for a 25-item questionnaire, while Cheong et al. (2017) recommend at least five times as many participants as items. Vielma-Aguilera et al. (2023) propose a minimum of ten participants per item for both EFA and CFA, and Echeverri et al. (2019) suggest a sample size exceeding 500 is sufficient for scale validation using EFA. Considering the 508 observations obtained in the current study, it is concluded that the sample size is adequate based on these recommendations.

Analysis of central tendency measures (mode, median, and mean) for scale items indicated a near-normal distribution due

to their close proximity. Further, outlier detection using Mahalanobis distances and Z scores revealed all Z values fell within the range of -2.91 to 3.27. Adhering to Tabachnick's criteria (-4, +4), no individual outliers were identified within the dataset.

While a Z score range of -4 to +4 is commonly employed to assess multi-item scale structures and identify underlying factors (Vannatta, 2005), Mahalanobis distances were also analyzed to detect multiple outliers. Using the Chi-squared distribution as a benchmark (χ2 46;0,001=86.661), 34 observations exceeding this value were excluded, leaving 474 observations for subsequent analyses.

Acknowledging the potential challenge in achieving perfect linearity for all variables (Kara et al., 2023), the analyses proceeded under the assumption of linear relationships. To assess normality, individual items were examined, revealing close alignment between central tendency measures and skewness/kurtosis coefficients, thus confirming univariate normality (Can, 2018). Skewness values for the 46 items ranged from .149 to -1.282, while kurtosis values ranged from 1.234 to -1.234. These values comfortably fall within the acceptable range for normality (-3.3 to +3.3 for skewness and -7 to +7 for kurtosis) as suggested by Bernstein (2000).

On the other hand, Multicollinearity was evaluated using Tolerance and Variance Inflation Factor (VIF) values. The 46 items yielded Tolerance values between 0.300 and 0.599 and VIF values between 1.731 and 3.326. Only item 35 exhibited Tolerance (0.177) and VIF (5.60) values outside the acceptable range, leading to its exclusion from further analysis. The remaining 45 items, with Tolerance values >0.20 and VIF values <5, indicated the absence of multicollinearity within the dataset.

Type I error may occur in the presence of autocorrelation of the errors expressing the correlation between the error terms that occur at different time points of the model (Jenson et al., 2007). In this context, the Durbin-Watson (D-W) value for all items was calculated as 1.949 and it was concluded that the errors were independent of each other (Kalaycı, 2010).

Furthermore, in assessing the factorability of the correlation matrix (R), a crucial assumption for factor analysis, the Kaiser-Meyer-Olkin (KMO) value was found to be .949 in the "Measurement of Sampling Adequacy Test." Bartlett's Test of Sphericity also indicated that the relationships between items were significantly different from zero. According to the criteria outlined by Hutcheson and Sofroniou (1999) and interpreted by Dağlı (2015), KMO values between 0.5 and 0.7 are considered moderate, 0.7 to 0.8 good, 0.8 to 0.9 very good, and 0.9 and above excellent. The obtained value of 0.949 clearly indicates excellent factorability. The significance of Bartlett's Test of Sphericity (p<.05) further confirms that the relationships within the correlation matrix are meaningful and the structure is suitable for factor analysis (Gürbüz & Şahin, 2014). The high KMO statistic of 0.949 reinforces the conclusion that the matrix is well-factorable. Consequently, the null hypothesis of Bartlett's Test of Sphericity, which posits no significant relationships between items, is rejected (χ2 = 11859.238, p<.05).

Table 1.
Descriptive information about gender, sport category and duration of sportsmanship parameters of participant active athletes

		N	%
Gender	Female	255	50.2
	Male	253	49.8
Sport Category	Individual Sports	296	58.3
	Team Sports	212	41.7
Duration of Sportsmanship	1-3 Years	178	35
	4-6 Years	101	20
	7-9 Years	92	18
	10 Years and over	137	27
Total			100.0

Table 1 shows the descriptive statistics of the participating active athletes. To further establish the construct validity of the Scale of Observing the Opponent in Sport, additional data was collected from 491 active athletes. The analyses aimed to determine estimated error variances, standardized factor loadings, goodness-of-fit criteria, and Cronbach's alpha reliability coefficients for the scale. The 30-item scale, finalized before CFA, was administered to this target group, and the resulting 491 observations were subjected to preliminary assumption analyses, including checks for missing data, linearity, normality, sample size adequacy, and multicollinearity.

