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I Volunteered: The Mediating Role of Leisure Satisfaction in The Effect of Leisure Motivation on The Meaning of Life

Gönüllü Oldum: Serbest Zaman Motivasyonunun Yaşamın Anlamına Etkisinde Serbest Zaman Doyumunun Aracılık Rolü

Research Article / Araştırma Makalesi

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Abstract

This study aims to test the mediating effect of leisure satisfaction on the relationship between leisure motivation and meaning of life. In the study, data were collected from individuals living in Istanbul using the convenience sampling method. A total of 324 volunteers (Age: 27.98±10.43 year) participated in the study, of which 156 (48.1%) were females and 168 (51.9%) were males. The data collection instrument consisted of two parts; the first part included questions about participants' demographic information, while the second part included the "Leisure Motivation Scale (LMS)," "Leisure Satisfaction Scale (LSS)," and "Meaning in Life Questionnaire (MLQ)". Basic descriptive statistics and Pearson correlation analysis were used to analyze the data. Furthermore, the mediating effect of leisure satisfaction on the relationship between leisure motivation and meaning of life was calculated using SPSS Process Macro (Model 4). Based on the results of Pearson correlation analysis, there were statistically significant, moderately positive relationships between the mean scores of "LMS," "LSS," and "MLQ" ($p<0.01$). The results indicate that leisure motivation has a direct and positive significant effect on the meaning of life ($\beta= 0.46$; $p<0.01$). Furthermore, it was confirmed that leisure satisfaction plays a mediating role in the relationship between leisure motivation and the meaning of life ($\beta= 0.18$; $p<0.01$). Consequently, an increase in the leisure motivation of volunteers leads to an increase in their leisure satisfaction, which gives more meaning to the individual's life. Therefore, it is significant to identify factors that increase people's participation in volunteer activities and develop awareness programs in this context.

Keywords: Leisure motivation, leisure satisfaction, meaning in life, volunteering

Öz

Bu çalışmanın amacı, serbest zaman motivasyonunun yaşamın anlamına etkisinde serbest zaman doyumunun aracılık etkisini test etmektir. Araştırmada elde edilen veriler kolayda örnekleme yöntemi kapsamında İstanbul'da yaşayan bireylerden toplanmıştır. Araştırmaya 156'sı (%48.1) kadın, 168'i (%51.9) erkek olmak üzere toplam 324 gönüllü ($Yaş_{ort}$: 27.98±10.43 yıl) katılmıştır. Veri toplama aracı iki bölümden oluşmaktadır. Birinci bölümde, katılımcıların demografik bilgilerini içeren sorular yer alırken ikinci kısımda; "Serbest Zaman Motivasyonu Ölçeği (SZMÖ)", "Serbest Zaman Doyumu Ölçeği (SZDÖ)" ve "Yaşamın Anlamı Ölçeği' (YAÖ)" yer almaktadır. Verilerin analizinde, temel betimleyici istatistikler, Pearson korelasyon analizi yöntemleri kullanılmıştır. Ayrıca, serbest zaman motivasyonu ile yaşamın anlamı arasındaki ilişkide serbest zaman doyumunun aracılık rolü etkisi SPSS Process Macro (Model 4) ile hesaplanmıştır. Pearson korelasyon analiz sonuçları, "SZMÖ", "SZDÖ" ve "YAÖ" ortalama puanları arasında istatistiksel olarak orta düzeyde pozitif yönlü anlamlı ilişkiler olduğunu göstermiştir ($p<0.01$). Elde edilen bulgulara göre, serbest zaman motivasyonu yaşamın anlamı üzerinde doğrudan ve pozitif anlamlı etkiye sahiptir ($\beta= 0.46$; $p<0.01$). Bununla birlikte serbest zaman doyumunun, serbest zaman motivasyonu ile yaşamın anlamı arasındaki ilişkide aracılık rolü olduğu da doğrulanmıştır ($\beta= 0.18$; $p<0.01$). Sonuç olarak; gönüllülerin serbest zaman motivasyonlarındaki artış ile birlikte serbest zaman doyumlarında da artış gözlemlenmiş ve bu durumun bireyler için yaşamı daha anlamlı hale dönüşmesinde etkili olduğu ifade edilebilir.

Anahtar Kelimeler: Serbest zaman motivasyonu, serbest zaman doyumu, yaşamın anlamı, gönüllülük

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Introduction

Leisure is an activity with the aims of relaxation, entertainment or personal development carried out freely, outside of the work, education and mandatory daily responsibilities of individuals (Caldwell, 2005, Gürbüz, 2017; Mansfield, Daykin, & Kay, 2020; Roberts, 2006). This concept provides the opportunity to meet basic needs like social interaction, self-realization and stress management by offering the chance for individuals to participate in events that develop identity, self-expression and free will (Ahn & Song, 2023; Jun & Kyle, 2012). Participation in leisure activities was observed to play a role in supporting the social skills of individuals and increasing social capital; thus, contributing to social adjustment (Bone et al., 2022; Kleiber, 2020; Koçak & Gürbüz, 2024). In this context, the motivational tendency of individuals toward leisure activities, in other words, leisure motivation, emerges as a determinative factor in the occurrence of positive effects for individuals (Beard & Ragheb, 1983; Kim, Brown, & Yang, 2019).

Leisure motivation is a basic factor determining the desire for participation in leisure activities and positive feelings obtained by individuals and is investigated under two main headings of internal and external motivation. Intrinsic motivation represents the individual doing an activity to meet their internal needs, for enjoyment or because they are interested. External motivation represents an individual participating in events due to external factors like external rewards, recognition, social acceptance or pressure (Alexandris, Tsorbatzoudis & Grouios, 2002; Chen & Pang, 2012). In this context, the internal and external components of leisure motivation undertake determinative roles in the continuous participation of individuals in activities, and their leisure satisfaction levels (Beggs & Elkins, 2010).

Leisure satisfaction represents the psychological and emotional satisfaction levels obtained by individuals from leisure activities (Beard & Ragheb, 1980). This concept reaches its highest levels when the activities an individual participates in during leisure are compatible with their interests and values and in situations where psychological needs are met (Leversen et al., 2012; Shin & You, 2013). Leisure satisfaction is not just limited to individual psychological satisfaction, at the same time it plays an important role in terms of social relationships (Kim et al., 2016). These interactions allow individuals to express themselves, to create support systems and to strengthen social bonds. Individuals participating in group activities, especially, may increase their social commitment by making new friendships in areas of common interest (Mortazavi et al., 2022). As a result, individuals find the opportunity to make their lives more valuable by deepening their perceptions about the meaning and purpose of life (Iso-Ahola & Baumeister, 2023). In other words, mood related to meaning of life is positively affected.

Meaning of life is a deep concept that individuals search for throughout their lives and which shapes their existential experiences. From a psychological and philosophical perspective, the meaning of life represents the total of the individuals' life experiences, values and goals (Wolf, 2012). Frankl (1985) stated the meaning of life was a guide to individuals when faced with challenges and events they encounter. This meaning provides motivation and a guiding framework for individuals, as they create their own life stories (Martela, & Steger, 2016). The meaning of life is deepened through the targets and goals determined by individuals; this search is enriched by voluntary activities, especially in the context of leisure activities. Individuals strengthen social relationships through volunteering and can determine targets full of meaning (Same et al., 2020). Volunteering, in addition to contributing to society, makes life more meaningful by increasing belongingness, and participants acquire a feeling of satisfaction (Zhou & Kodama Muscente, 2023). These types of activities allow individuals the chance to achieve their potential, to express themselves and to develop freely. Thus, volunteering becomes an important factor increasing feelings of satisfaction and motivation, and ensuring individuals find meaning in their lives (Faletehan et al., 2022).

When leisure motivation, leisure satisfaction and meaning of life concepts are evaluated in this framework, participation in voluntary activities by individuals will positively contribute to their motivation and satisfaction experiences and to the search for meaning related to their lives. The theoretical linkage between leisure motivation, leisure satisfaction, and meaning of life can be better understood through the lens of Self-Determination Theory (Deci & Ryan, 1985), which emphasizes the fulfillment of intrinsic psychological needs—autonomy, competence, and relatedness—as essential for fostering well-being and purpose. Intrinsically motivated leisure activities enable individuals to engage in actions aligned with personal interests and values, reinforcing a sense of agency and identity, which are fundamental to experiencing life as meaningful (Martela & Steger, 2016). Similarly, leisure satisfaction serves as a reinforcing mechanism that reflects the successful realization of personally significant experiences and goals (Newman et al., 2014). These meaningful leisure experiences contribute to eudaimonic well-being by facilitating reflection, connection with others, and personal growth—all of which are strongly associated with the development of a coherent life purpose (Ryff & Singer, 1998; Steger et al., 2006). Thus, the interplay among leisure motivation, satisfaction, and meaning of life is not merely behavioral, but deeply rooted in psychological theories of human flourishing and existential fulfillment. In the literature, there is information related to the concepts of leisure motivation (Ayhan & Öçalan, 2022; Chen, Li & Chen, 2013; Demirel et al., 2022; Molanorouzi, Khoo & Morris, 2014), leisure satisfaction (Doğan & Gürbüz, 2024; Liu et al., 2024; Satılmış et al., 2024) and the meaning of life (Czekierda et al., 2017; Guinée et al., 2022; İnal & Salar, 2020; Nozick & Benatar, 2016). Additionally, there is research in the literature related to the correlation between leisure motivation and satisfaction (Beggs & Elkins, 2010; Chen, Li & Chen, 2013). However, there is no study encountered investigating the

relationships of these three concepts, especially in the context of volunteer activities. Participation in voluntary activities provides significant contributions to the personal development of individuals, in addition to supporting the solution of social problems by strengthening social solidarity, indicating that this research will significantly contribute to the literature. Moreover, this study makes a novel contribution by integrating leisure motivation, satisfaction, and meaning of life within a single mediation model, specifically in the volunteering context, which is often overlooked in leisure literature. While prior research has separately examined these constructs, their combined effect—particularly the mediating role of leisure satisfaction—has not been empirically tested in this domain. Additionally, empirical studies have suggested significant correlations between leisure satisfaction and psychological well-being (Newman et al., 2014), as well as between life meaning and leisure experiences (Iwasaki, 2007; Musick & Wilson, 2003), reinforcing the theoretical foundation of our model. Therefore, the proposed framework is grounded in both theory and prior evidence, and addresses a meaningful gap by examining how leisure dynamics in volunteering settings contribute to existential outcomes.

In this context, volunteering is regarded as a distinctive form of leisure activity characterized by free choice, internal motivation, and social contribution (Henderson, 1984; Stebbins, 2015). Unlike compulsory work or structured obligations, volunteering is performed willingly and is often driven by a sense of purpose, altruism, or the desire for social connection (Snyder & Omoto, 2008). From a leisure perspective, volunteering enables individuals to engage in meaningful and enjoyable activities that align with their personal values and interests, fulfilling both hedonic (pleasure-oriented) and eudaimonic (meaning-oriented) aspects of well-being (Iwasaki, 2007). Leisure motivation in volunteering may arise from both intrinsic drivers such as personal growth, self-fulfillment, or passion, and extrinsic factors like social recognition or network-building (Vecina et al., 2012). These experiences often lead to enhanced leisure satisfaction through psychological rewards, emotional well-being, and social engagement. Moreover, volunteering offers a rich context for individuals to explore and deepen their meaning of life by contributing to a cause greater than themselves, fostering a stronger sense of identity and purpose (Musick & Wilson, 2003; Omoto & Snyder, 2002). Thus, investigating these concepts collectively within the volunteering context presents a valuable opportunity to understand how meaningful leisure engagement supports personal development and existential well-being.

Based on this, the basic aim of this study was to identify the mediating role of leisure satisfaction in the correlation of leisure motivation with meaning of life for individuals participating in voluntary activities. In line with this aim, the following hypotheses will be tested:

- Hypothesis 1 (H1): Leisure motivation has a direct positive effect on meaning of life.
- Hypothesis 2 (H2): Leisure motivation has a direct positive effect on leisure satisfaction.
- Hypothesis 3 (H3): Leisure satisfaction has a direct positive effect on meaning of life.
- Hypothesis 4 (H4): Leisure satisfaction has mediating role in the effect of leisure motivation on meaning of life.

Method

Research Model

This study is descriptive research based on the relational survey model, aiming to investigate the mediating role of leisure satisfaction in the correlation of leisure motivation with meaning of life. The research model is presented in Figure 1.

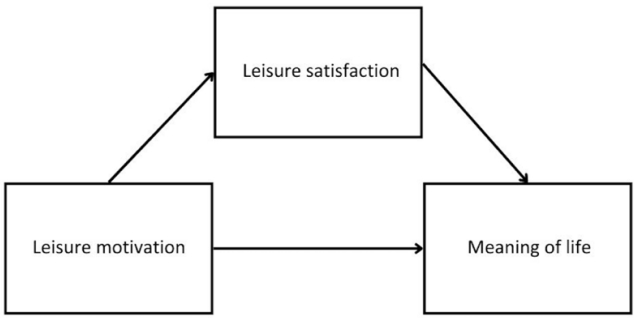

Figure 1. Research model

Research Group

The sample for the study comprised 324 individuals participating in voluntary activities benefiting society without any financial reward or expectation of personal benefit who are members of at least one civil society organization (CSO). The participants were selected using convenience sampling, based on their accessibility and willingness to participate in the research. This non-probability sampling method was preferred due to the practical constraints in reaching a randomized sample of volunteers within civil society organizations. All participants resided in İstanbul. Ages of participants varied from 18-63 years (mean age 27.98±10.43). When the demographic characteristics of individuals participating in the research are investigated, gender distribution was 48.1% female (n=156) and 51.9% male (n=168).

According to marital status, 53.1% of participants were single (n=172) and 46.9% were married (n=152). When evaluated in terms of income, 32.4% were below average (n=105), 52.5% were average (n=170) and 15.1% were above average (n=49) in terms of welfare level. In terms of receiving education about volunteering, 33% of participants had received education (n=107) and 67% had not (n=217). For duration of participation in voluntary activities, 54.9% had volunteered for 0-6 months (n=178), 8.3% for 7-12 months (n=27), 7.4% for 13-18 months (n=24), 3.1% for 19-24 months (n=10) and 26.2% for 25 months or longer (n=82) (Table 1).

Table 1. Information related to the demographic characteristics of participants

Demographic variables	N	%
Gender		
Female	156	48.1
Male	168	51.9
Marital status		
Single	172	53.1
Married	152	46.9
Income status		
Below average	105	32.4
Average	170	52.5
Above average	49	15.1
Education about volunteering		
Yes	107	33
No	217	67
Duration of volunteer activities		
0-6 months	178	54.9
7-12 months	27	8.3
13-18 months	24	7.4
19-24 months	10	3.1
25 months or more	85	26.2
Total	**324**	**100**

Data Collection Tools

Leisure motivation scale (LMS): The scale was developed by Vallerand et al. (1992) and adapted to Turkish by Güngörmüş (2012) with validity-reliability studies performed. The scale comprises seven subscales of to know, to achieve, to stimulate, identification, to determine, external regulation and lack of motivation, and contains a total of 28 items. Responses are evaluated with a rating from 1 (disagree completely) to 5 (fully agree). The scale adapted to Turkish culture was identified to have Cronbach alpha internal consistency coefficients that varied from 0.70 to 0.83. In this study, the internal consistency coefficient for the scale was calculated as 0.88.

Leisure Satisfaction Scale (LSS): The scale was developed by Neal, Sirgy and Uysal (1999) and comprises three items: 1 – Generally I have quality leisure time, 2 – Generally I'm someone who knows how to spend my leisure time, and 3 – Life becomes stressful if I don't do something with my leisure time. This scale was structured as a measurement tool by rating responses from 1 (definitely disagree) to 5 (fully agree). The Cronbach alpha internal consistency coefficient for the scale was identified as 0.66. The structure of the scale was tested with confirmatory factor analysis (CFA) and the analysis results show the model has acceptable fit indices (χ2/sd=2.11, GFI=0.98, CFI=0.99, NFI=0.98, AGFI=0.94, SRMR=0.02, RMSEA=0.05). In this study, the internal consistency coefficient for the scale was found to be 0.60.

Meaning in Life Questionnaire (MLQ): The Meaning in Life Questionnaire, developed by Steger et al. (2006), was adapted to Turkish by Demirdağ and Kalafat (2015) and validity-reliability studies were completed. The adaptation comprises two subscales of existing meaning and meaning that is sought, and comprises a total of 10 items. Individuals rate statements with a 7-point Likert scale from 1 (definitely not true) to 7 (definitely true). The structural validity of the scale was tested with CFA and the analysis results revealed the model had good level of fit (χ2/sd=3.50, RMSEA=0.06, CFI=0.95, NFI=0.93, GFI=0.93, AGFI=0.89, RFI=0.92). The reliability of the scale was supported by Cronbach alpha internal consistency coefficients, which were calculated as 0.81 for the existing meaning and 0.85 meaning that is sought. In this study, the general internal consistency coefficient for the scale was found to be 0.84.

