ISSN: 2148-1148

IntJSCS

International Journal of Sport Culture and Science (IntJSCS)

International Refereed Scientific Journal

Volume 12 Issue 1
March 2024

crossref <enabled>

doi®

International Refereed Scientific Journal

International Journal of Sport Culture and Science
March 2024 : 12(1)
ISSN : 2148-1148
Doi : 10.14486/IntJSCS

INTERNATIONAL SCIENCE CULTURE AND SPORT ASSOCIATION

www.iscs-a.org

IntJSCS is an International Refereed Scientific Journal published quarterly by ISCSA.

IntJSCS is indexed/included in CrossRef, DOAJ, Google Scholar, Cite Factor, J-Gate, Research Bible, Mendeley, Open Access Journals, Academic Keys, Scientific Indexing Services, DRJI, Journal Index, ASOS, İSAM, Dergipark, Arastirmax; and it is also under evaluation by many other primary indexing services.

Call for papers

We invite high-quality articles, review papers, case studies of theoretical, and empirical, conceptual, and experimental research solely on sport-related themes in a properly formatted file as per the author guidelines. We do our best to have evaluated all the submissions through a fast double-blind review process by our international scientific board and publish them in the following issue. Articles submitted in IntJSCS for consideration should not have been published elsewhere and should not be submitted for review elsewhere during the duration of evaluation. As mentioned in the general scope of the journal, we value submissions from different regions of the world in order to reach a real international coverage. Las, but not the least, we promote researchers to use our open access articles in their researches and to contribute to the development of our journal through their citations.

International Advisory Board

International Journal of Sport Culture and Science
March 2024 : 12(1)
ISSN : 2148-1148
Doi : 10.14486/IntJSCS

TABLE OF CONTENTS

Doi Number: http://dx.doi.org/ 10.14486/IntJSCS.2024.702

REFEREES OF THIS ISSUE

Dr. Ali ÖZKAN
Dr. Aygül ÇAĞLAYAN TUNÇ
Dr. Ayşegül YAPICI
Dr. Erbil Murat AYDIN
Dr. Eren ULUÖZ
Dr. Fatih GÜR
Dr. Fatih YAŞARTÜRK
Dr. Hakan SUNAY
Dr. Halit HARMANCI
Dr. Hüseyin Nasip ÖZALTAŞ
Dr. Mert Mazhar ERDURAN
Dr. Seçkin DOĞANER
Dr. Yağmur AKKOYUNLU

International Journal of Sport Culture and Science
March 2024 : 12(1)
ISSN : 2148-1148
Doi : 10.14486/IntJSCS.2024.695

BODY COMPOSITION AND REGIONAL PHASE ANGLE AS INDICATORS OF VO_{2max} IN ELITE MALE AND FEMALE COMBAT ATHLETES

Erkan TORTU[1], Gökhan DELİCEOĞLU[2], Aslıhan NEFES ÇAKAR[3], Selman KAYA[4]

[1]Faculty of Sport Sciences, Department of Coaching Education, Trabzon University
https://orcid.org/0000-0003-2816-9994
[2] Faculty of Sport Sciences, Department of Coaching Education, Gazi University
https://orcid.org/0000-0003-2459-9209
[3]Ministry of Youth and Sports, Ankara
https://orcid.org/0000-0002-1561-7789
[4]Faculty of Sport Sciences, Department of Coaching Education Yalova University
https://orcid.org/ 0000-0002-2185-6436

Type: Research Article (Received: 09.10.2023 – Accepted: 17.03.2024)

Email:erkantortu@trabzon.edu.tr,deliceoglugokhan@gmail.com,aslihan.nefes@gsb.gov.tr, selman.kaya@yalova.edu.tr