Following missing data analysis, central tendency measures (mode, median, and mean) and their relative positions were

evaluated to assess normality. The close proximity of these values indicated univariate normality. Furthermore, analysis of skewness and kurtosis values revealed a generally negative distribution, with skewness values between 0.110 and -1.287 and kurtosis values between 1.227 and -1.319. While the typical range for skewness in univariate normality is ±1 (Göldağ, 2019), values between -3.3 and +3.3 are also considered acceptable (Bernstein, 2000). The obtained results met these criteria, confirming the normality assumption. Outlier analysis was performed using Mahalanobis distances for multiple outliers and Z values for single outliers. Mahalanobis values exceeding the critical value (χ2 30;0,001=59.703) led to the exclusion of 30 observations. Additionally, with Z values ranging between 2.127 and -2.249, no single outliers were detected. Consequently, the subsequent analyses proceeded with the remaining 461 observations.

To assess potential multicollinearity, Variance Inflation Factor (VIF) and Tolerance values were examined. The analysis revealed VIF values ranging from 1.561 to 3.522 and Tolerance values between 0.284 and 0.614. As all Tolerance values exceeded 0.20 and all VIF values remained below 5, the absence of multicollinearity was confirmed. Following these preliminary analyses, and considering Tabachnick's criteria (Tabachnick & Fidell, 2015), the observation set of 461 was deemed suitable for confirmatory factor analysis (CFA). Consequently, CFA was conducted on this dataset, utilizing the 30-item scale form.

Results

Validity Results

The initial dataset for EFA consisted of 508 observations, which was reduced to 474 after preliminary assumption analyses. The explained variance values, indicating the extent to which the sub-dimensions represent the variables in the dataset, ranged from .811 to .465. While values below .10 for these indicators are generally considered problematic, relying solely on numerical thresholds might not be sufficient. To gain further insight into the functionality of the items, additional methods were employed, including the "Scree Plot," "Percentage of Total Variance Method," "Kaiser Method," and "Explained Variance Criterion" (Çokluk et al., 2012). Assuming that a plateau in the scree plot signifies the emergence of a new factor, the region between two points is interpreted as a factor (Kara et al., 2023). Figure 1 illustrates a clear plateau after the 5th point, suggesting a 4-factor structure for the Scale of Observing the Opponent in Sport. The Kaiser Method, which identifies factors with eigenvalues greater than 1, also supports a 4-factor solution. However, the eigenvalue exhibiting a decreasing acceleration from the outset requires further interpretation. To provide a more objective assessment of the main breaking points, the explained variance table is presented below. This table will help clarify the factor structure and address any potential ambiguities.

Figure 1. Slope Inclination Graph

The Percentage of Total Variance method, a statistical criterion employed across various domains, assesses the contribution of individual factors to the overall variance within a dataset. This technique aids in identifying the principal factors, with an additional contribution of less than 5% signaling the attainment of the maximum number of factors (Kalaycı, 2010). Within this context, Table 3 reveals a four-factor structure.