Analysis of data

Analysis of data used IBM SPSS 25 software. The skewness and kurtosis values of variables assessed within the scope of the study were investigated and all values were observed to be within the ±2 interval. This indicates that the assumption of normality is met (George & Mallery, 2016). With the aim of determining the reliability levels of the scales, the Cronbach alpha reliability coefficients were calculated, and the following results were obtained. Values were 0.88 for the Leisure Motivation Scale, 0.60 for the Leisure Satisfaction Scale and 0.94 for the Meaning in Life Questionnaire. With the aim of investigating the correlations between variables, the Pearson moments multiplication correlation coefficient analysis was applied.

To assess the mediation effect, the PROCESS macro v4.1 developed by Hayes (2013) was used. The PROCESS macro evaluates analysis results according to confidence intervals and confidence intervals provide more reliable results if the assumption of normal distribution is not met. The significance of the mediation effect is based on whether the confidence interval contains zero or not. If zero is outside the confidence interval, the mediation effect is accepted as being statistically significant. The size of the mediation effect was interpreted in line with the values proposed by Preacher and Kelly (2011). In this model, leisure motivation was determined to be the independent variable, meaning of life was the dependent variable, and leisure satisfaction was included as the mediating variable. The significance of the indirect effects in the analysis was evaluated with resampling of 5000 using the bootstrapping method in the 95% confidence interval.

Data Collection Process

Data for the research were collected from members of diverse civil society organizations organizing voluntary activities in İstanbul in January 2024. After necessary permissions were obtained, participants were reached through both face-to-face interviews and through Google Forms. Prior to participation, all participants were informed about the purpose and duration of the study, the voluntary nature of their involvement, and their right to withdraw at any time without any consequence. As part of the informed consent process, participants were asked for explicit consent to participate in the study, both verbally and in

writing, depending on the method of data collection. As the research has the quality of being a general assessment, it was emphasized to participants that they did not need to share any information that would directly state their identity. Participants were assured that the data would be used solely for scientific purposes, with no personal identifying information being collected or stored. Only individuals accepting voluntary participation were included in the study. Furthermore, it was explicitly communicated that the data would not be shared with any third parties and would remain confidential.

Ethical Statement

The ethical suitability of the research was approved by Nişantaşı University Rectorate Ethics Committee with decision 2023/38 at a meeting dated 29.09.2023. This study was conducted in strict compliance with the ethical standards and principles established by the Declaration of Helsinki, ensuring the protection of participants' rights, autonomy, and well-being throughout the research process.

Findings

In this section, findings related to the correlations of leisure motivation, leisure satisfaction and meaning of life for individuals participating in voluntary activities are presented.

Table 2. Correlations between variables and descriptive statistics

Variables	Correlation		Descriptive statistics			
	1	2	*Mean*	*Sd*	Skewness	Kurtosis
1. Leisure motivation	-	-	4.54	0.75	-0.11	1.57
2. Leisure satisfaction	0.43**	-	3.77	0.81	-0.30	-0.37
3. Meaning of life	0.47**	0.45**	5.14	1.03	-0.38	-0.31

According to the findings in Table 2, correlations between variables were positive and significant at moderate levels. When the mean scores related to the variables are investigated, participants appeared to have leisure motivation scores of 4.54, leisure satisfaction scores of 3.77 and meaning of life scores of 5.14. Additionally, the skewness (-0.11 to -0.38) and kurtosis (1.57 to 0.37) values show the data abided by normal distribution.

Table 3. Analysis of mediating role of leisure satisfaction in the correlation of leisure motivation with meaning of life

Predictive variables	Outcome variables			
	Leisure satisfaction		Meaning of life	
	β	*SE*	*β*	*SE*
(Constant)	1.705	0.24	1.565	0.31
Leisure motivation	0.46	0.05	0.46	0.07
Leisure satisfaction			0.39	0.06
	$R^2 = 0.18$		$R^2 = 0.29$	
	$F(1, 322) = 70.98, p < 0.01$		$F(2, 321) = 67.96, p < 0.01$	

In line with the findings in Table 3, firstly leisure motivation was identified to be a significant predictor of leisure satisfaction ($\beta = 0.46$, $t(322) = 8.42$, $p < 0.01$). Within this framework, leisure motivation explained 18% of the total variance in leisure satisfaction ($F(1,322) = 70.98$, $p < 0.01$). Secondly, leisure motivation ($\beta = 0.46$, $t(322) = 6.54$, $p < 0.01$) and leisure satisfaction ($\beta = 0.39$, $t(322) = 5.94$, $p < 0.01$) were found to significantly predict meaning of life. These two variables explained 29% of the variance in meaning of life ($F(2,321) = 67.96$, $p < 0.01$).

Table 4. Indirect effect on meaning of life through mediation by leisure satisfaction

Correlation between variables	Coefficient	95% CI	
		Lower Limit	Upper Limit
H1= Leisure motivation → Leisure satisfaction	0.46**	0.34	0.56
H2= Leisure motivation → Meaning of life	0.46**	0.32	0.60
H3= Leisure satisfaction → Meaning of life	0.39**	0.26	0.52
H4= Leisure motivation→ Leisure satisfaction → Meaning of life	0.18**	0.10	0.26
Total effect	0.64**	0.50	0.77

According to Table 4, with the aim of investigating the indirect effect within the scope of the research, the PROCESS macro based on bootstrap analysis of 5000 samples was used. As a result of the analysis, the confidence intervals calculated for leisure motivation, leisure satisfaction and meaning of life (BootLLCI and BootULCI) did not contain zero (Hayes and Preacher, 2014). When leisure satisfaction is controlled as mediating variable, a significant change was observed in the predictive power of leisure motivation for meaning of life ($F(1,322)= 90.84$, $p< 0.01$) and the explained variance fell to 22% ($\beta= 0.18$, $t(322) = 6.54$, $p< 0.01$). These findings show that leisure satisfaction undertakes a mediating role in the correlation of leisure motivation with meaning of life. When the direct effect of leisure motivation on meaning of life ($\beta= 0.46$) and the indirect effect mediated by leisure satisfaction ($\beta= 0.18$) are assessed together, the total effect value ($\beta= 0.64$) was detected. With these findings, the hypotheses in the research were confirmed.

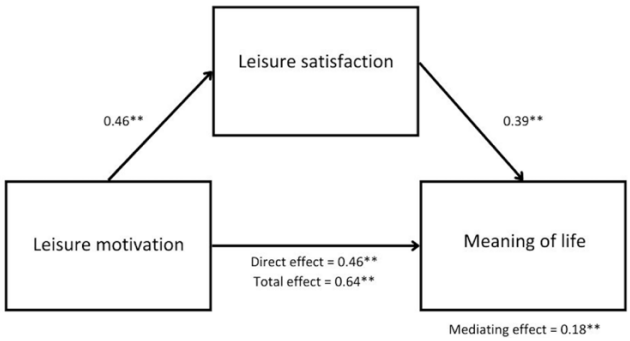

Figure 2. Analysis results related to the research model

Discussion

The basic aim of this study was to identify the mediating role of leisure satisfaction in the correlation of leisure motivation with meaning of life for individuals participating in voluntary activities. When the research findings are evaluated, positive and significant correlations were found between leisure motivation, leisure satisfaction and meaning of life (Fig. 2).

When the analysis results related to the research model are investigated, leisure motivation was identified to have positive and significant effect on leisure satisfaction. This finding supports the first hypothesis (H1). The study by Ragheb and Tate (1993) revealed there was a positive correlation between leisure motivation with leisure satisfaction. Individuals with high leisure motivation were determined to obtain higher satisfaction from leisure activities; this motivation was shown to be an important factor in increasing the satisfaction participants received from leisure experiences. The underlying reason for the findings in the study by Beggs and Elkins (2010) is that motivation positively affects the participation quality and experiences related to leisure activities of individuals. Individuals with high motivation feel more satisfied with themselves when they participate in events with interest and willingness and may become aware of skill developments; this situation clearly revealed the increasing effect of the motivation factor for leisure satisfaction. Research by Chen, Li and Chen (2013), Choi (2015) and Wu et al. (2021) are similar to these results and the findings of our research.

Leisure motivation was concluded to have a positive and significant effect on meaning of life. This finding supports the second hypothesis (H2). Although limited, existing studies provide indirect support for this relationship. The study by Iso-Ahola and Baumeister (2023) investigated the effect of leisure on the meaning of life for individuals. The study emphasized the important role played by leisure activities in self-actualization, the search for personal meaning and enhancement of satisfaction feelings for individuals and revealed leisure was a basic factor contributing to finding meaning in life. Bailey and Fernando (2012) concluded that project-based leisure activities provided higher happiness and meaning of life compared to routine-based leisure activities. These findings show that meaningful and target-focused leisure activities, like voluntary activities, create positive impacts on psychological well-being. While there is no direct empirical research found examining the specific relationship between leisure motivation and meaning of life, existing studies suggest that leisure-related behaviors can significantly contribute to the perception of meaning in life.

It was concluded that leisure satisfaction had positive and significant effect on meaning of life. This finding supports the third hypothesis (H3). There is no study encountered in the literature explaining the correlation between these two concepts. Among factors positively impacting meaning of life are psychological well-being, personal values, social connections and orienting toward meaningful targets. Leisure activities, especially meaningful social participation like volunteering, have a strong relationship with leisure satisfaction and meaning of life. Voluntary activities assist in the individual adding meaning to life by spending time with the aim of helping others and contributing to society (Wilson & Musick, 1999). These types of activities lead to individuals feeling internal satisfaction and that their lives are more meaningful. Additionally, leisure activities ensure the individual's actions are consistent with personal values; this results in higher leisure satisfaction and meaning of life. In this context, volunteering does not just contribute to society, at the same time it assists in individuals feeling more satisfied with themselves and sustaining a meaningful life.

When the analysis results are investigated, leisure satisfaction was identified to have a mediating role in the effect of leisure motivation on meaning of life. This finding supports the fourth hypothesis (H4). In the study by Matsumoto et al. (2018), participation in leisure activities was determined to shape the correlation between leisure involvement at emotional and cognitive levels with subjective happiness. The research showed that leisure satisfaction had a mediating role in the emergence of this correlation. Similarly, Cho (2024) determined that the effects of leisure nostalgia on well-being and intentions to leave a job were shaped by mediation with leisure satisfaction. In this

research, the leisure motivation of individuals participating in voluntary activities had direct effect on meaning of life; however, this effect appeared to be strengthened by mediation involving leisure satisfaction. Voluntary activities assist in individuals acquiring a meaningful place in their lives by guiding them with the purpose of providing social contributions and assisting others. These types of activities increase leisure motivation by ensuring individuals feel internal satisfaction and feel valuable. Leisure satisfaction is a tool enhancing the effect on meaning of life by ensuring these activities become more satisfying and meaningful for individuals.

Conclusion and Recommendations

This research revealed that for individuals participating in voluntary activities, the effect of leisure motivation on meaning of life was enhanced by mediation with leisure satisfaction. The research findings show that leisure motivation causes individuals to feel more satisfied by leisure activities and this satisfaction has positive effect on meaning of life. Additionally, meaningful leisure activities like volunteering were identified to provide significant contributions to individuals finding meaning in their lives. Leisure satisfaction, as basic factor mediating this process, assists strengthening the satisfaction experienced by individuals and their search for meaning.

The research findings emphasize that leisure motivation and satisfaction have strong effects on the meaning of life of individuals. In this context, leisure activities do not just have critical importance for the psychological well-being of individuals but also have critical importance for making their lives more meaningful. Social participation like volunteering contributes to internal satisfaction and finding meaning when the individual undertakes social responsibilities; at the same time, it positively affects meaning of life.

This research indicates that leisure activities have the potential to develop the meaning of life of individuals. In future research, the long-term effects of different leisure activities and volunteering types on the meaning of life of individuals may be investigated in more depth. Additionally, studies researching the effect of policies to increase leisure satisfaction on the psychological well-being of individuals may be performed. Ensuring individuals pass their leisure in more satisfying ways may strengthen both personal and social meaning of life. Additionally, organizations and communities may increase the quality of life of individuals by encouraging voluntary and similar meaningful leisure activities.

However, the study has certain limitations that should be acknowledged. Firstly, a convenience sampling method was used, which may restrict the generalizability of the findings to broader volunteer populations. Secondly, many participants had relatively short volunteering experience, which may affect the extent to which the findings reflect the long-term psychological outcomes of volunteering. Finally, the cross-sectional design of the study does not allow for causal interpretations. Longitudinal research would be beneficial in further exploring the developmental nature of the relationships between leisure motivation, satisfaction, and meaning of life. Longitudinal research would be beneficial in further exploring the developmental nature of the relationships between leisure motivation, satisfaction, and meaning of life.

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Conflict of Interest

There is no conflict of interest among the authors related to publication of this article.

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Correlation Between Dynamic Inspiratory Muscle Strength and Some Variables Associated with Aerobic Capacity

Dinamik İnspiratuar Kas Kuvveti ile Aerobik Kapasiteyi Etkileyen Bazı Değişkenlerin İlişkisi

Research Article / Araştırma Makalesi

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Abstract

The aim of this study was to investigate the relationship between dynamic inspiratory muscle strength (IMS) and body composition, peak oxygen consumption (VO_{2peak}), running economy (RE), and pulmonary function test variables. A total of 30 students (8 female and 22 male) (age=21.83±2.09years) from the Faculty of Sport Sciences voluntarily participated in this study. Body composition (with bioelectrical impedance analysis), dynamic inspiratory muscle strength (S-index), and tests of pulmonary function, VO_{2peak}, and RE were performed. VO_{2peak} and RE tests were measured using an ergo-spirometry system. The VO_{2peak} test started with a 5-min warm-up on the treadmill at a 1% constant incline at 6 km/h speed. The test began at an 8 km/h speed, without a break, and persisted by increasing the speed by 1 km/h every 2 minutes until exhaustion. RE was taken on a treadmill with 6-minute tests at a constant speed at 70% and 80% of VO_{2peak}. S-index indicated a significant positive correlation with body composition variables, lean body mass (r=0.661), total body water (r=0.667), and body mass index (r=0.602) ($p<0.05$). No significant correlation was found between the S-index and VO_2 ($ml \cdot kg^{-1} \cdot min^{-1}$) taken by RE tests ($p>0.05$). However, a significantly moderate positive correlation was determined between S-index and VO_{2peak} ($ml \cdot kg^{-1} \cdot min^{-1}$) (r=0.380) ($p<0.05$). Regarding the pulmonary function test, forced vital capacity (r= 0.634), forced expiratory volume in the first second (r=0.600), peak expiratory flow (r=0.768), and maximum voluntary ventilation (r=0.770) indicated a significant positive correlation with S-index ($p<0.05$). In conclusion, dynamic inspiratory muscle strength was found to be significantly related to lean body mass and some pulmonary function variables. As a result of VO_{2peak} and RE, which are critical variables of aerobic performance, it is thought that dynamic inspiratory muscle strength may be relevant to oxygen consumption at maximal exercise rather than submaximal exercise.

Keywords: Respiratory muscle strength, VO2 peak, Running economy, Pulmonary function test

Öz

Bu çalışmanın amacı, dinamik inspiratuar kas kuvveti ile vücut kompozisyonu, zirve oksijen tüketimi (VO_{2zirve}), koşu ekonomisi (KE) ve solunum fonksiyon testi değişkenleri arasındaki ilişkinin incelenmesidir. Çalışmaya Spor Bilimleri Fakültesi öğrencisi olan toplam 30 öğrenci (8 kadın ve 22 erkek) (yaş=21.83±2.09 yıl) gönüllü olarak katılmıştır. Katılımcılara vücut kompozisyonu ölçümleri (biyoelektrik impedans analizi ile), dinamik inspiratuar kas kuvveti (S-indeksi), solunum fonksiyon, VO_{2zirve} ve KE testleri uygulanmıştır. VO_{2zirve} ve KE testleri ergospirometri sistemi gaz analizörü ile ölçülmüştür. VO_{2zirve} testi, koşu bandında %1 sabit eğimde 6 km/saat hızda 5 dakikalık ısınma ile başlamıştır. Ardından ara vermeden 8 km/saat hızla test başlamış ve her 2 dakikada bir 1 km/saat hız artırılarak katılımcı tükenene kadar teste devam edilmiştir. KE, VO_{2zirve} değerinin %70 ve %80'ine karşılık gelen sabit hızda 6 dakikalık koşu bandı testleri ile ölçülmüştür. S-indeks, vücut kompozisyonu değişkenlerinden yağsız vücut kütlesi (r=0.661), toplam vücut suyu (r=0.667) ve vücut kütle indeksi (r=0.602) ile pozitif anlamlı ilişki göstermiştir ($p<0.05$). S-indeks ile KE testlerinden belirlenen VO_2 ($ml \cdot kg^{-1} \cdot dk^{-1}$) değerleri arasında anlamlı ilişki bulunmamıştır ($p>0.05$), ancak VO_{2zirve} ($ml \cdot kg^{-1} \cdot dk^{-1}$) ile arasında orta düzeyde anlamlı pozitif ilişki tespit edilmiştir (r=0,380) ($p<0,05$). Solunum fonksiyon testlerinden ise zorlu vital kapasite (r= 0.634), birinci saniyedeki zorlu ekspiratuar hacim (r=0.600), zirve ekspiratuar akım (r=0.768) ve maksimum istemli ventilasyon (r=0.770) değerleri, S-indeks ile pozitif anlamlı ilişki göstermiştir ($p<0.05$). Sonuç olarak, dinamik inspiratuar kas kuvvetinin, yağsız vücut kütlesi ve bazı solunum fonksiyon değişkenleri ile anlamlı ilişkisi olduğu görülmüştür. Aerobik performansın önemli göstergelerinden olan VO_{2zirve} ve KE sonuçlarına göre ise dinamik inspiratuar kas kuvvetinin submaksimal egzersizlerden ziyade maksimal egzersizdeki oksijen tüketimiyle ilişkili olduğu düşünülmektedir.