Abstract

Various potentially related factors, such as maximal oxygen consumption (VO_{2max}) and anthropometric, physiological, genetic, and chronotype data, can contribute to athletes' training programs. Therefore, this study examined the relationship between bioelectric impedance analysis (BIA), phase angle (PhA) values, and aerobic power in female and male combat athletes. PhA, lean mass (kg), fat mass (kg), and body fat percentage (%) values of the athletes were measured using the BIA method. Oxygen consumption (VO_2) was measured using a mobile cardiopulmonary exercise test system. Statistical tests included analyses of bivariate correlation, t-tests, and multiple regressions. All parameters differed except for male and female athletes' age and training experience. Male athletes have higher maximal oxygen consumption (VO_{2max}) and PhA values than female athletes. BIA and PhA were differentially (small-medium) associated with absolute and relative VO_{2max} in all athletes ($p<0.05$), whereas no correlation was found between both PhA and relative VO_{2max}, respectively. The relationship between PhA and VO_{2max} is more revealing, especially in male and female athletes. PhA and BIA have the potential to be used in the field by conditioning and trainers to assess aerobic endurance swiftly; this can aid in determining competition readiness, training progress, and monitoring the recovery of muscle performance following injury.

Keywords: Body Composition, Regional Phase Angle, Aerobic Endurance, Elite Combat Athletes

Introduction

Changes in body composition are associated with athletic performance (Campa et al., 2020). Lean mass gain is for the development muscle power and strength. On the other hand, losing weight improves cardiovascular fitness agility, and speed (Silva, 2019). However, since BIA is affected by hydration and physical activity, there needs to be a clear recommendation regarding the accuracy of using this method in athletes (Deutz et al., 2019). The commonly used BIA examines the electrical properties of the human body either at 50 kHz (single-frequency BIA) or at many frequencies in the range of 1-1000 kHz (multifrequency BIA and BIS = bioimpedance spectroscopy). Impedance is the body's resistance to an alternating current. It is caused by reactance (Xc), which is related to the capacitance component of tissues, including cell membranes and tissue interfaces, and resistance (R), which relates to the current flowing through tissue containing water and electrolytes. PhA, also known as the arctangent of the Xc to R ratio, is a term used to describe the angular shift (phase difference) between voltage and current sinusoidal waveforms. In humans, the current reaches its maximum/minimum peaks at regular intervals after the voltage (positive PhA values), and cell membranes and tissue interfaces most likely cause this lag (Di Vincenzo et al., 2019a).

For this reason, recent studies on athletes have begun focusing on the PhA instead of BIA. It has become a widely used method for evaluating athletes' body composition and cellular health and is used in the general population (Toselli et al., 2020). It is accepted that cell function increases as PhA increases. PhA is also associated with muscle mass, an essential determinant of muscle tissue functionality, and physical adaptations obtained after training or nutritional interventions (Cunha et al., 2018; Tomeleri et al., 2019). Furthermore, the literature emphasizes the positive relationship between phase angle and sport-specific muscle strength (Lukaski and Raymond-Pope, 2021; Martins et al., 2021). Therefore, PhA may be a viable way to measure muscle quality in athletes, according to a recent systematic review, which added data on general muscle tissue functionality and performance to the literature (Di Vincenzo et al., 2019b). It is known that PhA is significantly related to muscle strength (Mundstock et al., 2019) and varies according to gender (Barbosa-Silva et al., 2005). In a study with male cyclists, muscle mass increased as muscle PhA increased; In female volleyball players, it was found that handgrip strength increased as PhA increased (Di Vincenzo et al., 2020; Pollastri et al., 2016). Veitia et al. reported that male athletes in artistic gymnastics, weightlifting, wrestling, and rowing had higher PhA values of ≥7 than other athletes. In artistic gymnastics, weightlifting, and rowing, female athletes had higher PhA values of ≥6.5 than other female athletes (Di Vincenzo et al., 2020). Although it is known that PhA is highly variable among athletes, there is no clear information about phase angle values by sport category. For this reason, it is crucial to do sports-specific studies. Studies on aerobic power, BIA, and PhA have reported possible mechanisms for a direct relationship between these parameters (Langer et al., 2020). The term "body cell mass" refers to the metabolically active cell mass that takes part in processes such as the intake of oxygen, the production of carbon dioxide, and the expenditure of energy. It is believed that body cell mass is directly related to aerobic power. PhA was highly linked with running performance in a study examining the association between PhA and endurance performance (Genton et al., 2020).