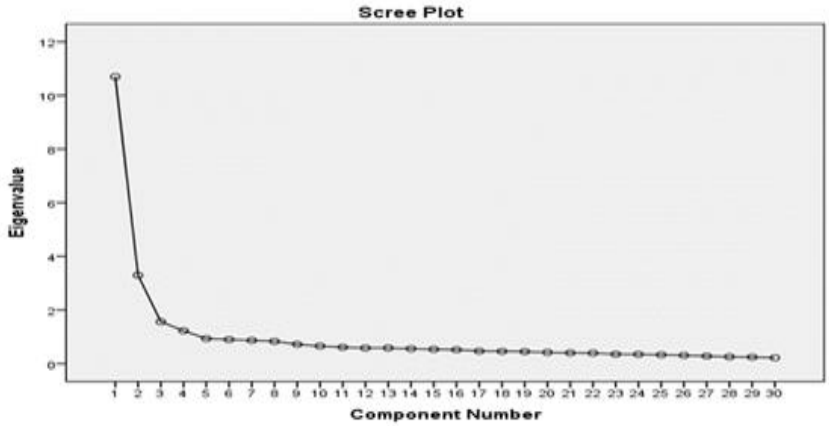

Figure 1. *Slope Inclination Graph*

Table 2
Total Variance Explained

Component	Initial Core Values			Total extraction of squared loads		
	Total	Variance	Cumulative	Total	Variance	Cumulative
1	10.697	35.658	35.658	5.822	19.408	19.408
2	3.295	10.983	46.641	4.149	13.831	33.239
3	1.564	5.215	51.856	3.973	13.243	46.482
4	1.226	4.085	55.941	2.838	9.459	55.941
30	.198	761	100.000			

Considering the explained variance criterion, while Chen et al. (2014) acknowledge that the percentage of explained variance might occasionally fall below the recommended 30% threshold, Büyüköztürk (2018) suggests an ideal ratio of 30% or higher for unidimensional scales. However, in social sciences, a generally accepted range lies between 40% and 60%. In this study, the achieved explained variance of 55.941% is notably favorable. Supporting this perspective, Direktör and Nuri (2019) deemed a 46.3% explained variance acceptable for a single-factor scale. Similarly, Demir (2023) emphasized the significance of exceeding 40% explained variance in social sciences research. Additionally, Büyüköztürk (2012) proposed a minimum of 30% explained variance for scale acceptability.

Therefore, when considering all criteria collectively, the presence of a 4-factor structure is strongly supported. Horn's (1965) parallel analysis, which compares randomly distributed experimental indicators with eigenvalues, further corroborates this 4-factor structure. The analysis, based on the total variance explained table, reveals eigenvalues greater than 1 for four factors, collectively accounting for approximately 56% of the total variance. As detailed in Table 3, factor 1 explains 19.408% of the total variance, factor 2 explains 13.831%, factor 3 explains 13.243%, and factor 4 explains 9.459%. Table 3 also provides a list of items excluded from the analysis along with the reasons for their exclusion.

Table 3.
Exploratory Factor Analysis Item Inferences and Reasons

Communalities<0.30 (Items)	Items with Factor Loadings Below 0.45	Binary Items	Rational Reasons
17-40-44	39-42-45	5-10-14-25-33	16-18-19-35

Following exploratory factor analysis, items 18, 19, 16, and 35 were removed as they failed to form a factor. Additionally, items 17, 40, and 44 were excluded due to communalities values less than 0.30. Items 39, 42, and 45, with factor loading values below 0.45, were also deemed unsuitable. Furthermore, items 5, 10, 14, 25, 31, and 33, exhibiting overlapping characteristics due to factor loading differences less than 0.10, were removed. Consequently, the initial 46-item form was refined to a 30-item, 4-factor structure explaining 56% of the variance. Table 3 presents the final scale structure, including the retained items and their corresponding communality values.