Anahtar Kelimeler: Solunum kas kuvveti, VO2 zirve, Koşu ekonomisi, Solunum fonksiyon test

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Introduction

Aerobic endurance performance can be attributed to three main variables: maximal oxygen uptake, lactate threshold, and exercise economy (Helgerud et al., 2007). The most critical one in deciding the achievement of aerobic endurance performance is likely VO_{2max} (Helgerud et al., 2007). However, VO_{2max} is not a favorable performance estimator at each condition, for instance, for runners who have similar VO_{2max} levels (Bassett & Howley, 2000). Running economy (RE) is a more suitable performance estimator than VO_{2max} in runners who have similar VO_{2max} values (Barnes & Kilding, 2015; Fletcher, Esau, & MacIntosh, 2009; Saunders, Pyne, Telford, & Hawley, 2004). RE is the steady-state oxygen consumption (VO_2) at a constant submaximal running velocity and represents the energy demand at that constant velocity of submaximal exercise. At the same exercise speed, runners with higher RE consume less oxygen than those with lower RE (Barnes & Kilding, 2015; Saunders et al., 2004). Despite the importance of RE for aerobic exercise performance, there is neither an experimental study to test the effect of inspiratory muscle training on RE nor a correlation study to test the relations between IMS and RE, to the best of our knowledge. On the other hand, one of the training methods used to improve aerobic performance is respiratory muscle training (RMT) (de Sousa et al., 2021; Koç & Saritas, 2019; Markov, Spengler, KnoÈpfli-Lenzin, Stuessi, & Boutellier, 2001). For instance, an 8-week RMT increased VO_{2max} in taekwondo athletes in the study of Koç and Saritas (2019). While Volianitis et al. (2001) found RMT enhanced rowing performance on the 5000-m trial in competitive rowers, Stuessi, Spengler, KnoÈpfli-Lenzin, Markov, and Boutellier (2001) reported that RMT improved cycling endurance in sedentary subjects. There are mainly training studies resulting in VO_{2max} improved by RMT, but studies investigating the correlation between VO_{2max} and IMS are limited. For instance, Klusiewicz (2008) found a significant positive correlation between IMS and VO_{2max} in female athletes. Gök, Koç, Macit, Arslantürk, and Coşkun (2024) found a positively significant moderate relationship between dynamic IMS and estimated VO_{2max} in physically active university students, but Deliceoğlu, Kabak, et al. (2024) and McConnell, Caine, and Sharpe (1997) did not find a significant relation in trained athletes. The lack of studies on RE and the contradictory and limited number of studies on the relationship between VO_{2max} and IMS necessitate the examination of the relationship between these two factors, RE and VO2max, with IMS.

One of the sensitive and widespread ways of determining inspiratory muscle strength is the test of maximal inspiratory pressure (MIP) (Pessoa et al., 2014; Schoser et al., 2017). MIP is a noninvasive test that is applied with powerful inspiration resisting an occluded mouthpiece (Pessoa et al., 2014). MIP is mainly used to test inspiratory muscle strength, which is a traditional spirometry measurement. However, spirometry tests have been mostly used for medical reasons, with specific rules applied by only medical professionals. To assess MIP in sports environments, there is a current option called the S-index test generated by POWERbreathe (POWERbreathe International Ltd., Southam, UK) (Kowalski & Klusiewicz, 2023). The S-Index is also a noninvasive and easy test, but it evaluates IMS dynamically (Areias, Santiago, Teixeira, & Reis, 2020). MIP is established on static effort, while the S-index test is based on dynamic maneuvers. Therefore, the S-index test is recommended for sports settings (Kowalski & Klusiewicz, 2023).

Body composition (Nalbant & Özer, 2018; Sharma, Kamal, & Chawla, 2016) and pulmonary function (Campoi et al., 2019; Fatemi, Shakerian, Ghanbarzade, Habibi, & Fathi, 2012) are other variables related to aerobic performance. It is well known that aerobic power is affected by body composition, especially body fat has an impact on cardiorespiratory functions, and there is an inverse relationship between aerobic endurance and body fat (Nalbant & Özer, 2018; Sharma et al., 2016). Fatemi et al. (2012) concluded that pulmonary functions are associated with VO_{2max} and can have a restrictive effect on aerobic capacity. Campoi et al. (2019) reported that VO_{2max} may directly affect pulmonary capacity. It is noted that FEV_1 (forced expiratory volume in one second) and FVC (forced vital capacity) raised with the improvement of VO_{2max}, and there may be a direct influence on inspiratory muscle strength (IMS) (Campoi et al., 2019). However, the study results investigating these two variables, body composition and pulmonary function, with regard to the relationship with IMS are not constant (Bairapareddy et al., 2021; Gök et al., 2024; Hackett & Sabag, 2021; Hulzebos, Takken, Reijneveld, Mulder, & Bongers, 2018; Ozmen, Gunes, Ucar, Dogan, & Gafuroglu, 2017). Therefore, the aim of this study is to examine the relationship of dynamic inspiratory muscle strength with aerobic performance-related variables such as body composition and pulmonary function, and especially VO_{2peak} and RE, which are the main determinants of aerobic performance. While we hypothesize that we will likely find a substantial positive correlation between IMS and VO_{2peak}, we are unable to mention the relationship between IMS and RE because of lack of research on it.

Method

Study Design

This research is a correlational study. Before the main test days, the tests were introduced, and participants performed trials for S-index and spirometry tests. Body composition and resting heart rate were measured before the tests on the test day. Then, dynamic IMS measurement, pulmonary function test, and VO_{2peak} test were performed. RE tests were performed at least 24 hours after the VO_{2peak} test. Participants were asked not to participate in physical activity on the recovery day between VO_{2peak} and RE tests. The tests were performed at the same time of day. The research design is presented in Figure 1.

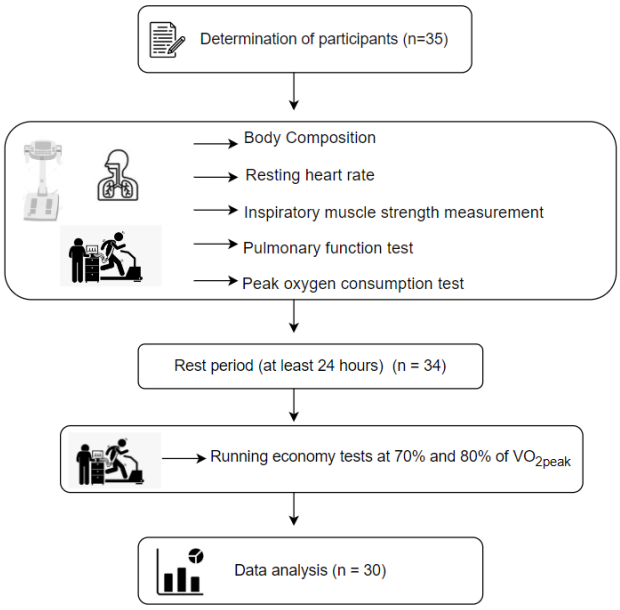

Figure 1. Study protocol

Participants

A priori participant number was decided by using the G Power (G*Power 3.1.9.7) power analysis program. It was evaluated with a significance level of 0.05, 80% statistical power, and 0.50 effect size (Gök et al., 2024), and the number of participants was found to be 29.

Thirty-five university students from a Faculty of Sports Sciences, who had no chronic respiratory or cardiovascular diseases, voluntarily participated in this study. However, the data of five students were not included in the analyses since they did not complete all the test procedures. Volunteers were randomly selected from untrained individuals who were not competitive athletes. Those with a respiratory infection within the last four weeks were not included in the study. The study was completed with 30 students (age=21.83±2.09 years, body height=169.00±8.10 cm, body weight=66.71±10.21 kg), 22 male and 8 female. Before starting data collection, each participant filled out a written informed consent form after getting brief information about the study.

Data Collection Instruments

Body Composition

While body height was determined with a Seca stadiometer (Seca 213, Hamburg, Germany), body weight and body composition variables were determined with the Jawon Segmental body composition analyzer Avis 333 Plus (Korea). Participants took part in the tests with sportswear, and the clothing weight was recorded as 0.5 kilograms (kg) into the device. Body weight, percent body fat (PBF), lean body mass (LBM), total body water (TBW), and body mass index (BMI) values were obtained with bioelectrical impedance analysis.

Heart Rate

Heart rate was determined with the Polar Team2 System (Finland) at rest and during the VO_{2peak} test. Resting heart rates were recorded for 5 minutes in the supine position without talking using the Elite HRV (Elite Hrv Inc. USA) smartphone application. The results were transmitted to the computer and read via the Kubios HRV (The MathWorks, Inc. USA) application. The oxygen saturations at rest were measured on the left index finger with a pulse oximeter (JPD-500E Model).

Pulmonary Function

Pulmonary function variables were estimated using an MIR brand MiniSpir model spirometer (Rome, Italy) in a sitting position, and the results were recorded on the computer with the Winspiro PRO 8.1 program. A new cardboard mouthpiece of the spirometer was used for each participant before testing. A nose clip was used during the tests. Slow and forced vital capacity measurements were applied according to the standards of the American Thoracic Society and the European Respiratory Society (Graham et al., 2019). At least three trials were taken at 2-minute intervals, and the best value was evaluated for analysis (Tenório et al., 2012). Maximum voluntary ventilation was determined by breathing as fast and deep as possible for 12 seconds (Tenório et al., 2012). The variables of forced vital capacity (FVC) forced expiratory volume in one second (FEV_1), FEV_1/FVC ratio (FEV_1/FVC), peak expiratory flow (PEF), forced expiratory flow between 25%–75% of vital capacity ($FEF_{25-75\%}$), vital capacity (VC), and maximal voluntary ventilation (MVV) obtained from pulmonary function tests were used in the analyses.

Dynamic Inspiratory Muscle Strength Measurement

Dynamic inspiratory muscle strength (S-index) was measured with a POWERbreathe K5 (HaB International Ltd, England) device with the participant in a sitting position and with their nose closed with a nose clip. The measurement was taken with 10 consecutive repetitions (P. E. Silva et al., 2018). The best value measured was recorded as the score (Minahan et al., 2015; R. L. C. Silva, Hall, & Maior, 2019). The participants were instructed and motivated by the same researcher during the assessments to show maximum performance (P. E. Silva et al., 2018; R. L. C. Silva et al., 2019).

Peak Oxygen Consumption

Peak oxygen consumption (VO_{2peak}) was determined on a treadmill in the laboratory with a Jaeger brand Masterscreen CPX model ergo- spirometer system (Germany) gas analyzer. Before starting the test, the device calibration was appropriately completed according to the manufacturer's instructions. To determine VO_{2peak}, a running test was performed on a treadmill at a constant incline with an increasing speed protocol. This test, which was implemented using a gradually increasing workload protocol, started with a 5-minute warm-up at a 6 km/h speed at a constant 1% slope. After warm-up, the test protocol was started at 8 km/h speed without a break, and the speed was

increased by 1 km/h every 2 minutes until the participant was exhausted (Archiza et al., 2018; Castagna, Impellizzeri, Chamari, Carlomagno, & Rampinini, 2006; Colosio, Pedrinolla, Da Lozzo, & Pogliaghi, 2018). Since the tests applied in the studies of Colosio et al. (2018) and Castagna et al. (2006) were conducted on groups of athletes, we made some changes in the workload increase in our study, adapting from the studies of Colosio et al. (2018) and Castagna et al. (2006). For this test conducted in the laboratory, the treadmill incline was kept constant at 1% to correspond to wind resistance (Jones & Doust, 1996). The 30-second VO_2 averages of the last 2 minutes of the treadmill test were evaluated, and the highest one was used as the VO_{2peak} for the analyses (Keiller & Gordon, 2018). The maximum HR value of 10 seconds in the last 2 minutes was considered as the HR_{peak} (Colosio et al., 2018; Keiller & Gordon, 2018). The following criteria were evaluated as the termination criteria of the VO_{2peak} test.

- There is no increase in VO_2 despite increased workload (plateau)
- The heart rate at the end of the test reaches within ±10 beats of the theoretical maximum HR (220 - age),
- Respiratory exchange ratio (VCO_2/VO_2) exceeds 1.10,
- Rating of perceived exertion **(**RPE) score exceeds 17 (Castagna et al., 2006; Faulkner, Mauger, Woolley, & Lambrick, 2015).

Running Economy

Running Economy (RE) measurements were performed in the laboratory with the same devices used in the VO_{2peak} test. Running speeds were determined using peak oxygen consumption data. A previous study investigated the alterations in RE at various intensities and concluded that RE evaluated at high-intensity exercise is impacted more than at low-intensity exercise. Regarding the previous studies and their experiences, the authors tested RE at three intensities, 70%, 80%, and 90% VO_{2max}, since they assumed 70% VO_{2max} as below the lactate threshold, 80% VO_{2max} as close to the lactate threshold, and 90% VO_{2max} as above the lactate threshold (Chen, Nosaka, Lin, Chen, & Wu, 2009). Therefore, in our study, we tested RE with a 6-minute treadmill test at a constant speed with an intensity of 70% and 80% of VO_{2peak} (Chen et al., 2009; Weston, Mbambo, & Myburgh, 2000). Participants began the test with a 4-minute warm-up at approximately 50% VO_{2peak} (Lundby et al., 2017). After the warm-up, we randomly applied RE tests at 70% and 80% of VO_{2peak} for each individual. In both RE tests, performed in random order, RPE was recorded in the last 20 seconds of the test (Chen et al., 2009). A 5-minute passive rest was given between running tests at two different intensities (W. A. Silva, de Lira, Vancini, & Andrade, 2018; Weston et al., 2000). The average of the last 1-minute values recorded by the Jaeger brand Masterscreen CPX model ergo-spirometer system (Germany) gas analyzer was used in the analyses (Chen et al., 2009; Weston et al., 2000). The heart rate average of the last 1 minute was recorded as the heart rate value of the RE tests ($HR_{70\%}$ and $HR_{80\%}$). VO_2 in the last 1 minute was taken as $ml \cdot kg^{-1} \cdot min^{-1}$ to be used in the analyses and was also normalized with respect to the 0.66 power of the body weight (Weston et al., 2000). Thus, the amount of oxygen consumed in the RE tests was evaluated in the analyses as $ml \cdot kg^{-1} \cdot min^{-1}$ and $ml \cdot kg^{-0.66} \cdot min^{-1}$. $HR_{70\%}$, $HR_{80\%}$, $RPE_{70\%}$, and $RPE_{80\%}$ values were also included in the analyses as RE test variables.

Rating of Perceived Exertion

Rate of Perceived Exertion (RPE) was assessed with the Borg scale (6-20). For the tests conducted with the treadmill, we placed the Borg scale where the participants could easily see it throughout the tests. RPE was recorded every two minutes of the VO_{2peak} test and in the last 20 seconds of the RE tests.

Data Analysis

IBM SPSS 23.0 statistical package program was used for data analyses. Mean and standard deviations were given to represent descriptive statistics. The normal distribution of the variables was checked with the Shapiro-Wilk test. While Pearson correlation analysis was used for the variables with satisfied normality assumption, Spearman correlation analysis was used for those unsatisfied with the normality assumption. The significance level was accepted as $p<0.05$. The power of correlations was categorized as trivial (r is under 0.1), small (r is higher than 0.1 and up to 0.3), moderate (r is higher than 0.3 and up to 0.4), strong (r is higher than 0.5 and up to 0.7), very strong (r is higher than 0.7 and up to 0.9), nearly perfect (r is higher than 0.9), and perfect (r is equal to 1.0) (Hackett & Sabag, 2021; Stone, Moir, Glaister, & Sanders, 2002).

Ethics Statement

Ethical approval was obtained from the Clinical Research Ethics Committee of Erciyes University Faculty of Medicine on 22.09.2021 with number 2021/606.

Results

A total of 30 students, 22 male (age=21.82±2.24 years, body height=171.14±6.62 cm, body weight=70.01±6.07 kg, S-index=154.44±17.43 cmH_2O) and 8 female (age=21.88±1.73 years, body height=163.13±9.33 cm, body weight=57.63±13.90 kg, S-index=100.28±24.58 cmH_2O) students participated in this study.

Descriptive statistics of body composition variables and the relationship between the S-index and these variables are presented in Table 1. The S-index is found to be strongly positively correlated with the variables LMB (kg) (r=0.661), TBW (kg) (r=0.667), and BMI (kg/m^2) (r= 0.602) ($p<0.05$) (Table 1).