Various potentially related factors such as VO_{2max} and anthropometric, physiological, genetic, and chronotype data can contribute to athletes' training programs. As a result, this study aims to investigate the connection between the values of BIA and PhA and the aerobic power of male and female combat athletes. The characteristics of body composition measures related to

athletic performance and aerobic power may be easier for trainers. We hypothesize that a higher phase angle is related to better VO_{2max} İn Combat Athletes.

Material and Method

Participants and study design

Two hundred ninety-two athletes (147 men, 145 women) from combat sports (judo-karate-taekwondo) trained at the Turkish Olympic Preparation Center and voluntarily agreed to participate in this study. Accordingly, ethical approval was obtained by the Non-Interventional Medicine Ethics Committee of Gazi University Faculty of Sport Sciences on 08.02.2022 (Reference number: 286499). The inclusion criteria were; Be over 18, have at least three years of strength training history, be a licensed athlete, and not have additional problems affecting training performance. Exclusion criteria were: Having any discomfort that will affect the measurements on the dates of the tests, having trained at high intensity within two days prior to the measurements, unexpected discrepancies during measurements, and Voluntary withdrawal of the participant from the research. From the designated universe G-Power program for calculating sample size (Faul et al., 2009), our study planned the sample group as 290 combat athletes. The current cross-sectional survey study was conducted in a single period.

Bioelectrical Impedance Analysis (BIA)

The athletes' phase angle, body fat percentage, lean mass, and fat mass values were measured using the BIA (MC 980; Tanita Corp.,1000 kHz, Japan) after 12 hours of fasting. With the help of hand and foot electrodes in the device, the electric current passing through the body provides a comprehensive body analysis. The head-to-leg (H-L) value shows the electric current passing through the whole body from hand to foot and the phase angle value of the whole body. The leg-to-leg (L-L) value shows the electric current passing from foot to foot and the phase angle values of the lower extremity.

VO_{2max}

Oxygen consumption (VO_2) was measured with a portable cardiopulmonary exercise test (Cosmed K5, Italy Serial No: 2019030706) system, which is capable of automatic gas analysis from each expiratory air, with a ramp protocol (Scheer et al., 2018) on the treadmill. Before each test, the portable metabolic gas analyzer was calibrated using a sample of recognized gases (5.0% CO_2 and 16.0% O_2). In order to eliminate the adverse effects of room conditions on performance and oxygen consumption data during the tests carried out in the laboratory environment, the temperature was 18-23°C, and the relative humidity was below 70% with air conditioners. Participants warmed up at 8 $km.h^{-1}$ for 4 min. Then, the running speed progressively increased by 1 $km.h^{-1}.min^{-1}$ until volitional exhaustion. The achievement of VO_{2peak} was identified as the plateauing of VO_2 (<2.1 $mL.kg^{-1}.min^{-1}$ decrease) despite an increase in workload (Poole and Richardson, 1997). Regarding the data obtained from the VO_{2max} test, Absolute VO_{2max} is simply the amount of oxygen breathed in litres per minute. Relative VO_{2max} measures weight in litres per minute per kilogram of body weight.

Statistical analysis

The data were analyzed using SPSS 22.0 (IBM Corp, Armonk, NY, USA), and the results were presented as mean ± standard deviation. Data normality was verified using the

Kolmogorov-Smirnov test**.** The relationship between PhA, BIA, and VO_{2max} parameters was investigated using a preliminary bivariate correlation analysis. VO_{2max}, BIA, and PhA variables were compared using the independent samples t-test to control the values of men and women. Gender-specific multiple regressions evaluated whether the phase angle and body composition were associated with the VO_{2max}. The alpha level was set at 0.05 for all the analyses. Cohen's d was used to compute effect sizes for the independent samples t-test, which were then categorized according to Hopkins.