Table 4.
Common Variances, Factor Loadings and Aggregated Factors of The Items

No	Items	Factor 4	Factor 3	Factor 2	Factor 1	Common Factor Variance (h2)
M32	Providing a Pleasure to Watch	.505				.501
M34	Social Media Interactions	.719				.567
M36	Projected Image	.811				.674
M37	Popularity in his Branch	.722				.591
M38	Past Sporting Achievements	.591				.507
M41	Leadership Qualities	.578				.531
M43	Sporting Earnings	.715				.563
M46	Family Relationships	.706				.534
M4	Physical Skills		.465			.444
M20	Competition Concentration		.557			.507
M21	Physical Stamina		.729			.634
M22	Speed And Agility		.755			.674
M23	Power and Strength Level		.798			.721
M24	Flexibility Level		.668			.490
M26	General Fitness		.689			.581
M27	On-Field Behaviour (Impression)		.564			.540
M28	Physical Readiness		.704			.634
M29	Reflexes		.631			.562
M30	Techniques Specialized in		.603			.520
M9	Body Language			.533		.435
M11	Communication with The Referee			.657		.505
M12	Communication with Own Team Members			.650		.575
M13	Attitude Towards The Audience			.698		.577
M15	Spirit of Fair Play			.468		.334
M1	Defence Strategy				.639	.488
M2	Offence Techniques				.683	.536
M3	Game Dominance				.681	.604
M6	Game Building Ability				.736	.644
M7	Position Diversification				.765	.669
M8	Tactical Actions				.699	.639
	Explained Variance Values	%19.40	%13.83	%13.24	%9.45	%55.94
	Cronbach's Alpha Values	.86.	.92	.73.4	.86.4	.93

The total variance values of the items and their raw versions are presented in Table 5. The analysis revealed a total explained variance of approximately 56%. Cronbach's alpha internal consistency reliability coefficients were calculated for

each factor and the overall scale: Factor 1 (.864), Factor 2 (.734), Factor 3 (.920), Factor 4 (.863), and the entire scale (.930). Table 4 further outlines the nomenclature, number of items, and reliability values for each dimension, considering their relational status, language, and expression features within the context of existing literature.

Table 5.
Factor Names and Reliability Coefficients

Number of Factors	Factor Names	Item Count	Cronbach Alfa
Factor 1	Tactics-Strategy	6	.86
Factor 2	Communication	5	.73
Factor 3	Technical-Physical	11	.92
Factor 4	Image	8	.86
Total Scale			.93

Based on the literature review, the factors were appropriately named as follows: the 1st factor was designated as "Tactics-Strategy," the 2nd factor as "Communication," the 3rd factor as "Technical-Physical," and the 4th factor as "Image." All factors exceeded the critical acceptance threshold for the reliability coefficient (>0.60), indicating that the measurement tool yielded reliable results

Reliability Results

The confirmatory factor analysis yielded standardized loading values for each factor as follows: For the 1st factor, the standardized loading values ranged from 0.80 to 0.64, with the 8th item being the most strongly explanatory. For the 2nd factor, the standardized loading values ranged from 0.65 to 0.55, with the 12th item emerging as the most explanatory. For the 3rd factor, the standardized loading values ranged from 0.81 to 0.71, with the 22nd item being the most strongly explanatory. For the 4th factor, the standardized loading values ranged from 0.73 to 0.64, with the 41st item identified as the most explanatory.

Further analysis, as proposed by Kara et al. (2023), involved examining T values to assess potential differences between participants providing extreme positive or negative responses to the items, thus evaluating item discrimination properties. All T values fell within the critical range of -1.96 to +1.96, indicating satisfactory item discrimination. These T values provide additional support for the inclusion of all 30 items in the final scale. Figure 2 presents the standardized values and corresponding T values for each item.