Table 1. Descriptive statistics of body composition and correlations between the variables and dynamic IMS

Variables	Mean ± SD	S-index (cmH_2O)	
		r	p
PBF (%)	20.89 ± 3.57	-0.340	0.066
LBM (kg)	52.48 ± 7.76	**0.661**	**<0.001**
TBW (kg)	37.78 ± 5.58	**0.667**	**<0.001**
BMI (kg/m^2)	23.26 ± 2.71	**0.602**	**<0.001**
HR_{rest} (bpm)	76.73 ± 16.45	-0.077	0.686
$Sp0_2$ (%)	97.20 ± 1.86	-0.156	0.410
S-index (cmH_2O)	139.99 ± 30.97	1	

PBF (%): Percent body fat, LBM (kg): Lean body mass, TBW (kg): Total body water, BMI (kg/m^2): Body mass index, HRrest (bpm): Heart rate at rest, $Sp0_2$ (%): Pulse oximetry oxygen saturation.

VO_{2peak} test variables and results are given in Table 2. The findings indicate that there is a moderate positive correlation between the S-index and VO_{2peak} ($ml{\cdot}kg^{-1}{\cdot}min^{-1}$) (r=0.380) (p<0.05), but there is no significant correlation with the other two variables (HR_{peak} and RPE_{peak}) (p>0.05) (Table 2).

Table 2. Descriptive statistics of VO_{2peak} test variables and correlations between the variables and dynamic IMS

Variables	Mean ± SD	S-index (cmH_2O)	
		r	p
VO_{2peak} ($ml{\cdot}kg^{-1}{\cdot}min^{-1}$)	44.49 ± 4.45	**0.380**	**0.038**
HR_{peak} (bpm)	189.53± 7.74	-0.153	0.419
RPE_{peak}	18.33 ± 1.24	-0.032	0.866

VO_{2peak} ($ml{\cdot}kg^{-1}{\cdot}min^{-1}$): Peak oxygen consumption, HR_{peak} (bpm): Heart rate, RPE_{peak}: Rating of perceived exertion.

Table 3. Descriptive statistics of RE test results and correlations between the variables and dynamic IMS

Variables	Mean ± SD	S-index (cmH_2O)	
		r	p
$VO_{2Economy70\%}$	33.41 ± 3.04	0.097	0.611
$HR_{70\%}$ (bpm)	160.99 ± 12.70	**-0.448**	**0.013**
$RPE_{70\%}$	10.73 ± 2.62	**-0.495**	**0.005**
$VO_{2Economy80\%}$	37.21 ± 2.91	0.265	0.157
$HR_{80\%}$ (bpm)	170.45 ± 12.55	0.286	0.125
$RPE_{80\%}$	12.73 ± 2.66	**-0.402**	**0.028**
$VO_{2Normalized70\%}$	138.51 ± 13.19	**0.415**	**0.022**
$VO_{2Normalized80\%}$	154.55 ± 14.71	**0.642**	**<0.001**

$VO_{2Economy70\%}$ ($ml{\cdot}kg^{-1}{\cdot}min^{-1}$): Oxygen consumption at RE test with 70% of VO_{2peak}, $HR_{70\%}$ (bpm): Heart rate at RE test with 70% of VO_{2peak}, $RPE_{70\%}$: Rating of perceived exertion at RE test with 70% of VO_{2peak}, $VO_{2Economy80\%}$ ($ml{\cdot}kg^{-1}{\cdot}min^{-1}$): Oxygen consumption at RE test with 80% of VO_{2peak}, $HR_{80\%}$ (bpm): Heart rate at RE test with 80% of VO_{2peak}, $RPE_{80\%}$: Rating of perceived exertion at RE test with 80% of VO_{2peak}.

The results of RE test were presented in Table 3. The S-index showed no significant correlation with the variables of $VO_{2\text{-}Economy70\%}$ ($ml{\cdot}kg^{-1}{\cdot}min^{-1}$), $VO_{2\text{-}Economy80\%}$ ($ml{\cdot}kg^{-1}{\cdot}min^{-1}$) and $HR_{80\%}$ (bpm) (p>0.05). However, there is a moderate to strong negative correlation between the S-index and the variables of $HR_{70\%}$ (bpm) (r= -0.448) and $RPE_{70\%}$ (r= -0.495). A moderate negative correlation was found between $RPE_{80\%}$ and S-index (r= -0.402). There is a moderate positive correlation between the S-index and $VO_{2Normalized70\%}$ ($ml{\cdot}kg^{-0.66}{\cdot}min^{-1}$) (r=0.415), and a strong positive correlation between the S-index and $VO_{2Normalized80\%}$ ($ml{\cdot}kg^{-0.66}{\cdot}min^{-1}$) (r= 0.642) (p<0.05).

Descriptive statistics of pulmonary function test variables and the correlation results are seen in Table 4. A strong positive correlation was observed between the S-index and the variables of FVC (L) (r= 0.634) and FEV_1 (L) (r= 0.600). A very strong positive correlation was found between the S-index and the variables of PEF (L/s) (r= 0.768) and MVV (L/min) (r= 0.770) (p<0.05).

Table 4. Descriptive statistics of pulmonary function test variables and correlations between the variables and dynamic IMS

Variables	Mean ± SD	S-index (cmH_2O)	
		r	p
FVC (L)	5.31 ± 1.03	**0.634**	**<0.001**
FEV_1 (L)	4.34 ± 0.73	**0.600**	**<0.001**
FEV_1/FVC (%)	83.35 ± 7.77	-0.135	0.475
PEF (L/s)	9.57 ± 1.81	**0.768**	**<0.001**
FEF 25-75% (L/s)	4.39 ± 1.35	0.148	0.435
VC (L)	6.20 ± 1.50	0.361	0.050
MVV (L/min)	176.90 ± 36.41	**0.770**	**<0.001**
FVC (L)	5.31 ± 1.03	**0.634**	**<0.001**

FVC (L): Forced vital capacity, FEV_1 (L): Forced expiratory volume in one second, FEV_1/FVC (%): FEV_1/FVC ratio, PEF (L/s): Peak expiratory flow, FEF25-75% (L/s): Forced expiratory flow between 25%–75% of vital capacity, VC (L): Vital capacity, MVV (L/min): Maximal voluntary ventilation.

Discussion

This study was conducted to investigate the relationship between dynamic inspiratory muscle strength and some selected variables related to aerobic capacity. Inspiratory muscle strength showed a positive and significant relationship with body composition variables, LBM, TBW, and BMI. Similarly, it showed a significant positive correlation with respiratory function variables, such as FVC, FEV_1, PEF, and MVV. Concerning the relationship between VO_{2peak} and RE tests, which can be considered the most important findings of this study, there is a positive and significant relationship between IMS and VO_{2peak} ($ml{\cdot}kg^{-1}{\cdot}min^{-1}$), while no significant relationship was found between IMS and VO_2 ($ml{\cdot}kg^{-1}{\cdot}min^{-1}$) results at RE tests. In addition, finding a positive relationship between IMS and the normalized VO_2 results of economy tests indicates that higher respiratory muscle strength does not mean higher RE performance.

It is known that high-intensity exercise activates the respiratory muscle metaboreflex and induces peripheral vasoconstriction; thus, blood flow to working muscles is restricted (Arslan & Melekoğlu, 2019; Babcock, Pegelow, Harms, & Dempsey, 2002; Deliceoğlu, Çakır, et al., 2024; Dempsey, Amann, Romer, & Miller, 2008; Fernández-Lázaro et al., 2021; Jurić, Labor, Plavec, & Labor, 2019). Thus, the respiratory system can be considered as a limiting element for performance. However, if the inspiratory muscles are trained or strengthened, the respiratory muscle metaboreflex triggering can be delayed and exercise performance can be enhanced (Arslan & Melekoğlu, 2019; Deliceoğlu, Çakır, et al., 2024; Fernández-Lázaro et al., 2021; Jurić et al., 2019). The finding of a significant relationship between IMS and VO_{2peak} because of our study supports this information. It appears that participants with high IMS also have high VO_{2peak} values, or vice versa. Similar to our results, Gök et al. (2024) found a moderately significant positive relationship between IMS and estimated VO_{2max} in physically active university students. While a significant relationship was found between IMS and VO_{2max} in the studies with untrained subjects (Gök et al., 2024), as in our study, no significant relationship was observed in those with trained athletes, as in the studies of Deliceoğlu, Kabak, et al. (2024) and McConnell et al. (1997). Training studies have shown that respiratory muscle performance is not the limiting factor for elite athletes (Williams, Wongsathikun, Boon, & Acevedo, 2002), but it is a limiting factor for untrained individuals (Boutellier & Piwko, 1992).

Regarding RE results, we found no significant relationship between IMS and VO_2 ($ml \cdot kg^{-1} \cdot min^{-1}$) of RE tests but a significantly positive relationship with normalized VO_2 ($ml \cdot kg^{-0.66} \cdot min^{-1}$) results. Accordingly, higher VO_2 ($ml \cdot kg^{-0.66} \cdot min^{-1}$) values at the RE test, which are associated with higher IMS, indicate a worse exercise economy. RE is complicated and a combination of varied characteristics such as metabolic, which is related to energy utilization to enable optimum performance; cardiorespiratory, which is related to decreased work outcome for transport and utilization processes of oxygen; biomechanical and neuromuscular, which are related to the interactive relation between the neural and musculoskeletal systems (Barnes & Kilding, 2015). Oxygen delivery by the cardiorespiratory system (heart, lungs, and blood) is crucial for VO_{2max}, while metabolic adaptations in skeletal muscle are crucial for enhancing submaximal performance (Bassett & Howley, 2000). It is reported that improved IMS may be effective in facilitating oxygen delivery by enhanced circulatory responses (Sasaki, Kurosawa, & Kohzuki, 2005). The primary importance of different mechanisms for VO_{2max} and RE may explain our different correlation results regarding these two variables.

IMS showed a significant negative relationship with RPE values at the RE tests. Our study showed that high inspiratory muscle strength was associated with lower fatigue perception in submaximal exercises, but this significant relationship was not found in maximal exercise. The knowledge that perceptual responses usually decrease at submaximal-intensity exercises supports our RPE results of RE tests (Barnes & Ludge, 2021). On the other hand, during near-maximal intensity exercises, dyspnea can be a critical factor, such as fatigue. Barnes and Ludge (2021) reported that performance improvement may be related to the decrease in rating of perceived dyspnea after an inspiratory muscle warm-up, but not to RPE. This result may support our nonsignificant RPE result of the maximal test (VO_{2peak}), although we did not examine the rating of perceived dyspnea. Similarly, while inspiratory muscle strength did not show a significant relationship with HR at the RE test with higher intensity, it showed a significant negative relationship with the maximum heart rate ($HR_{70\%}$) obtained from the RE test with lower intensity. It is known that RE evaluated at high-intensity is impacted more than at low-intensity (Chen et al., 2009). Between the cardiac system and respiratory muscles, especially the diaphragm, there is an interactive relationship that impacts the development of venous return and reduces resting heart rate (Ladriñán-Maestro, Sánchez-Infante, Martín-Vera, & Sánchez-Sierra, 2024; Sasaki et al., 2005). However, on the contrary, respiratory muscle fatigue may restrict exercise capacity and negatively affect the cardiovascular system (Ladriñán-Maestro et al., 2024). Diaphragm fatigue stimulates metaboreflex and induces increased heart rate (Welch, Archiza, Guenette, West, & Sheel, 2018). This fatigue also enhances the perception of effort and reduces exercise tolerance and performance (Ladriñán-Maestro et al., 2024). Therefore, inspiratory muscle fatigue may be the reason for our RPE and HR results with the maximal test in our study, which were different from submaximal tests (RE), since fatigue arises in the diaphragm as the intensity of exercise surpasses 80% of the maximum (Deliceoğlu, Çakır, et al., 2024; Dempsey et al., 2008). On the other hand, in the study of Chen et al. (2009), the authors considered 70% of VO_{2max} as below the lactate threshold, 80% of VO_{2max} as close to the lactate threshold, and 90% of VO_{2max} as above the lactate threshold based on their experiences and previous studies. In our study, we found that high respiratory muscle strength (RMS) was associated with high aerobic capacity, or vice versa, during the maximal test, which is above the lactate threshold, but higher RMS did not indicate better running economy performance during the submaximal RE test, which is most probably below or close to the lactate threshold. Our maximal exercise testing may have caused diaphragm fatigue because exercise intensity >85% of VO_{2max} leads to diaphragm fatigue, and a work rate >80% of VO_{2max} leads to improved limb O_2 transport substantially (Amann, Pegelow, Jacques, & Dempsey, 2007). These all led us to think that cardiorespiratory-based reasons may support our VO_{2peak} results, while other factors such as physiological features (muscle strength, muscle fiber type, and leg stiffness) (Li, Xu, & Xu, 2020), biomechanical variables (Tartaruga et al., 2012), numerous lower body features (Barnes, Mcguigan, & Kilding, 2014), and especially running technique (Folland, Allen,

Black, Handsaker, & Forrester, 2017) may support more the RE results in our study.

Concerning body composition, we found a significant positive relationship between the variables of LBM, TBW, and BMI, and inspiratory muscle strength. Contrary to our results, Ergezen, Menek, and Demir (2023) found that body composition was not associated with respiratory muscle strength (MIP and MEP) in young, non-obese healthy individuals. Also, although the study results of Gök et al. (2024) do not support ours, as they found no significant relationship between the S-index and any body composition variables in male university students of a similar age group. However, there is also some research with similar findings to our study results. For instance, Hackett and Sabag (2021) detected a positive and significant relationship between FFM and maximal expiratory pressure (MEP) in non-athletic men, while they found a moderate positive significant relationship between fat-free mass index value (FFMI; kg/m^2) and MIP as well after the contribution of body height difference was eliminated. They also found no significant relationship between RMS and fat mass and between RMS and body fat percentage (Hackett & Sabag, 2021). In another research study conducted in healthy children and adolescents, the findings of BMI and FFM as significant predictors of RMS, including MIP and MEP, align with our study results. In the same study, there was no significant correlation between body fat (%) and RMS (Hulzebos et al., 2018).

It is known that fat-free mass is related not only to inspiratory muscle strength but also to respiratory function (Azad & Zamani, 2014). While Maiolo, Mohamed, and Carbonelli (2003) concluded that improvement in muscular mass leads to linear raises for spirometry variables in healthy individuals, Azad and Zamani (2014) detected lean body mass as a significant indicator of lung function in sedentary young women. These findings from various research support the strong relationship between IMS and pulmonary function variables found in our study. Regarding MVV as an indirect measurement of RMS in the literature (Bairapareddy et al., 2021) supports the very strong relationship found between IMS and MVV in our study.

Similar to our pulmonary function results, Gök et al. (2024) also observed a strong and positive correlation between IMS and respiratory function variables, FVC, FEV_1, VC, and MVV, in male university students at the same ages as our participants. In another study on healthy male and female young adults, a significant relationship was also found between MIP and FVC, FEV_1, and MVV (Bairapareddy et al., 2021). As for the training studies, while FVC and FEV_1 increased after an 8-week RMT in adolescent taekwondo athletes in the study of Koç and Saritas (2019), no significant alteration was found in pulmonary function variables after a 4-week RMT in competitive runners in the study of Amonette and Dupler (2002). Ozmen et al. (2017) detected no significant improvement in FVC, FEV_1, and MVV after 5 weeks of RMT in male soccer players. It is evident that results can change according to research type, age, gender, and characteristics of the sample group, sports branch, and length of training period.

Despite the importance of RE for aerobic exercise performance, there is neither an experimental study to test the effect of inspiratory muscle training on RE nor a correlation study to test the relations between IMS and RE, to the best of our knowledge. Therefore, the most notable finding of our research study is that increased dynamic inspiratory muscle strength is associated with greater oxygen consumption in the VO_{2peak} test, but higher VO_2 values in the RE test, which are associated with higher dynamic inspiratory muscle strength, do not mean better exercise economy. The fact that our results could not be evaluated according to gender due to the limited number of participants is one of the limitations of this study. The physical activity level and nutritional habits of the participants were not considered, and these are also limitations. We recommend that these limitations should be eliminated in future studies while evaluating the current or further results.

Conclusion and Recommendations

It was found that dynamic inspiratory muscle strength was positively and strongly related to lean body mass and some pulmonary function variables, FVC, FEV_1, PEF, and MVV. As for the results of VO_{2peak} and RE, which are important determinants of aerobic capacity, it can be concluded that inspiratory muscle strength was substantially related to oxygen consumption at maximal exercise (VO_{2peak} test) rather than submaximal exercises (RE tests), which was a moderate and positive relation. On the other hand, high inspiratory muscle strength was associated with lower fatigue perception at submaximal exercises but not at maximal exercise.

Because the RE is a more suitable performance estimator than VO_{2max} in runners with similar VO_{2max}, for future studies, we recommend examining whether these results found in untrained individuals in our study are also valid for elite athletes/runners or not. As we measure only inspiratory muscle strength as an indicator of respiratory muscle strength, we also recommend determining expiratory muscle strength to test the correlations with the same variables. Lactate threshold measurement should also be included in future studies since it is a critical factor for aerobic performance, such as VO_{2max} and RE.