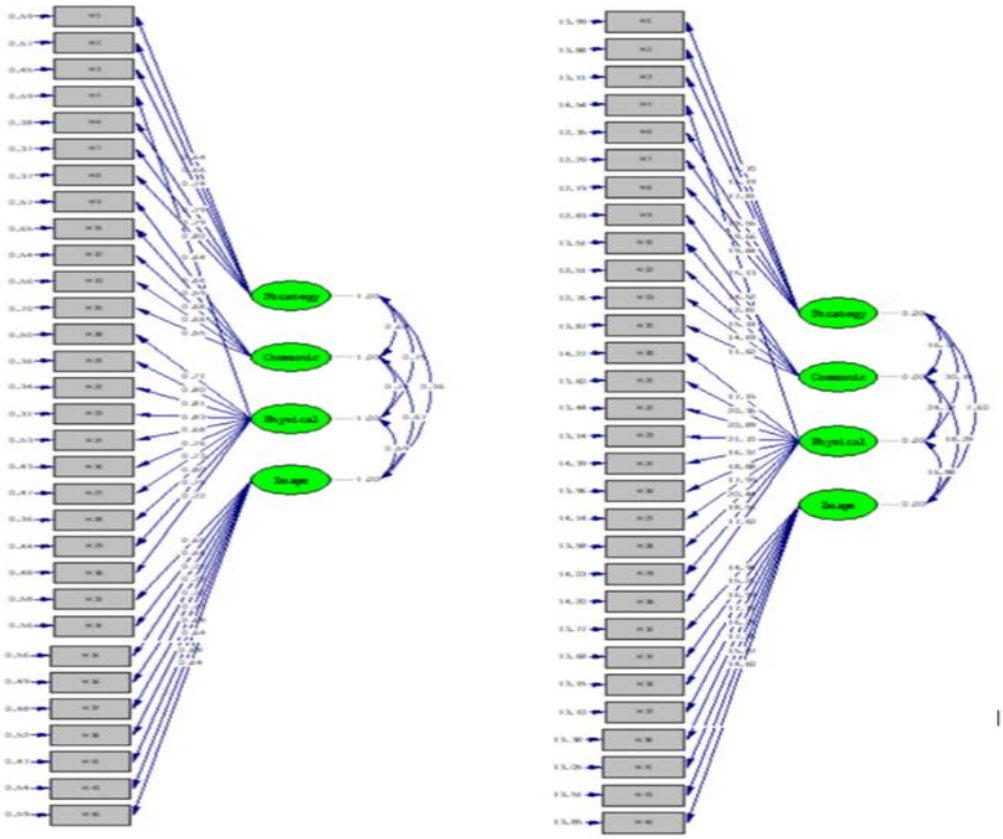

Figure 2. *Standardized Values of the Tested Model and Significance Levels of t Values (p≤=.05)*

Figure 2 reveals high values for all standardized relationship coefficients, further confirming the strong associations between items and their respective factors. Additionally, all t values associated with the scale items were found to be significant, providing further evidence for the validity of the measurement model. Importantly, the model's goodness-of-fit criteria, serving as supplementary evidence, clearly indicate a strong fit between the model and the observed data from the study group (Çokluk et al., 2012). This alignment between the theoretical model and empirical observations further strengthens the validity and reliability of the developed scale.

Table 6.
Goodness of Fit Criteria and Generated Values

Compliance Measurement	Perfect Fit	Good-Acceptable Fit	Obtained Value
χ2/sd	<2	<5	3.2
RMSEA	0≤RMSEA≤ .05	.05≤ RMSEA≤ .08	.05≤ .072 ≤ .08
SRMR	0 ≤ SRMR ≤ .05	.05≤ SRMR ≤ .10	.05≤ .069 ≤ .08
NFI	.95 ≤ NFI ≤ 1.00	.90 ≤ NFI ≤ .95	.95 ≤ .96≤ 1.00
NNFI	.97 ≤ NNFI ≤ 1.00	.95 ≤ NNFI ≤.97	.95 ≤ .97 ≤ .97
CFI	.97 ≤ CFI ≤ 1.00	.95 ≤ CFI ≤ .97	.95 ≤ .95 ≤ .97
GFI	.95 ≤ GFI ≤ 1.00	.90 ≤ GFI ≤ .95	.90 ≤ .90 ≤.95
AGFI	.90 ≤ AGFI ≤ 1.00	.85 ≤ AGFI ≤ .90	.85 ≤ .85≤ .90

References: (Munro, 2005; Schreiber vd., 2006; Şimşek, 2020; Hooper and Mullen 2008; Schumacker and Lomax, 2004; Lenz vd., 2010; Wang and Wang, 2019).

Within the scope of model fit, the χ2/sd indicator (χ2: 1277 and sd: 399) was calculated as 3.2. A low Chi-square value signifies a good model fit (Kline, 2014; Sumer, 2000), and the study's findings fall within the acceptable critical value range. Other model fit indices were also calculated: RMSEA = .072, SRMR = .069, NFI = .96, NNFI = .97, CFI = .95, GFI = .90, and AGFI = .85. These values, falling within acceptable limits, indicate that the model serves its intended purpose (Jöreskog & Sörbom, 1993). Thus, the model fit for the developed 4-factor, 30-item opponent observation scale in sport was confirmed.

To further assess the scale's psychological construct validity, Table 6 presents the following factor values: the square of the maximum shared variance (MSV), the average variance extracted (AVE), the average of the square of the maximum shared variance (ASV), and the composite reliability values (CR).

The study's findings reveal that the calculated AVE values, aligned with convergent and divergent validity evidence for the factors and intra-factor structures, are greater than 0.5 (AVE > 0.5). Additionally, all CR values surpass their corresponding AVE values (Yaşlıoğlu, 2017). This observation fulfills the condition that CR values, considered a fundamental criterion for convergent validity, should exceed AVE values, representing the average variance explained (CR > AVE).

Divergent validity, signifying weaker inter-factor relationships compared to intra-factor relationships in multi-factor structures, denotes the distinctness of separate factors. In this study, the MSV values exceeded the ASV values, supporting this notion. Furthermore, fulfilling the divergent validity criterion, AVE values were greater than MSV values. Collectively, these findings indicate that the divergent validity criteria are generally met.

Analyzing convergent reliability values (CR), which offer additional evidence, all values met the required threshold of .70. Table 7 presents these values alongside the necessary criteria, further substantiating the scale's convergent validity.

Table 7.
Convergent and Divergent Validities and Combining Reliability Values of the Scale

Factors	AVE	MSV	ASV	CR
1	0.53	0.50	0.185	0.86
2	0.55	0.50	0.185	0.73
3	0.56	0.50	0.185	0.92
4	0.50	0.50	0.185	0.86
Criteria CR>AVE	AVE>.50	MSV<AVE	ASV<MSV	CR>.70

In the current scaling study, Cronbach's alpha reliability analysis coefficients were obtained from the 491 observations utilized in the analyses. The final 30-item scale, applied to the active athlete study group, yielded the following reliability coefficients: Factor 1 (.86), Factor 2 (.73), Factor 3 (.92), Factor 4 (.86), and the overall scale (.93). These findings confirm the high reliability of The Scale of Observation of Opponent in Sport (SRAS) as a measurement tool, thereby establishing its psychological construct validity.

Conclusion and Recommendations

Sport, encompassing both positive and negative emotions like excitement, competition, success, and failure, often drives athletes to employ various strategies, including observing their rivals, in pursuit of victory. Observation enables athletes to analyze opponents' behavior and performance, thereby enhancing their strategic planning, anticipation skills, and overall on-field performance. The Scale of Observing the Opponent in Sport (SRAS), developed to measure athletes' focus on technical, tactical, physical, and communication aspects of their opponents, is thus crucial for athletic success.

This study aimed to identify the factors active athletes prioritize when observing their competitors. Data collected from two groups of athletes underwent exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) to assess the scale's construct validity and reliability.

The initial data collection in July 2024 for EFA involved 508 observations, reduced to 494 after assumption analyses. This data provided detailed descriptive statistics on athlete demographics and sports backgrounds. The second data collection in August 2024 involved 491 active athletes for CFA, testing the scale's validity and reliability. The scale development process encompassed six stages: focus group interviews, essay writing by target athletes, literature review, content validity ratio analysis, trial form administration, and EFA/CFA. Expert opinions were sought throughout these stages to create and refine scale items.

EFA results revealed that the explained variance values of the scale items were between .811 and .465, with four factors explaining 55.941% of the total variance. These factors represent key elements athletes consider when observing opponents:

- Tactics-Strategy (α = .86): Focus on opponents' game plans, strategies, and tactical decisions.
- Communication (α = .73): Observation of opponents' verbal and nonverbal communication.
- Technical-Physical (α = .92): Evaluation of opponents' technical skills and physical capabilities.
- Image (α = .86): Focus on opponents' overall image and projected personality traits.