Author's Note:

This study was produced from the master's thesis titled "Relationship between respiratory muscle strength and some selected variables affecting aerobic capacity (Solunum kas kuvveti ile aerobik kapasiteyi etkileyen seçilmiş bazı değişkenlerin ilişkisi). It was supported by the Erciyes University Scientific Research Projects Unit with the project code TYL-2022-11752. The measurements were conducted at *Ankara University Performance Analysis* in *Sports Application* and *Research Center*.

Conflict of Interest

The authors have no conflicts of interest regarding the publication of this article.

Author Contributions

Research Idea: GA and BC; Research Design: BC, MK, DA, and TH; Data Analysis: GA and BC; Manuscript Writing: GA, BC, TH; Critical Review: BC, MK, DA, and TH.

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Determination of Importance Levels of Event Quality Dimensions According to Typologies Using AHP Method

Tipolojilere Göre Etkinlik Kalitesi Boyutlarının Önem Derecelerinin AHP Yöntemi ile Belirlenmesi

Research Article / Araştırma Makalesi

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Abstract

This research aims to examine the degree of importance of fan typologies for the dimensions that constitute the quality of the event using the Analytical Hierarchy Process (AHP) method, which is one of the multi-criteria decision-making techniques. In the study, the survey model, one of the quantitative research methods, and criterion sampling, one of the purposeful sampling methods, were used to select the research group. The criteria of being a fan of a team and watching the match of that football team at least 3 times in the stadium in the 2023-2024 season were sought from the participants who would participate in the research. In this context, 476 football fans were included in the study. The "Fan Typology Scale" and "Sports Events Quality Scale" were data collection tools. Data were collected from the researchers face to face. Descriptive statistics, a two-stage hierarchical cluster analysis, and an analytical hierarchy process were used to analyze the data. According to the hierarchical cluster analysis, the fans were divided into four clusters. These clusters were named hooligan, fanatic, classic, and social fans. When the analytical hierarchy process was examined, It was determined that the importance levels were similar according to the fan typologies; the most critical dimensions were performance, entertainment, and access to the facility in all typologies, and the least essential dimensions were design and buffet dimensions. It can be said that these results are significant in terms of providing a guide for sports club managers to use their limited resources correctly.

Keywords: Football, Fan, Quality, Importance level, Fan expectations

Öz

Bu araştırmanın amacı, taraftar tipolojilerinin etkinliğin kalitesini oluşturan boyutlara yönelik önem derecesini çok kriterli karar verme tekniklerinden Analitik Hiyerarşi Süreci (AHS) yöntemi kullanılarak incelenmesidir. Nicel araştırma yöntemlerinden tarama modelinin kullanıldığı çalışmada araştırma grubunun seçiminde amaçlı örnekleme yöntemlerinden ölçüt örnekleme kullanılmıştır. Araştırmaya katılacak katılımcılarda, bir takımın taraftarı olma ve 2023-2024 sezonunda taraftarı olduğu futbol takımının maçını stadyumda en az 3 kez izleme ölçütleri aranmıştır. Bu kapsamda 476 futbol taraftarı çalışmaya dahil edilmiştir. Veri toplama aracı olarak, "Taraftar Tipolojisi Ölçeği" ve "Spor Etkinlikleri Kalite Ölçeği" kullanılmıştır. Veriler araştırmacılardan yüz yüze toplanmıştır. Verilerin analizinde tanımlayıcı istatistik, iki aşamalı hiyerarşik kümeleme analizi ve analitik hiyerarşi süreci tekniği kullanılmıştır. Hiyerarşik kümeleme analizine göre taraftarlar dört kümeye ayrılmıştır. Bu kümeler; holigan, fanatik, klasik ve sosyal taraftar olarak isimlendirilmiştir. Analitik hiyerarşi süreci incelendiğinde, taraftar tipolojilerine göre önem düzeylerinin benzer olduğu; önem derecesi en yüksek boyutların tüm tipolojilerde performans, eğlence ve tesise erişim olduğu, en az öneme sahip boyutların ise tasarım ve büfe boyutları olduğu belirlenmiştir. Bu sonuçların spor kulübü yöneticilerinin sınırlı kaynaklarını doğru kullanmaları için bir rehber sağlaması açısından önemli olduğu söylenebilir.

Anahtar Kelimeler: Futbol, Taraftar, Kalite, Önem düzeyi, Taraftar beklentileri

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Introduction

Businesses are in intense competition to continue their activities. To be successful in a competitive environment, increasing customer satisfaction has become an essential strategic priority (Halıcı & Yetim, 2024). In cases where businesses cannot provide customer satisfaction, they may face the risk of losing customers. This situation, which is experienced in general companies, may not be explicitly experienced in sports clubs. The probability of fans leaving a sports club and moving to another club is generally lower than the risk of losing customers in other sectors. Fans rarely choose to change clubs, usually due to emotional ties and a sense of belonging. In addition, football clubs see fans as individuals who support their team regardless of the conditions (Salman, 2008). In such cases, it may lead club management to constantly ignore the need to monitor and improve fan satisfaction. However, even if the club does not make a team change, if the fans are not satisfied, the club may be affected financially and morally by this situation (Halıcı & Ötkan, 2024).

Fans who lose interest may decrease match attendance, negatively affecting matchday revenues, product sales, sponsorship agreements, and television broadcast revenues. Fan dissatisfaction affects not only the financial performance of the club but also morale. Considering the driving force of fans on team performance, empty stadiums can directly affect team performance (Halıcı, Karacif & Doğan, 2024; Kuyzu & Lökçü, 2019; Silveira, Cardoso & Quevedo-Silva, 2019). In addition, some fans prefer sports competitions for entertainment and socializing, which can lead fans to meet these needs in other entertainment sectors when their expectations are not met (Çimen, Halıcı & Aktaş, 2022; Fillis & Mackay, 2013). For these reasons, fan satisfaction is essential for sports club managers. Scientific studies (Kim, Ko & Rhee, 2024; Ko, Zhang, Catani & Pastore, 2011; Phonthanukitithaworn & Sellitto, 2018) also show that fans expect quality. In this regard, detailed scientific studies are necessary to measure fan satisfaction and develop improvement strategies accurately.

When scientific studies are examined, many national and international studies investigate fan satisfaction. These studies focus on what fans expect for the event and perceptions of quality elements (Calabuig-Moreno et al., 2016; Foroughi, Iranmanesh, Gholipour & Hyun, 2019; Halıcı & Çimen, 2021; Jones, Byon & Huang 2019; Ko et al., 2011; Wakefield, Blodgett & Sloan, 1996). In these studies, it was determined that in addition to the quality of team performance, physical elements such as buffet, design, seats, in-facility access, scoreboard, and complementary elements such as entertainment and buffet are also important. In addition, with the prediction that conducting quality studies based on a single type of fan would yield incomplete results (Halıcı & Yetim, 2024), scientific studies classifying fans in quality studies have been conducted and it has been determined that expectations and perceptions can vary according to different fans (Halıcı & Ötkan, 2024; Halıcı & Yetim, 2024; Hunt, Bristol & Bashaw, 1999; Kearney, 2003; Quick, 2000; Sutton, McDonald, Milne & Cimperman, 1997). However, these studies analyze the current situation by measuring the expectations and perceptions of fans, in which quality dimensions are measured independently of each other. Therefore, although the results of these studies contribute to sports club managers' strategy for fan satisfaction, they cannot provide results on which is more important.

Considering that sports clubs have limited resources, knowing which elements are more important will contribute to efficiency in using limited resources. Club managers can create strategies by analyzing which areas they should prioritize. For example, suppose fans think seat comfort, access to the facility, and buffet services are more important than other quality elements. In that case, they can use club resources to increase the quality of these elements. Thus, they can increase the hit rate of the services provided.

The "performance" dimension, called the leading service, is expressed as the core product determining the quality of the event in many studies (Kim, Ko & Park 2013; Lee & Kang, 2015; Sutton et al., 1997). For some fans, the team's success may be much more important than the services provided in the stadium. In the study of Halıcı (2018), some fan opinions argue that other quality elements can be ignored if the team's performance is good. Although team success is significant for some fans, it is known that some fans perceive the matches as an event and that the high perception of quality of other services contributes to the audience's enjoyment of the event even if the score of the match is negative (Kuenzel & Yassim, 2007; Wakefield & Sloan, 1995; Zhang, Lee, Judge & Johnson, 2014). In addition, the lack of entertainment elements in football matches at the national level has been associated with low fan expectations (Halıcı, 2018; Mahony & Moorman, 2000). Based on these elements, comparing quality elements with each other and determining which elements are more important forms the basis of this study.

Considering that quality expectations and perceptions can vary according to fan types, in addition to knowing which elements are important, prioritization according to fan typologies is also necessary to reach more detailed results. For example, while classic and social fans with lower fan loyalty want fun events before the match and during half-time, supporting the team can motivate fanatic and hooligan fans. Determining the prioritization according to typologies will cause club strategies to differ according to each fan type. Thus, it may be easier for sports clubs to increase fan satisfaction with target-oriented marketing strategies. In light of this information, the fact that football fans have different quality expectations and that sports

clubs must respond to these expectations to ensure their sustainability necessitates prioritizing these expectations according to fan types, considering the limited resources of the clubs.

In this context, the study aims to determine the importance levels of fan typologies regarding the dimensions that constitute the quality of the event by using the Analytical Hierarchy Process (AHP), which is one of the multiple decision-making techniques.

Method

Research Model

The survey model, one of the quantitative research methods, was used in the design of this research. Karasar (2012) defined the survey model as “all the processes applied to describe a situation in the past or present as it is, for learning to take place and for the development of desired behaviors in the individual.” A general survey model is the scanning conducted on the whole universe or a sample to reach a general judgment about the universe, which consists of many elements.

Research Group

The criteria sampling method, one of the purposeful sampling methods, was used to determine the research group. Criteria sampling is the study of all situations that meet predetermined criteria. The researcher creates the criterion, or a previously prepared list of criteria can be used (Marshall & Rossman, 2014). In this context, the criteria to be included in the research were sought from the participants to be a team fan and to have watched at least three matches of the football team they supported at the stadium in the 2023-2024 season. Individuals who attended 1 or 2 matches were required to have attended at least three matches due to the possibility of not being able to make sufficient observations about the stadium, affecting the perception of quality. The sample size table determined by Çıngı (1994) was used to determine the sample group. In this context, at least 383 units represent the universe size of 100,000 with a 95% probability. In line with the methods and analyses performed, the research group consisted of 476 football fans. Descriptive information about the research group is presented in Table 1.

Table 1. Descriptive information about the participants

Variables	Categories	f	%
Gender	Female	136	28,6
	Male	340	71,4
Education	Primary school	21	4,4
	High school (studying)	38	8
	High school (graduate)	133	27,9
	Undergraduate (studying)	49	10,3
	Undergraduate (graduate)	188	39,5
	Postgraduate (studying)	20	4,2
	Postgraduate (graduate)	27	5,7
Watching a match in the stadium		Mean=10,2	
Age		Mean=32,0	

Data Collection Tool

The data collection tool was applied to the participants face-to-face. First, voluntary participation was taken as the basis, and the researchers informed the participants verbally and through the instructions in printed sources. The data collection process was completed in 45 days. The data collection tool of the research consists of 3 parts. The first section of the data collection tool includes descriptive questions. The demographic information form created within this scope consists of 4 questions, including age, gender, education status, and the number of matches watched in the stadium in the 2023-2024 season.

In the second part of the data collection tool, the "Fan Typology Scale" was used to determine the typologies of the fans. The Fan Typology Scale was developed by Halıcı and Yetim (2024). The scale consists of 7 dimensions: product use, watching behavior, sensitivity to the score, tendency to violence, following, information collection, and belonging. The related study stated that the factor loadings of the items varied between 0.43 and 0.83 as a result of Exploratory Factor Analysis (EFA). It was noted that the subdimensions explained approximately 60% of the total variance. As a result of confirmatory factor analysis (CFA), it was reported that the Root Mean Square Error of Approximation (RMSEA) value of the current structure was 0.061, and other goodness-of-fit indices were at an acceptable level. It was stated that the Cronbach’s alpha values of the subdimensions ranged between 0.751 and 0.908. The Fan Typology scale is rated on a five-point Likert type (Always-Never).

After determining the fan typologies, the Analytic Hierarchy Process (AHP) technique, developed as an estimation and decision-making technique, was used to determine the importance levels of the event quality dimensions. Analytic Hierarchy Process (AHP) is a decision-making method individuals and organizations use to rank the alternatives they consider based on pairwise comparisons (Saaty, 1977). AHP is a measurement theory based on priority values from pairwise comparison of specific criteria and/or alternatives (as cited in Yılmaz, Özgüven, 2011). In order to use the AHP method, the event quality dimensions were first determined. In this context, the dimensions used in the Sports Event Quality Scale (SEQS) developed by Çimen et al. (2022) were included in the study. The scale has 10 dimensions: design, buffet, output, performance, fan-fan interaction, fan-employee interaction, facility access, in-facility access, seat, and entertainment. However, the output quality, which means the general evaluation after the activity, was not included in the study because the researchers thought it would not be appropriate to compare it with other dimensions. In this direction, nine dimensions were included in the study and designed by the AHP method. Fans were asked to compare each dimension with another to determine which paired comparisons were more important. Then, fans were asked to score from 1 to 9 (1 Equally Important - 9 Very Important) to determine how important their choice was compared to the other dimension.

Table 2. Sample representation of the data collection tool created with AHP

		Please mark the level of importance								
Which dimension is more important to you?		1	2	3	4	5	6	7	8	9
More important	**More important**									
Access to the facility	Design									
Access to the facility	Buffet									
Access to the facility	Entertainment									
Access to the facility	Performance									
Access to the facility	Fan-employee interaction									
Access to the facility	Fan-fan interaction									
Access to the facility	In-facility access									
Access to the facility	Seat									

Data Analysis

A total of 491 fans were reached in this study to determine the event quality of fan typologies. The obtained data was first transferred to the digital environment without any intervention. Afterward, 15 missing, incorrect forms that created an extreme value problem in the data set were not included in the analysis using data review and cleaning methods. The research was conducted on 476 data with this cleaning method.

Two methods were used to analyze the data within the scope of the research. These methods were two-stage hierarchical cluster analysis and analytic hierarchy period (AHP) technique.

A two-stage hierarchical cluster analysis was used to reveal fan typologies. One of the cluster analysis methods, two-stage hierarchical cluster analysis, as defined by Ceylan, Gürsev and Bulkan (2017), is "a hybrid clustering technique formed by combining the non-hierarchical clustering techniques "k Means" and the hierarchical techniques "Ward's Least Variance." Dalmaijer, Nord and Astle (2022) stated that each cluster should have at least 30 participants. In this context, it was determined that the data collected from 476 fans was sufficient to apply the two-stage hierarchical clustering analysis.

Within the scope of the research, the Analytical Hierarchy Process (AHP) was used to create an alternative in determining the event quality dimensions according to the fan typologies. In this context, the data obtained from the fans were transferred to the Excell program. The fans' answers were first normalized with pairwise comparison matrices. Consistency was calculated for each participant, and it was determined that the consistency rates were lower than the value of 0.10 determined in the literature (Saaty, Vargas & Dellmann, 2003). Then, the criteria weights of the participants were determined. The determined criteria weights were brought together, and the average weights were taken.

Ethics Statement

This research was initiated by Gazi University Ethics Commission's decision dated 30.07.2024 and numbered 13, with approval that there was no ethical objection.

Findings

This section will present the fan typologies resulting from the cluster analysis and the findings revealing the importance levels of these typologies regarding event quality dimensions. Firstly, a two-stage clustering analysis was used to examine how many clusters the fans were grouped under the dimensions of product use, sensitivity to the score, watching behavior, violence tendency, information collection, belonging, and following. Accordingly, when the coefficients were analyzed, the Euclidean difference showing the distance between the cluster coefficients of 476 participants revealed four clusters. These clusters are named hooligan, fanatic, classical, and social based on the literature and expert opinion. The average scores regarding the distributions of the clusters are shown in Figure 1.

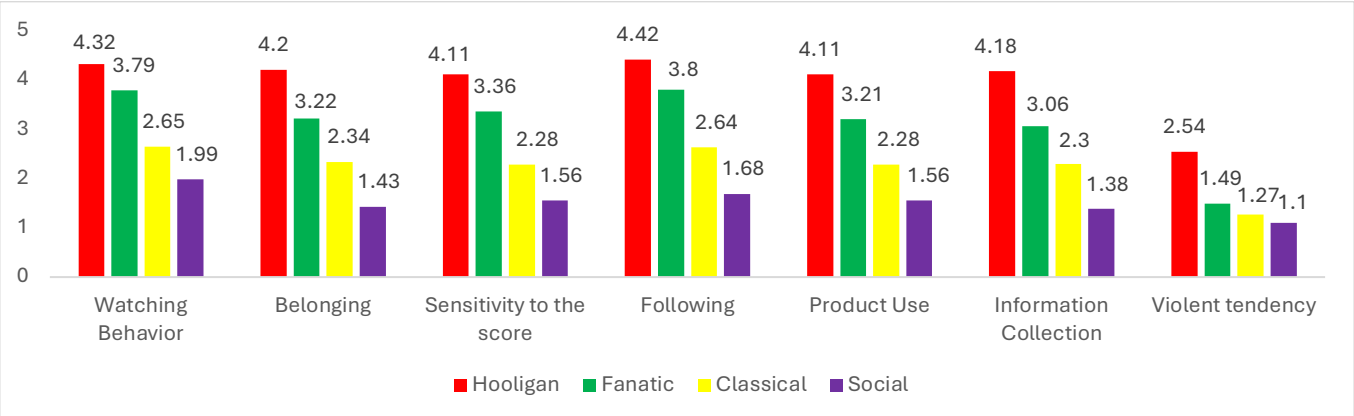

Figure 1. Mean score distributions of the clusters for the dimensions

When Figure 1 is analyzed, it is determined that the averages of hooligan and fanatical fans are higher than the averages of classical and social fans.