The Scale of Observing the Opponent in Sport (SRAS) demonstrated high reliability, with a Cronbach's alpha internal consistency coefficient of .93 for the whole scale. Confirmatory factor analysis (CFA) further supported the validity of the four-factor structure, indicating a good model fit. The CFA model fit indices were within acceptable ranges: $\chi 2/sd$ = 3.2, RMSEA = .072, SRMR = .069, NFI = .96, NNFI = .97, CFI = .95, GFI = .90, and AGFI = .85. These values suggest that the model aligns well with the observed data, providing evidence for its validity and the appropriateness of the four-factor structure. Overall, the SRAS has been shown to be a reliable and valid instrument for assessing the factors that athletes focus on when observing their opponents.

Limitations and Future Directions

While this study offers valuable insights, it is not without limitations. Alternative measures like similar scale validity could have further strengthened the psychometric properties of the SRAS. However, the lack of existing instruments measuring opponent observation in sport precluded this approach. Additionally, the test-retest technique, which assesses consistency over time, was not employed due to the dynamic nature of the athlete population. Despite these limitations, the study's findings provide a comprehensive understanding of athletes' observational focus. This knowledge can contribute to a deeper understanding of their habits and strategies, potentially leading to interventions aimed at enhancing performance. Future research could explore the relationship between these observational factors and actual performance outcomes, and examine the impact of training programs designed to improve observational skills.

Recommendations

Identifying the factors athletes prioritize when observing opponents is crucial for coaches and sport scientists. The developed scale serves as an effective tool to understand athletes' observational habits and strategies, revealing the importance they place on tactical, communication, technical, and image-related factors.

This scale can be utilized in talent identification and performance analysis, particularly during the development of young athletes, to determine critical observational factors influencing performance. Coaches can also leverage this scale to enhance athletes' observation abilities and strategic thinking skills.

Researchers can employ this scale to compare observational habits across different sports and genders, potentially leading to the development of novel strategies and training programs that support athlete development. Further research can also investigate observational habits in specific sports and their impact on performance.

Finally, to enhance the scale's validity and reliability, it is recommended to test it in diverse cultural and geographical contexts. This approach would ensure the scale's generalizability and universality, facilitating a broader understanding of athletes' observational habits.

Etik Komite Onayı: Bu çalışma için etik komite onayı Hatay Mustafa Kemal Üniversitesi, Sosyal ve Beşeri Bilimler Bilimsel Araştırma ve Yayın Etiği Kurulu'ndan (04 Temmuz.2024, Karar No: 07, Sayı No: 02) alınmıştır.
Katılımcı Onamı: Çalışmaya katılan tüm katılımcılardan yazılı onam alınmıştır.
Hakem Değerlendirmesi: Dış bağımsız.
Yazar Katkıları: Fikir- N.S.K.; Tasarım-N.S.K.; Denetleme M.K.; Kaynaklar-E.B.Ö.; Veri Toplanması ve/veya İşlemesi M.K., N.S.K., E.B.Ö.; Analiz ve/ veya Yorum- M.K., N.S.K.; Literatür Taraması- E.B.Ö.; Yazıyı Yazan- N.S.K.; M.K.; E.B.Ö.; Eleştirel İnceleme- E.B.Ö.
Çıkar Çatışması: Yazarlar, çıkar çatışması olmadığını beyan etmiştir.
Finansal Destek: Yazarlar, bu çalışma için finansal destek almadığını beyan etmiştir.

Ethics Committee Approval: Ethics committee approval for this study was obtained from Hatay Mustafa Kemal University, Social and Human Sciences Scientific Research and Publication Ethics Committee (July 04, 2024, Decision No: 07, Issue No: 02).
Informed Consent: Written consent was obtained from all the participants.
Peer-review: Externally peer-reviewed.
Author Contributions: Concept-N.S.K.; Design- N.S.K, Supervision-M.K.; Resources-E.B.Ö.; Data Collection and/or Processing-M.K., N.S.K, E.B.Ö.; Analysis and/or Interpretation- M.K., N.S.K.; Literature Search-E.B.Ö.; Writing Manuscript- N.S.K., M.K., E.B.Ö.; Critical Review- E.B.Ö.
Conflict of Interest: The authors have no conflicts of interest to declare.
Financial Disclosure: The authors declare that they received no financial support for this study.