Table 3. Importance weights for event quality dimensions of all fan typologies

	Hooligan	Fanatic	Classic	Social
Performance	0,16	0,17	0,17	0,14
Access to facility	0,15	0,14	0,17	0,15
Entertainment	0,14	0,13	0,16	0,14
Seat	0,12	0,13	0,14	0,12
In-facility access	0,10	0,11	0,9	0,11
Fan-employee interaction	0,8	0,9	0,8	0,10
Fan-fan interaction	0,12	0,10	0,8	0,10
Design	0,7	0,8	0,6	0,7
Buffet	0,6	0,5	0,5	0,6

When the Table 3 is examined, it is evident that the most important dimensions ensuring event quality across different fan typologies exhibit both consistency and variation. For hooligan, fanatic, and classic fans, performance and access to the facility emerge as the most critical dimensions, while design and buffet are consistently rated as the least important. Similarly, for social fans, access to the facility, performance, and entertainment are identified as the most important dimensions, with design and buffet again ranking lowest. Overall, considering all fan typologies together, performance and access to the facility stand out as the most important dimensions ensuring event quality, whereas design and buffet remain the least important aspects.

Discussion

When the importance levels of the quality of the event were examined according to the typologies, it was determined that the "performance" criterion representing the "performance of the team and the athletes" came first. Regarding this dimension, which is also called game quality in the literature (Ko et al., 2011), and Kelley and Turley (2001) determined that the most essential element in service quality perceptions is game quality. Many studies support these findings (Kim et al., 2013; Ko et al., 2011; Lee & Kang, 2015; Phonthanukitithaworn & Sellitto, 2018). In addition to the studies conducted on a single type of fan, when the studies classifying the fans are examined, there is evidence that reveals the importance of the expectation of performance quality in the satisfaction of fans with high team loyalty (Quick, 2000; Salman, 2008). In this context, it can be said that the performance quality of hooligan and fanatic fans with high team loyalty obtained in the study is an expected result. However, it can be said that it is an unexpected result that classical and social fans, who are less committed to their team and less sensitive to the score, prioritize the performance dimension. Although some results indicate that fans with lower team loyalty prioritize the performance criterion (Kim, Rogol & Lee, 2022), studies indicate that fans focused on socialization and entertainment put performance in the background (Halıcı & Yetim, 2024; Sutton et al., 1997). Although it contradicts the typology literature, the fact that performance is the main element can be associated with stadium occupancy rates. An increase in team performance can cause stadiums to fill up. Studies in the literature show that team success is related to stadium occupancy rates (Kuyzu & Lökçü, 2019; Silveira et al., 2019). A decrease in team performance can cause the number of fans in stadiums to decrease. In the study by Özgen (2015), 73.8% of the fans stated that the occupancy rates in the stadiums decreased due to the low quality of the football played. The increased and decreased stadium occupancy rates may be due to classical and social fans. Although studies show they are less sensitive to the score than other fans (Halıcı & Yetim, 2024), classical and social fans may have moved away from the stadiums due to poor team performance and insufficient other quality elements. Hooligan and fanatic fans, who have high team loyalty, may not be affected by the team performance, even if it is poor, due to their sense of belonging to the team, and may continue to support their team in the stadium. However, as the literature states, sports managers have limited control over performance (Foroughi, Mohammad Shah, Nikbin & Hyun, 2014; Halıcı & Yetim, 2024; Kelley & Turley, 2001; Phonthanukitithaworn & Sellitto, 2018; Zhang et al., 2014). Many variables affect the team's or the athlete's performance, and many elements are not under control, such as climate conditions, opponents, and referees. As stated in the literature (Foroughi, Nikbin, Hyun & Iranmanesh, 2016; Silveira et al., 2019), sports managers need to focus on other service areas they can control rather than elements such as performance, which have limited control.

In addition to performance, another dimension that comes to the fore in quality expectations is entertainment. Although it is frequently preferred in measurement studies in the international literatüre (Kim et al., 2013; Yoshida & James, 2011), it is less preferred as a factor determining the quality of the event in the national literature (Çimen et al., 2022). The literature provides much evidence that the primary motivation sources of fans with lower team commitment are entertainment and socialization rather than supporting the team and,

therefore, expect more entertainment (Funk, Mahony & Ridinger, 2002; Halıcı & Ötkan, 2024; Halıcı & Yetim, 2024; Kim et al., 2022; Lough & Kim, 2004). The research results also show that classic and social fans attach high importance to the entertainment dimension. In this direction, these findings reinforce the evidence from the literature. Due to this expectation, these fans must organize entertaining activities before the match and during half-time. It can be said that the failure to meet this expectation of social fans, whose primary motivation is entertainment, causes their commitment to the team to be less than others. However, considering that the primary motivation of hooligan and fanatic fans with high team commitment is to support the team and performance, it can be said that the emphasis on the entertainment dimension is an unexpected result. These results may indicate that the fans' expectations have started to change due to entertainment elements that have a limited number of equivalents at the national level but have started to be used frequently in the international arena. Considering that one of the reasons why hooligan fans exhibit violent behavior is negative match scores, as stated by Halıcı and Yetim (2024), bringing entertainment elements to the forefront may allow these fan groups to be less affected by the score. Thus, the tendency of this fan group to violence may be reduced, and they may be transformed into fanatic fans. In addition to these inferences, these findings may have emerged due to the different perceptions of the concept of entertainment stated in the study by fanatic and hooligan fans. The "entertainment" dimension included in the study covers the activities carried out by the club before the match and during half-time. The fans participating in the study may have perceived entertainment as the atmosphere they created, such as choreography and cheering, rather than the shows presented by the club.

In addition to the performance and entertainment dimensions, access to the facility has been determined to be among the most important in all fan typologies. Many studies show that access to the facility quality affects fans' expectations (Foroughi et al., 2019; Ko et al., 2011; Wakefield & Blodgett, 1996). However, it is remarkable that the quality of access to the facility is more important than quality elements such as seats, In- facility access, fan-fan interaction, fan-employee interaction, design, and buffet for all types of fans. This result shows that fans should take precautions regarding access to the facility to the stadium regardless of their loyalty to the team.

It can be said that seat quality perception is of average importance in all fan types. Although there are scientific studies in the international literature that seat comfort affects the perception of quality (Dhurup, Mofoka & Srujlal 2010; Foroughi et al., 2019; Yusof & See, 2008), some studies in the national literature have determined that seat comfort does not affect the quality process (Argan, Özgen & Koç, 2018). Especially since our country's fans usually watch the matches standing, they may not have expectations regarding seat comfort. In fact, in the study by Halıcı and Çimen (2021), most of the fans stated that they had no expectations regarding seat comfort and that seats should be without seats. When the results in the literature are examined, it can be said that although it is thought to be the dimension with the least importance level, the results obtained from the study do not show parallelism with the national literature, as the results are at a medium importance level. Although these results are considered normal for classical and social fans, it can be said that it is an unexpected result that they are at a medium level of significance for fanatic and hooligan fan groups with high viewing behavior averages, including standing and cheering. These results show that scientific research on seat quality should be increased for fanatic and hooligan fans.

There are many studies indicating that the services provided in areas where fans can purchase food and beverages within the stadium affect the quality perceptions of the fans (Bulgurcuoğlu, 2014; Çimen et al., 2022; Gençer, 2005; Ko et al., 2011). However, although the study results show that buffet quality affects the quality of the event, it shows that buffets have the least importance compared to other dimensions. This situation is expected since buffet services are also described as complementary in the literature (Ko et al. 2011; Wakefield and Sloan, 1995).

Conclusion

As a result, the study determined that the importance levels are similar according to the fan typologies; the most important dimensions are performance, entertainment, and transportation in all typologies, and the least important dimensions are design and buffet. It can be said that the importance of the entertainment dimension is particularly high in all types of fans, which is an important finding in terms of contributing to the literature. It can also be said that the performance quality, described as the leading service in the literature, is the most important quality element for classical and social fan types with higher socialization and entertainment motivation, which is a remarkable finding. It can be said that these results are significant in terms of providing a guide for sports club managers to use their limited resources correctly.

Practical Implications

These results show that all fans attach great importance to the performance quality. However, it is difficult for sports club managers to control team performance due to many factors, such as climate conditions, opponents, referees, etc. Poor performance can have devastating effects, especially for fan types sensitive to the score, such as hooligans and fanatic fans. However, despite its destructive effects, high commitment will cause these fans to continue watching the matches. However, poor performance may cause classic and social fans to leave the stadiums. Therefore, it would be a logical strategy for sports clubs to invest in an enjoyable game approach and a quality game system to create long-term fan satisfaction. It is thought

that it is a significant finding that all fan types attach great importance to the entertainment dimension. In order for fans to increase their match experience, the number of pre-match and half-time events such as concerts, competitions, and fan zone applications to be organized by the club should be increased. Including the entertainment element can increase the participation of classic and social fans in matches. In addition, sustainable fan participation can be achieved by ensuring that fans with high score sensitivity get out of their win-lose-focused mindset. Considering that one of the reasons for violence by hooligan fans is negative match scores, entertainment-oriented activities of clubs can contribute to reducing the violent tendencies of hooligan fans. Events such as pre-match and half-time competitions may have limited effect on hooligan and fanatic fans. Elements such as choreography, sound, acoustics, and lighting systems that will improve the atmosphere of the stands can be targeted. Another dimension that has a high level of importance according to typologies is the transportation dimension. Since fanatic and hooligan fans are the fans who watch the most matches and go to away games, the club can make organizations for both home and away games to ensure the continuity of these habits. In addition, parking services must be problem-free to ensure the participation of all typologies. However, since expanding the parking area after the construction of the stadium will be challenging, the parking problem can be eliminated by agreements with surrounding parking lots.

Limitations

The developed scale designed for fans watching the match in the stadium. However, different types of fans may be loyal to their team at different levels, even if they do not watch the match in the stadium. For this reason, future studies can reveal fan types without looking for criteria for watching matches in the stadium. In this study, comparisons between dimensions were made using the AHP method. In future studies, criteria weights can be determined by using the pairwise comparison method in the items that make up the dimensions. In addition, the relatively long data collection tool prepared with the AHP method may have tired the participants. Therefore, other comparison methods such as SWAR, which is shorter than the AHP method, may be preferred.

Author notes

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Conflict of Interest

There is no conflict of interest among the authors regarding the publication of this article.

Author Contributions

Research Idea: AH; Research Design: AH, AK; Data Analysis: AH; Article Writing: AH, AK; Critical Review: AH

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How Football Celebritys' Brand Authenticity Shapes Fan Loyalty: The Mediating Role of Team Brand Image

Futbol Ünlülerinin Marka Özgünlüğü Taraftar Sadakatini Nasıl Şekillendiriyor? Takım Marka İmajının Aracı Rolü

Research Article / Araştırma Makalesi

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Abstract

The purpose of this study is to determine the effect of personel brand identification and celebrity authenticity of famous athletes on fan loyalty. In order to test the hypotheses of the model, the fans of the four major football teams (Galatasaray, Fenerbahçe, Beşiktaş, Trabzonspor) in the Turkish Super League were selected as the research group. Data collected from 408 respondents using online survey tools was analyzed using structural equation modeling with Smart PLS software. According to the findings, talent and originality among rarity constructs affect celebrity authenticity. In addition, football players' personal brand identification and celebrity authenticity positively affect team image, while team image positively affects fans' behavioural and attitudinal loyalty. It will be important for football team managers and sports marketing departments to bring famous players to their teams to improve club image and fan loyalty. In addition, the harmony between the famous footballer and the team image plays an important role in this relationship. This study presents a multidimensional conceptual framework based on Brand Authenticity Theory. The model offers a different perspective by identifying rarity constructs (talent, discretion and originality) as antecedents of celebrity authenticity and examining their impact on both personnel brand identification and team brand image.

Keywords: Celebrity, Authenticity, Football Star, Team Image, Loyalty

Öz

Bu çalışmanın amacı, ünlü sporcuların kişisel marka özdeşleşmesi ve ünlü özgünlüğünün taraftar sadakati üzerindeki etkisini belirlemektir. Modelin hipotezlerini test etmek için Türkiye Süper Ligi'nde yer alan dört büyük futbol takımının (Galatasaray, Fenerbahçe, Beşiktaş, Trabzonspor) taraftarları araştırma grubu olarak seçilmiştir. Çevirimiçi anket araçları ile 408 taraftardan toplanan veriler Smart PLS yazılımı aracılığıyla yapısal eşitlik modellemesi ile analiz edilmiştir. Bulgulara göre, nadirlik yapılarından yetenek ve orijinallik ünlülerin özgünlüğünü etkilemektedir. Ayrıca, futbolcuların kişisel marka kimliği ve ünlü özgünlüğü takım imajını olumlu yönde etkilerken, takım imajı da taraftarların davranışsal ve tutumsal sadakatini olumlu yönde etkilemektedir. Futbol takımı yöneticileri ve spor pazarlama departmanları, kulüp imajını ve taraftar sadakatini geliştirmek için ünlü oyuncuları takımlarına kazandırmaları önem arz edecektir. Ayrıca ünlü futbolcu ile takım imajı arasındaki uyum da bu ilişkide önemli bir rol oynamaktadır. Bu çalışma, Marka Özgünlüğü Teorisi'ne dayanan çok boyutlu bir kavramsal çerçeve sunmaktadır. Model, nadirlik yapılarını (yetenek, takdir ve orijinallik) ünlü özgünlüğünün öncülleri olarak tanımlayarak ve bunların hem personel marka özdeşleşmesi hem de takım marka imajı üzerindeki etkilerini inceleyerek farklı bir bakış açısı sunmaktadır.

Anahtar Kelimeler: Ünlü, Özgünlük, Futbol Yıldızı, Takım İmajı, Sadakat

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Introduction

The extreme popularity and commercialisation of professional football has led football clubs to look for ways to attract fans to their teams and to maintain this relationship. For this reason, team managers tend to strengthen their teams with famous players. The influence of individual athletes goes beyond on-field performance, shaping not only match results but also fan perceptions and brand loyalty (Carlson & Donavan, 2013). Globally popular celebrity footballers serve to strengthen the corporate identity of the teams they represent along with their own image (Lobpries, Bennett, & Brison, 2018). For this reason, the personal brand authenticity of the football players in the team has become decisive in connecting fans emotionally and behaviourally to both the player and the team (Bauer, Stokburger-Sauer, & Exler, 2008; Kucharska, Confente, & Brunetti, 2020).

Research has shown that trust, commitment, and loyalty are positively affected by brand authenticity in various fields (Deng, Wang, & Li, 2024; Uysal & Okumuş, 2022; Xu, Prayag, & Song, 2022). Despite existing studies examining the impact of brand identity or brand authenticity on brand loyalty for products or services, footballers' personal brand identification and celebrity authenticity have been studied to a limited extent and continue to attract interest as an important area of research (Moulard, Garrity, & Rice, 2015). Furthermore, the team brand image functions as a pivotal mediating factor in this relationship. A positive team image, influenced by the alignment between the athlete's authentic personality and the club's core values, has the potential to increase fan loyalty and strengthen long-term emotional bonds (Bauer et al., 2008; Gladden & Funk, 2001). However, there is a paucity of research that has empirically examined how the authenticity of celebrity players enhances team brand perceptions, which in turn promotes fan loyalty. Despite the growing academic interest in celebrity branding and fan behaviour, there is a paucity of empirical research addressing how the perceived authenticity of football celebrities contributes to different dimensions of fan loyalty, particularly through the mediating mechanism of team brand image. It is evident that extant studies frequently consider the athlete brand in isolation, without integrating it into a broader theoretical framework. Such frameworks should encompass both individual brand attributes (e.g. authenticity, rarity) and organisational-level constructs (e.g. team image, brand fit) (Lobpries et al., 2018; Moulard et al., 2015).

This study addresses these theoretical and empirical gaps by developing a multidimensional conceptual model grounded in Brand Authenticity Theory. It examines how three components of celebrity rarity—talent, discretion, and originality—influence perceived authenticity, and how this, along with personal brand identification, shapes team brand image. Ultimately, the study investigates how these constructs influence attitudinal and behavioral fan loyalty, decomposing loyalty into its emotional and action-oriented components for a more nuanced understanding.

By exploring these relationships, the present research responds to recent calls in the literature for integrated models that explain how personal branding strategies and perceived athlete authenticity can generate tangible outcomes at the organizational level, including improved fan engagement and brand equity (Carlson & Donavan, 2013; Morhart, Malär, Guèvremont, Girardin, & Grohmann, 2015).

Furthermore, the research contributes to the practical domain by providing insights for club managers, sports marketers, and talent agents on how aligning a player's authentic image with the team's brand identity can reinforce fan loyalty and long-term commitment. Particularly in the era of social media and global sports consumption, understanding how individual athlete traits influence organizational perception is essential for sustainable brand management. To this end, the study seeks to answer the following research questions (RQ):

RQ1=To what extent do the rarity constructs of talent, discretion, and originality affect the perceived authenticity of football celebrities?

RQ2=How does personal brand identification and celebrity authenticity influence team brand image?

RQ3=How does team brand image affect attitudinal and behavioral fan loyalty?

RQ4=Does team brand image mediate the relationship between (a) personal brand identification and fan loyalty, and (b) celebrity authenticity and fan loyalty?

In summary, this study suggests that athlete authenticity ultimately influences fans' attitudinal and behavioral loyalty. When placed within a broader branding context where the athlete's personal identity, team image, and fan loyalty develop together, it gains strategic value. By filling this literature gap, the research offers both theoretical advancement and practical guidance for stakeholders in the football industry.

Theoretical backround

Brand Authenticity Theory

Marketing and consumer research recognises that preferences for authentic consumption stem from traditional sources of self-identity in relation to postmodernity (Morhart et al., 2015). Authentic consumption applies to many consumption items (tourism, restaurants, sports, etc.) that have the potential to create meaning (Chen, Zhou, Zhan, & Zhou, 2020; Kucharska et al., 2020; Xu et al., 2022). Brand authenticity focuses on the perception of a brand as genuine, honest, trustworthy, consistent and loyal (Portal, Abratt, & Bendixen, 2019). It is expected to be explained by dimensions such as credibility, authenticity, and continuity in the sub-dimensions of the theory (Morhart et al.,

2015). Especially today, the fact that consumers are exposed to exaggerated marketing strategies has made it important for consumers to find brands authentic and sincere (Uthaisar, Eves, & Wang, 2024). According to this theory, the success of a brand depends on consumers believing it to be real and authentic (Napoli, Dickinson, Beverland, & Farrelly, 2014). In previous research, this theory has been used in many different sectors (Jian, Zhou, & Zhou, 2019; Safeer, He, Lin, Abrar, & Nawaz, 2023; Schallehn, Burmann, & Riley, 2014). Brand authenticity theory has also been utilised in many studies on celebrities (Ilicic & Webster, 2016; Kucharska et al., 2020; Moulard et al., 2015). For this reason, the model was developed on the basis of brand authenticity in this research, which deals with celebrity football players.

Literature review and hypotheses development

Rarity and Celebrity Authenticity

Moulard et al. (2015) defined rarity as the degree of rarity of the celebrity and put forward the idea that there are unique features that distinguish these celebrities from other celebrities. Again, researchers have put forward three sub-dimensions of rarity: talent, discretion and originality. Talent refers to a person's talent and skill that makes them famous. Discretion, on the other hand, refers to the fact that celebrities are not very visible outside their work and are cautious about revealing their private lives. For this reason, they appear in public more rarely than other celebrities. Originality is the perception that a celebrity acts creatively, authentically and out of the ordinary. Pine and Gilmore (2011) argue that being everywhere and excessive commercialization reduce brand authenticity. These celebrities exhibit unique behaviours instead of following the crowd and following the fashion (Moulard et al., 2015). Previous research has shown that celebrities with unique skills are perceived as more authentic, which creates a sense of admiration in consumers (Cruikshank, 2018). In addition, a celebrity's common sense behaviour, i.e. collaborating with brands in line with their values, increases their authenticity (Kennedy, Baxter, & Kulczynski, 2021). The ability to offer unique perspectives or creative endorsements contributes to a celebrity's overall authenticity and positively affects consumer engagement (Osorio, Centeno, Cambra-Fierro, & del Castillo, 2022). Research has shown that talent, discretion and authenticity positively influence celebrity authenticity (Ilicic & Webster, 2016; Moulard et al., 2015). Based on this information, the following hypotheses were developed:

H1a, H1b, H1c: *Talent, discretion, and originality positively influence celebrity authenticity.*

Personal Brand identification, Celebrity Authenticity and Team Brand Image

Identification is a social influence process in which an individual adopts certain values, beliefs, attitudes and behaviours reflected by another individual or group (Kelman, 1961). According to social identity theory, individuals who strongly identify with a brand follow the brand, participate in brand-related engagement activities and become brand advocates because the brand has become part of their self-concept (Giakoumaki & Krepapa, 2020; Tajfel, Turner, Austin, & Worchel, 1979). McCracken's (1989) transfer theory helped to reveal the motives behind identification and accordingly, the meaning of the personality perceived in a football player is transferred to the fans through identification with this football player. Fans seeking authenticity may identify with an authentic footballer (Kucharska et al., 2020). In addition, it has also been revealed that identification affects brand image (Coelho, Rita, & Santos, 2018; P. Becerra & Badrinarayanan, 2013). It is thought that identification with sports celebrities strengthens the image they perceive towards the teams they are fans of. Therefore, the following hypothesis was developed:

H2: *Personal brand identification positively influences brand image.*

The concept of brand authenticity is associated with permanence, authenticity, naturalness and trustworthiness (Bruhn, Schoenmüller, Schäfer, & Heinrich, 2012; Schallehn et al., 2014). Personal brand authenticity is defined as the perception of an individual as authentic, reliable and honest by others (Moulard, Garrity & Rice, 2015). Moulard, Rice, Garrity, and Mangus (2014) suggested that the perception of brand authenticity towards celebrities has a determining effect on the positive attitude of the world around them towards them. In the context of sport, the perception of football players' personal brands as authentic may increase fans' trust and loyalty towards that athlete (Carlson & Donavan, 2013). The bond of the fan who identifies with the sports celebrity is strengthened and in this case, identification plays a key role in a football brand (Richelieu, 2012). Football clubs also want to have the best players within the club's budget. Fans of the team also tend to identify with sports celebrities as personal brands with distinctive personalities (Carlson & Donavan, 2013). The image of an authentic footballer can positively affect brand image by increasing the perceived value and credibility of the brand he represents (Heere & James, 2007). Football fans tend to develop loyalty not only to their team but also to individual players (Arai, Ko, & Ross, 2014). In this context, personal brand authenticity is thought to contribute to the overall image of sports brands and the following hypothesis was developed:

H3: *Celebrity authenticity positively influences brand image.*

Team Brand Image and Fan Loyalty

Brand image is defined as 'brand perceptions that reflect the associations in consumers' minds' (Keller, 1993). Team brand image is a collection of brand associations in the mind of the sports consumer, such as attributes related to the team's products or attributes not related to the team's products (Yun, Rosenberger III, & Sweeney, 2021). Brand image is an important

component to ensure brand loyalty in a competitive environment (Kim, Choe, & Petrick, 2018; Parris & Guzmán, 2023). When teams create a strong jewellery brand image, it positively affects the loyalty formation of their fans (Bauer, Sauer, & Exler, 2005; Bauer et al., 2008; Mahmoudian, Sadeghi Boroujerdi, Mohammadi, Delshab, & Pyun, 2021). The importance of fan loyalty has been emphasised for teams to ensure sustainability and gain competitive advantage (Stevens & Rosenberger, 2012). Fan loyalty is a clear expression of fans' loyalty towards an object or person and their biases in both everyday and scientific discourses (Zhang et al., 2015). Loyal fans are unconditionally committed to both teams and athletes and support their products (Theysohn, Hinz, Nosworthy, & Kirchner, 2009). Bauer et al. (2008) divided fan loyalty into attitudinal and behavioural. The most appropriate construct to measure attitudinal loyalty is psychological commitment, which is defined as 'the tendency to resist preference change in response to conflicting information or experience' (Gahwiler & Havitz, 1998). When fans form a high level of commitment to their teams or athletes, they show a high level of psychological commitment even in case of failure. Behavioural loyalty shows past loyalty and future behavioural intentions such as participation, viewing or purchase intentions. Behavioural loyalty towards celebrity athletes results in fans and spectators following them on social media, watching them in the stadium or on television (Yun et al., 2021). Previous research has shown that team brand image is effective in creating attitudinal and behavioural fan loyalty (Bauer et al., 2008; Liu, Liu, Mo, Zhao, & Zhu, 2020; Wu, Tsai, & Hung, 2012; Yun et al., 2021). Thus, the following hypotheses were formed:

H4: *Team brand image positively influences attitudinal fan loyalty.*

H5: *Team brand image positively influences behavioral fan loyalty.*

Mediating Role of Team Brand Image

According to Keller (1993), the perception of brand image in consumers can directly and indirectly affect brand loyalty. Especially in the sports industry, the relationship that fans have with a particular footballer or sports brand plays an important role in shaping brand image (Biscaia, Correia, Ross, Rosado, & Maroco, 2013). The perception of athletes' personal brands as authentic can strengthen the image of the brand they represent (Carlson & Donavan, 2013). A strong brand image can increase fans' attitudinal and behavioural loyalty towards the brand((Heere & James, 2007). Thus, the following were hypothesised:

H6a: Brand image mediates the relationship between personal brand authenticity and attitudinal brand loyalty.

H6b: Brand image mediates the relationship between personal brand authenticity and behavioural brand loyalty.

The perception of sport celebrities such as footballers as authentic may lead fans to evaluate the brand image more favourably (Thomson, 2006). Positive perceptions of the brand increase consumer loyalty (Bauer et al., 2008). In this context, brand image, as an important variable in sports marketing, helps to understand the impact of both personal and celebrity authenticity on brand loyalty (Holt, 2004). Accordingly, hypotheses were put forward:

H7a: Brand image mediates the relationship between celebrity authenticity and attitudinal brand loyalty.

H7b: Brand image mediates the relationship between celebrity authenticity and behavioural brand loyalty.

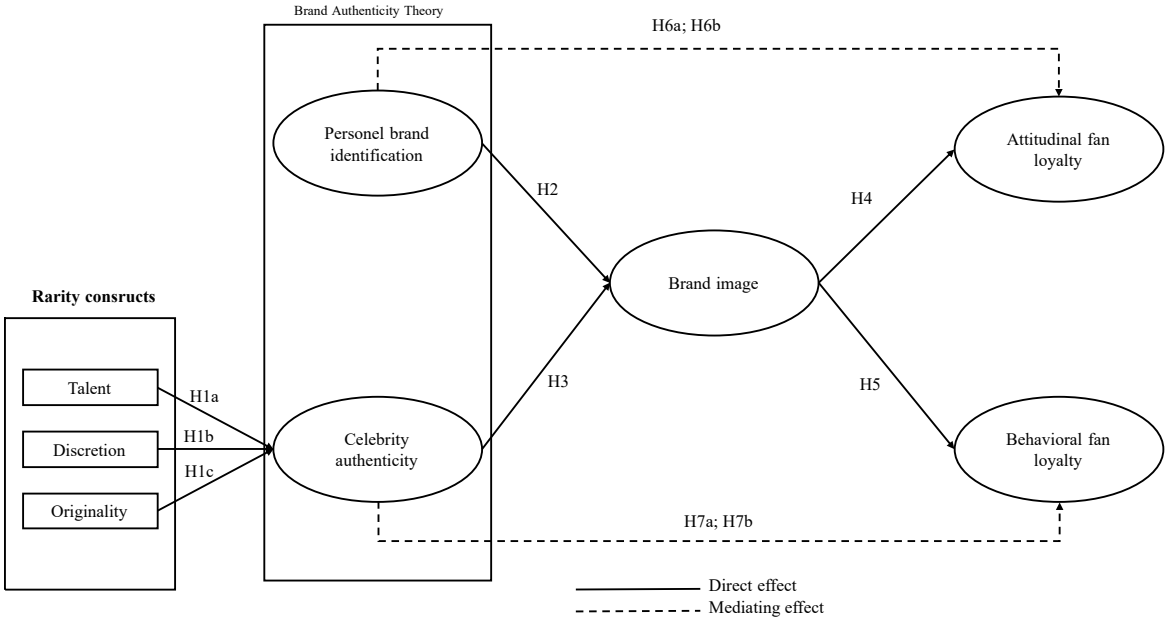

Figure 1: Research model

Method

Data Collection Procedure and Sampling

Only the fans of Galatasaray, Fenerbahçe, Beşiktaş and Trabzonspor teams in the Turkish Football Super League were selected as the sample group of the study. The reason for choosing these teams is that the players who are considered as celebrities usually take place in these football clubs. Purposive sampling was used to reach the fan group and those who were not fans of the above teams were excluded from the research. The questionnaires were created through Google Forms and the survey link was distributed through various social media platforms (WhatsApp, Facebook, Instagram, e-mail). Questionnaires were sent to 511 participants and 422 were returned. Participants who were under the age of 18 and who were not fans of the designated football teams were excluded from the study and the analysis was started with 408 participants. Hair et al. (2019) stated that 408 sample size is a sufficient number for structural equation modeling. In addition, G-power software was also used to perform model-specific power analyses to determine sample sizes and to calculate the minimum sample size. According to this analysis, the sample size is sufficient.

According to the demographic information of the fans, the participants consist of 48% (N=196) male and 52% (N=212) female fans. 48% (N=196) of the fans follow the matches of their teams regularly every week. In addition, 53.2% (N=217) have a licensed product of their team, while 46.8% (N=46.8) do not have a licensed product. The average age of the fans is 21,07±3,92.

Measurement Tools

In the study, data were collected by questionnaire method and the questionnaire consisted of two parts. The first part includes personnel brand identification (3 items), celebrity authenticity (3 items), talent (2 items), discretion (3 items), originality (3 items), brand image (5 items), fan loyalty (altitudinal-6 items and behavioral loyalty-5 items) scales. Personnel brand identification, celebrity authenticity, talent, discretion and originality scales were adapted from Moulard et al. (2015). Brand image scale was adapted from Şimşek and Noyan (2009) and fan loyalty scale was adapted from Bauer et al. (2008). All scales were scored on a five-point Likert-type scale. In the second part, questions such as gender, age, the frequency of following their team's matches and the ownership of licensed products of their team were included.

Measurement items were revised from previous research in the context of this study. Since the research participants lived in Turkey, the scales in other languages were translated into Turkish. The translated scale questions were checked by three language experts. Then, to ensure face validity, the scales were examined by three academicians specialized in marketing. After the evaluations of the experts, ambiguous expressions were corrected. The finalized questionnaire was piloted and distributed to 50 people and the participants were asked whether there were any unclear questions. As a result of these procedures, content validity was ensured. As a result of the pilot application, the factor loadings of the items of the scales were higher than 0.6 and the Cronbach Alpha internal consistency coefficients were above 0.7. These results showed that the questionnaire was suitable for large-scale data collection.

Common Method Bias (CMB)

In this research, both procedural and analytical strategies were employed to mitigate common method bias (CMB). As part of the procedural approach, participant anonymity was ensured. In the analytical phase, Harman's single-factor test was conducted using IBM SPSS 24.0 (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003), revealing that a single factor accounted for only 38.92% of the total variance. This outcome confirmed that no single factor explained more than 50% of the covariance among measurements (Doty & Glick, 1998). Additionally, variance inflation factor (VIF) values were examined, with all values remaining below the threshold of 3.3, aligning with recommendations by Kock (2015) to control CMB. Lastly, a common latent factor was incorporated into the model, and the comparison between models with and without this factor showed that differences in standardized factor loadings remained under 0.20 (Serrano Archimi, Reynaud, Yasin, & Bhatti, 2018). These findings collectively suggest that CMB does not pose a significant issue in this study.

Data Analysis

To assess the predicted relationships, analyses were conducted using a partial least squares structural equation modelling (PLS-SEM) approach supported by Smart-PLS® 3.2.8 software. PLS-SEM is a method that uses weighted composites of indicator variables to minimise unexplained variance and facilitate accountability for measurement errors (Hair Jr, Hult, Ringle, & Sarstedt, 2021; Ringle, Wende, & Becker, 2015). This software also determines the constructs of the dependent variable and measures the effects of each independent variable on the dependent variable (Henseler, Ringle, & Sinkovics, 2009). In this model, Talent, Discretion, Originality, Personal Brand Identification, and Celebrity Authenticity are independent variables; Team Brand Image is an instrument (as well as a dependent variable); Attitudinal Fan Loyalty and Behavioral Fan Loyalty are dependent variables.

In the data analysis process, the measurement model was tested first. In this context, Cronbach's Alpha and Composite Reliability (CR) were used for internal consistency, Average Variance Extracted (AVE) was used for convergent validity, and the Fornell-Larcker criterion and HTMT (Heterotrait-Monotrait Ratio) analysis were used for discriminant validity. After the measurement model was found to be valid, the structural model test was performed, and the hypotheses were evaluated using path coefficients, t-values, and p-values. The explanatory power of

the model was examined using R^2 and Q^2 values. In addition, VAF (Variance Accounted For) analysis was performed to evaluate the mediating effects.

Ethical Statement

This research was approved by the Ethics Committee of the Rectorate of Niğde Ömer Halisdemir University on 03.12.2024 with decision number 20.