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RAKİP GÖZLEMLERKEN, O SPORCUNUN AŞAĞIDAKİ ÖZELLİKLERİNİ DİKKATE ALIRIM	Her Zaman	Sık Sık	Ara Sıra	Nadiren	Hiçbir Zaman
1. Savunma Stratejisi	5	4	3	2	1
2. Hücum Teknikleri	5	4	3	2	1
3. Oyun Hakimiyeti	5	4	3	2	1
6. Oyun Kurma Yeteneği	5	4	3	2	1
7. Pozisyon Çeşitlendirebilmesi	5	4	3	2	1
8. Taktik Hamleleri	5	4	3	2	1
9. Beden Dili	5	4	3	2	1
11. Hakemle olan iletişimi	5	4	3	2	1
12. Kendi takım üyeleri ile olan iletişimi	5	4	3	2	1
13. Seyirciye karşı tutumu	5	4	3	2	1
15. Adil Oyun Ruhu	5	4	3	2	1
4. Fiziksel Becerileri	5	4	3	2	1
20. Müsabaka konsantrasyonu	5	4	3	2	1
21. fiziksel dayanıklılığını	5	4	3	2	1
22. Hız ve çevikliğini	5	4	3	2	1
23. Güç ve kuvvet seviyesi	5	4	3	2	1
24. Esneklik seviyesi	5	4	3	2	1
26. Genel kondisyonu	5	4	3	2	1
27. Saha içi duruşu	5	4	3	2	1
28. Fiziksel hazırbulunuşluğu	5	4	3	2	1
29. Refleksleri	5	4	3	2	1
30. Uzmanlaştığı teknikler	5	4	3	2	1
32. Seyir zevki vermesi	5	4	3	2	1
34. Sosyal medya etkileşimleri	5	4	3	2	1
36. Yansıttığı İmajı	5	4	3	2	1
37. Branşındaki popülerliği	5	4	3	2	1
38. Geçmiş Sportif başarıları	5	4	3	2	1
41. Liderlik özellikleri	5	4	3	2	1
43. Sportif kazancı	5	4	3	2	1
46. Aile ilişkileri	5	4	3	2	1

OBSERVING THE OPPONENT, I TAKE INTO ACCOUNT THE FOLLOWING CHARACTERISTICS OF THAT ATHLETE	All the time	Frequently	Occasionally	Rarely	Never
1. Defence Strategy	5	4	3	2	1
2. Offence Techniques	5	4	3	2	1
3. Game Dominance	5	4	3	2	1
6. Game Building Ability	5	4	3	2	1
7. Position Diversification	5	4	3	2	1
8. Tactical Moves	5	4	3	2	1
9. Body Language	5	4	3	2	1
11. Communication with the referee	5	4	3	2	1
12. Communication with own team members	5	4	3	2	1
13. Attitude towards the audience	5	4	3	2	1
15. Spirit of Fair Play	5	4	3	2	1
4. Physical Skills	5	4	3	2	1
20. Competition concentration	5	4	3	2	1
21. physical endurance	5	4	3	2	1
22. Speed and agility	5	4	3	2	1
23. Strength and power level	5	4	3	2	1
24. Flexibility level	5	4	3	2	1
26. General fitness	5	4	3	2	1
27. In-field stance	5	4	3	2	1
28. Physical readiness	5	4	3	2	1
29. Reflexes	5	4	3	2	1
30. Techniques specialised in	5	4	3	2	1
32. Providing viewing pleasure	5	4	3	2	1
34. Social media interactions	5	4	3	2	1
36. Projected Image	5	4	3	2	1
37. Popularity in his branch	5	4	3	2	1
38. Past sporting achievements	5	4	3	2	1
41. Leadership characteristics	5	4	3	2	1
43. Sporting earnings	5	4	3	2	1
46. Family relations	5	4	3	2	1