Results

Partial least squares structural equation modelling (PLS-SEM) method was applied using Smart PLS 4 software to test the complex structural model and hypotheses proposed in the research and to evaluate the strength and direction of the relationships (Hair, Risher, Sarstedt, & Ringle, 2019). SEM is a widely used analysis technique for the verification of theoretical models in fields such as marketing, psychology, social sciences, and business administration (Akoğlu, Yildiz, & Kumar, 2024; Kumar & Hsieh, 2024).

Measurement model

External loadings, average variance extracted (AVE), composite reliability (CR) and discriminant validity were examined to ensure the validity and reliability of the measurement model. Factor loadings, AVE and CR values for convergent validity are shown in Table 1. To evaluate the quality of the measurement model, Composite Reliability (CR) and Average Variance Extracted (AVE) were calculated. CR assesses the internal consistency of the latent construct indicators and is considered a more accurate reliability estimator than Cronbach's Alpha, particularly in SEM using PLS (Hair et al., 2019). A CR value above 0.70 indicates that the construct has satisfactory internal consistency and that its indicators consistently measure the same underlying concept. On the other hand, AVE evaluates convergent validity, which refers to the degree to which multiple items measuring the same construct are in agreement. An AVE value above 0.50 suggests that the construct explains more than half of the variance of its indicators, which confirms that the latent variable adequately captures the intended concept (Fornell & Larcker, 1981). In this study, all constructs demonstrated CR values greater than 0.70 and AVE values above 0.50, supporting the reliability and convergent validity of the measurement model. These findings provide empirical evidence that the constructs are both consistent and valid representations of the theoretical concepts under investigation. (Hair et al., 2019). In addition, Cronbach's alpha values are also higher than the recommended value threshold of 0.7 (Eisinga, Grotenhuis, & Pelzer, 2013). These findings indicate that convergent validity was achieved (Table 1).

Table 1. Factor loading, validity, and reliability

Sub-dimensions	Items	Outer loading (>0.6)	Cronbach's alpha (>0.7)	CR (> 0.7)	AVE (> 0.5)
Personel brand identification	PBI1	0.929	0.919	0.949	0.861
	PBI2	0.934			
	PBI3	0.921			
Celebrity authenticity	CA1	0.920	0.920	0.949	0.851
	CA2	0.941			
	CA3	9.923			
Talent	T1	0.963	0.918	0.922	0.705
	T2	0.960			
Discretion	D1	0.880	0.858	0.914	0.779
	D2	0.893			
	D3	0.874			
Originality	O1	0.954	0.927	0.953	0.872
	O2	0.937			
	O3	0.910			
Brand image	BI1	0.870	0.951	0.963	0.837
	BI2	0.937			
	BI3	0.937			
	BI4	0.920			
	BI5	0.910			
Altitudinal fan loyalty	AFL3	0.865	0.893	0.922	0.705
	AFL4	0.898			
	AFL5	0.655			
	AFL6	0.823			
Behavioral fan loyalty	BFL1	0.694	0.836	0.887	0.665
	BFL2	0.898			
	BFL3	0.909			
	BFL4	0.855			
	BFL5	0.824			

Note (s): Factor loading, α= Cronbach's alpha, CR=Composite reliability and AVE=Average variance explained

In order to ensure discriminant validity, Fornell and Larcker (1981) criteria and heterotrait-monotrait (HTMT) analysis, which are two generally accepted methods in the literature, were used. According to Fornell and Larcker (1981) criteria, each construct was determined to be different from the other constructs (Table 2). HTMT is a robust and widely recommended method for assessing discriminant validity, especially in PLS-SEM (Henseler, Ringle, & Sarstedt, 2015). In this study, all HTMT values were below 0.90, confirming that the constructs are not only internally consistent and convergent but also discriminantly valid, meaning they measure conceptually distinct dimensions as theorized Table 2).

Table 2. Discriminant validity (Fornell-Larcker criterion), Heterotrait-monotrait ratio (HTMT)

Constructs	**PBI**	**CA**	**T**	**D**	**O**	**BI**	**AFL**	**BFL**
Personel brand identification	**0.928**							
Celebrity authenticity	**0.719**	**0.928**						
Talent	0.630	0.852	**0.961**					
Discretion	0.564	0.613	0.660	**0.882**				
Originality	0.690	0.792	0.822	0.692	**0.934**			
Brand image	0.578	0.755	0.779	0.578	0.758	**0.915**		
Altitudinal fan loyalty	0.651	0.787	0.755	0.564	0.726	0.726	**0.840**	
Behavioral fan loyalty	0.691	0.701	0.649	0.568	0.674	0.658	0.777	**0.816**
Heterotrait-monotrait ratio (HTMT)								
Constructs	**PBA**	**CA**	**T**	**D**	**O**	**BI**	**AFL**	**BFL**
Personel brand identification								
Celebrity authenticity	**0.780**							
Talent	0.684	0.827						
Discretion	0.632	0.687	0.741					
Originality	0.746	0.857	0.891	0.777				
Brand image	0.688	0.807	0.833	0.639	0.807			
Altitudinal fan loyalty	0.722	0.865	0.828	0.645	0.790	0.734		
Behavioral fan loyalty	0.783	0.765	0.692	0.658	0.732	0.695	0.889	

Structural model

Table 3. Hypothesis testing

Hypothesis	Paths	*(β)*	S.D	t-value	p	Reliability interval		Result
						(%2,5)	(%97,5)	
H1a	T→ CA	0.615	0.055	11.125	0.000	0.491	0.705	Supported
H1b	D→ CA	0.018	0.038	0.486	0.627	-0.053	0.096	Not supported
H1c	O→CA	0.274	0.056	4.918	0.000	0.172	0.393	Supported
H2	PBI→TBI	0.211	0.054	3.886	0.000	0.108	0.316	Supported
H3	CA→ TBI	0.603	0.052	11.493	0.000	0.508	0.704	Supported
H4	TBI→ AFL	0.726	0.029	25.410	0.000	0.671	0.779	Supported
H5	TBI→BFL	0.658	0.032	20.567	0.000	0.596	0.719	Supported

T=Talent; D=Discretion; O=Originality; CA= Celebrity authenticity; PBI= Personal brand identification; TI=Team brand image; AFL= Attitudinal fan loyalty; BFL= Behavioral fan loyalty

According to the findings presented in Table 3, talent (T) significantly influences celebrity authenticity (CA) (H1a: $\beta = 0.615$, $p < 0.001$), highlighting the importance of talent in shaping the perceived authenticity of a celebrity. Discretion (D) does not have a significant effect on celebrity authenticity (CA) (H1b: $\beta = 0.018$, $p = 0.627$), suggesting that discretion alone is insufficient to establish celebrity authenticity. However, originality (O) positively and significantly impacts celebrity authenticity (CA) (H1c: $\beta = 0.274$, $p < 0.001$), underlining the role of originality in creating an authentic celebrity image. Personal brand identification (PBI) has a significant positive effect on team brand image (TBI) (H2: $\beta = 0.211$, $p < 0.001$), indicating that authenticity in personal branding enhances the overall perception of the brand.

Furthermore, celebrity authenticity (CA) strongly predicts team brand ımage (TBI) (H3: $\beta = 0.603$, $p < 0.001$), showing that the authenticity of celebrities contributes significantly to the perceived image of the brand. TBI significantly influences attitudinal fan loyalty (AFL) (H4: $\beta = 0.726$, $p < 0.001$), which marks the strongest relationship in the model. This suggests that a positive brand image fosters emotional and psychological commitment among consumers. Finally, TBI also positively affects behavioral fan loyalty (BFL) (H5: $\beta = 0.658$, $p < 0.001$), indicating that a favorable perception of the brand translates into consistent purchasing behaviors and long-term consumer loyalty.

Table 4. Mediation testing

Hypothesis	Paths	*(β)*	S.D	t-value	p	Reliability interval (%2,5)	Reliability interval (%97,5)	Result
	Total effect							
	PBI → AFL	0.180	0.049	3.769	0.000	0.079	0.269	
	PBI → BFL	0.400	0.052	7.638	0.000	0.306	0.502	
	CA → AFL	0.658	0.043	15.264	0.000	0.573	0.744	
	CA → BFL	0.404	0.053	7.693	0.000	0.301	0.496	
	Mediator: team brand image (TBI)							
	PBI→BI	0.211	0.054	3.886	0.000	0.108	0.316	
	CA→ BI	0.603	0.052	11.493	0.000	0.508	0.704	
	TBI→ AFL	0.726	0.029	25.410	0.000	0.671	0.779	
	TBI→BFL	0.658	0.032	20.567	0.000	0.596	0.719	
H6a	PBI→TBI→ AFL	0.058	0.017	3.414	0.001	0.028	0.094	Supported
H6b	PBI→TBI→ BFL	0.042	0.016	2.699	0.007	0.015	0.076	Supported
H7a	CA→TBI→ AFL	0.166	0.033	5.105	0.000	0.107	0.240	Supported
H7b	CA→TBI→ BFL	0.122	0.037	3.283	0.001	0.054	0.195	Supported

T=Talent; D=Discretion; O=Originality; CA= Celebrity authenticity; PBI= Personal brand identification; TI=Team brand image; AFL= Attitudinal fan loyalty; BFL= Behavioral fan loyalty

The mediation effect magnitude was assessed using Variance Accounted For (VAF) values, calculated as the ratio of indirect to total effects (Hair Jr, Hult, Ringle, Sarstedt, et al., 2021; Hayes, 2017). Table 4 presents all effects (direct, indirect, and total). A VAF below 20% indicates almost zero mediation, 20-80% suggests partial mediation, and above 80% indicates full mediation (Chawla & Joshi, 2023). The VAF for PBI→TBI→ AFL is 32.2% (total effect = 0.18, indirect effect = 0.06), indicating partial mediation. The VAF for PBI→TBI→ BFL is 10.5% (total effect = 0.40, indirect effect = 0.04), indicating zero mediation. The VAF for CA→TBI→ AFL is 25.2% (total effect = 0.66, indirect effect = 0.17), indicating partial mediation. Lastly, the VAF for CA→TBI→ BFL is 30.2% (total effect = 0.40, indirect effect = 0.12), indicating partial mediation.

Table 5. Predictive accuracy and relevance of the model

Endogenous latent constructs	R-Square	R-Square Adjusted	Q^2
CA	0.752	0.750	0.640
TBI	0.591	0.589	0.490
AFL	0.667	0.664	0.464
BFL	0.573	0.570	0.373

In Table 5, the predictive power of the model is evaluated with the help of R-square, Q^2. R^2 values are 75% for CA, 59% for BI, 67% for AFL and 57% for BFL. According to Hair Jr, Hult, Ringle, Sarstedt, et al. (2021), these values indicate that the predictive power of the model is medium and high. Stone-Geisser Q^2 (Stone, 1977) was used to determine the predictive fitness. Q^2 values indicate that the predictive fitness of the model is high (Akoglu & Özbek, 2024; Hair Jr, Hult, Ringle, Sarstedt, et al., 2021).

Discussion and Conclusion

This study aims to determine the effect of personal brand identity and celebrity authenticity on team image and fan loyalty. The mediating effect of team image in this relationship was measured. In addition, the effect of rarity constructs on celebrity authenticity was analysed.

Accordingly, the prediction that the rarity constructs talent and originality will affect celebrity authenticity was confirmed, while the effect of discretion was not confirmed. Moulard et al. (2015) and Kucharska and Firgolska (2018) showed that all of the rarity constructs positively affect celebrity authenticity. The reason why discretion has no effect on celebrity authenticity in our research findings may be that the athletes who transfer to Turkish teams in the Turkish sample generally live their private lives openly. Contrary to expectations, the fact that the effect of the "discretion" dimension on the perception of authenticity was not statistically significant may indicate a tendency among the Turkish football community to recognize media-savvy athletes for their private lives. This situation provides a starting point for new research on how the local cultural context can shape the perception of authenticity.

The effect of personal brand identification and celebrity authenticity on the brand image of the club was confirmed in this study. Khan and Fatma (2023) showed the positive effect of brand identification on brand image in their research. In addition, contrary to our research results, Tu and Xu (2023) showed that brand identification mediated the relationship between brand loyalty and innovativeness perceived by smartphone consumers, but brand identification did not have a significant effect on brand image. Im, Kim, Jwa, and Gim (2022) revealed in their study that brand identity and brand image are closely related to each other and stated that effective brand identity positively affects the perception of brand image among consumers. Moulard et al. (2015) stated that the perception of celebrities as authentic will positively affect brand image. Ilicic and Webster (2011) also stated that if the lifestyle and personality of celebrities are compatible with the brand, brand image will

be more positive by consumers and supported our research results. In addition, Kennedy et al. (2021), Cruikshank (2018) and Nichols and Shapiro (2023) obtained results that support our research results.

The positive effect of team brand image perceived positively by fans on attitudinal and behavioural fan loyalty is confirmed in this study. Bauer et al. (2008) and Yun et al. (2021) examined the effect of team image on fan loyalty and found that team image positively affects both attitudinal and behavioural loyalty of fans. Mostafavipour, Hezaveh, and Anzehaei (2023) found that team brand image significantly affects both attitudinal loyalty and behavioural loyalty. They emphasise that brand image mediates the relationship between fan loyalty and these loyalty types among Iran Premier Football League fans. Similarly, Irianto and Kartikasari (2020) showed that team brand image significantly affects both behavioural and attitudinal loyalty.

Our results show that team brand image plays an important role in the relationship between personal brand identity, celebrity authenticity and both attitudinal and behavioural fan loyalty. This mediating effect suggests that fans' perceptions of a team's image, athletes' personal brand identity and authenticity play an important role in increasing their loyalty to the team. Gladden and Funk (2001) showed that a strong team identity contributes to the formation of a positive image in the minds of fans, which in turn increases attitudinal commitment (e.g. emotional closeness, positive attitude). In addition, the perception of famous athletes or celebrities who are the face of the team as authentic (sincere, honest and harmonious) positively affects the image of the brand. Morhart et al. (2015) stated that celebrities perceived as authentic increase trust and image towards the brand, which contributes to consumer loyalty. Especially in sports, the perception that an authentic celebrity is integrated with the team can increase both behavioural loyalty (going to matches, purchasing products) and attitudinal loyalty (feeling connected) by strengthening the team brand image.

In conclusion, this study revealed how football celebrities' authenticity and personal brand identification influence fan loyalty through team brand image. The findings show that rarity elements such as talent and originality increase the perception of authenticity and that team image is a determinant of both attitudinal and behavioural loyalty. The results emphasise that clubs should pay attention not only to player performance but also to the congruence of players' images with club values and provide valuable suggestions for sports marketing practitioners in terms of player selection and brand management strategies.

Managerial Implications

The findings of this study provide some suggestions for managers and practitioners for fan behaviour, sports marketing and celebrity brand management. Firstly, the positive effect of a football celebirty's brand authenticity on team brand image and fan loyalty may increase the desire of team managers to recruit famous athletes to their teams. In addition, it is important for athletes to invest in their authentic personal branding in order to increase the likelihood of being preferred by teams. In this respect, sports clubs and marketing teams are focusing on developing authentic and value-orientated brand identities for both their teams and their athletes and communicating these to fans (Moulard et al., 2015).

Moreover, the mediating role of team image shows that fans can be attracted to a club through celebrity player transfers. However, it is predicted that the sustainability of this loyalty depends on the compatibility of the player's image with the team image. Therefore, teams should balance the harmony between the image of the club and the personal image of the celebrity players and try to create a synergistic image among the fans (Carlson & Donavan, 2013).

In practice, team managers can capitalise on this relationship by actively using their team's celebrity players to build corporate brand equity and enhance team image with fans. The perceived authenticity and personal identity of celebrity players can increase fans' emotional attachment to the player and the team (Funk & James, 2001; Yoshida, Gordon, Nakazawa, & Biscaia, 2014).

Finally, considering the loyalty of fans to their teams and athletes, clubs should manage a crisis related to celebrity players by considering strategic communication methods. This may damage the overall brand image.

Limitations and Future Research

Although this research provides meaningful insights into the relationship between football celebrities' brand authenticity, team brand image and fan loyalty, it has some limitations.

Firstly, this research was conducted in the context of Turkey. Therefore, its generalisability for countries with different economic and cultural levels is limited. Therefore, comparisons can be made with different countries, different leagues and fan bases. In addition, the age groups of the participants are generally low and similar to each other. This limits the generalizability of the study. Future studies may include higher age groups. Secondly, since the study utilised a cross-sectional research design, causal inferences are limited. Future research could adopt longitudinal or experimental designs to examine how changes in a celebrity player's public image over time affect fan perceptions and loyalty. Thirdly, only celebrity player authenticity was analysed in this study. The institutional authenticity of the club and the brand value of the club were not considered. Therefore, in future research, the authenticity of the club and players can be considered differently and the interaction between them can be analysed. Fourth, while this study emphasised the mediating role of team brand image, other potentially influential mediators or moderators such as fan identity, emotional attachment

or social media engagement were not investigated. These variables may provide richer explanatory frameworks for future research.

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Conflict of Interest

There is no conflict of interest between the authors in this study.

Author Contributions

Research Idea: HEA, Research Design: HEA, NK; Data Analysis: HEA; Manuscript Writing: NK, HEA; Critical Review: HEA

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