Findings

Table 1. Body composition, phase angles, absolute and relative VO_{2max} test performance

	Men Mean-SD	Women Mean-SD	All Mean-SD	p	d
n	147	145	292		
Age (yrs.)	20.70 ±3.39	20.57 ±2.09	20.13 ±2.09	0.07	0.10
Experience (yrs.)	6.78 ±2.39	6.35 ±1.22	6.07 ±1.81	0.09	0.12
Body weight (kg)	75.71 ±14.93	62.48 ±8.66	69.14 ±13.89	0.00	1.08
Body Mass İndex (kg/m2)	24.32 ±3.69	22.88 ±2.05	23.60 ±3.07	0.00	0.48
Body fat (%)	12.992 ±5.55	19.85 ±5.32	16.40 ±6.42	0.00	1.26
Muscle Mass (kg)	65.21 ±10.40	47.37 ±5.71	54.84 ±11.21	0.00	2.12
VO_2 (mL/kg/min)	56.04 ±9.43	46.32 ±7.39	51.22 ±9.77	0.00	1.14
Phase Angle (H-L)	7.02 ±0.65	6.38 ±0.57	6.70 ±0.69	0.00	1.04
Phase Angle (L-L)	7.09 ±0.76	6.48 ±0.64	6.79 ±0.76	0.00	0.86

H-L; Head to leg, L-L; leg to leg

BIA, PhA, and VO_{2max} are contain in Table I. All parameters differed except for male and female athletes' age and training experience. Male athletes have higher VO_{2max} and PhA values than female athletes.

Table 2. The matrix of correlations body composition, phase angles, and VO_{2max} variables

Gender		Age (yrs.)	Body weight (kg)	BMİ	Body fat (%)	Muscle Mass (kg)	Phase Angle (H-L)	Phase Angle (L-L)
Male	VO_2 (mL/kg/min)	**-0.553***	**-0.638**	**-0.598***	**-.0498***	**-0.553***	-0.106	0.085
Female	VO_2 (mL/kg/min)	**-0.436***	**-0.434***	**-0.496***	**-0.346***	**-0.440***	**0.303***	**0.135***

$*p < 0.05$

The matrix of correlations includes body composition, phase angles, and VO_{2max} variables Table II. BIA and phase angle were differentially (small-medium) associated with VO_{2max} in both men and women athletes ($p < 0.05$).

Table3. Linear regression analysis independent variables and VO_{2max} performance.

	Age (yrs.)	Body weight (kg)	BMİ	Body fat (%)	Muscle Mass (kg)	Phase Angle (H-L)	Phase Angle (L-L)	Adjust R2
VO_{2max}								
Model 1	**-0.249***	1.320	-0.061	**-0.878***	**-1.389***	-0.093	**0.233***	0.50
Model 2	**0.159***	1.055	**-0.757***	-0.144	-0.867	**0.288**	**0.153***	0.37
Model 3	**-0.123***	**1.097***	**-0.531***	**-0.657***	-0.857	0.103	**0.249***	0.41

All values represent standardized β's.
Model 1 male athletes
Model 2 Female athletes
Model 3 All athletes
∗p < 0.05.

According to the results of linear regression analysis (Table 3); Model 1; age, body fat, muscle mass, and L-L were determined as strong predictors in VO_{2max} ($p<0.05$). Model 2, age, BMI, H-L, and L-L were determined as strong predictors in VO_{2max} ($p<0.05$). Model 3, age, body weight, BMI, and L-L were strong predictors in VO_{2max} ($p<0.05$).

Discussion and Conclusion

The relationship between one's body composition and one's level of athletic performance is an essential area of research in sports science, particularly for highly skilled athletes who train frequently and intensively. Our study shows that BIA, phase angles head to the leg, and phase angles leg to leg obtained from 1000 kHz bioelectrical impedance analysis highly correlate with VO_{2max} value in female and male athletes. The relationship between the angles and VO_{2max} is more revealing, especially in male athletes than in female athletes. According to this study, men athletes had a higher phase angle regardless of sport modality than women athletes. These findings are consistent with previous studies on the general population and former athletes (Matias et al., 2021; Mattiello et al., 2020).

A high phase angle may represent regular physical activity, as superior physical performance usually results from training. In addition, two recent systematic reviews discovered a connection between phase angle and physical activity (Di Vincenzo et al., 2019b; Mundstock et al., 2019). So far, the relationship between BIA, PhA, and VO_{2max} has yet to be studied in different categories of male and female athletes. Similarly, longitudinal studies in non-athletes revealed that implementing a physical activity program increased PhA (Langer et al., 2019). In addition, several cross-sectional studies on specific sports indicate that elite athletes have a more significant phase angle, muscle mass, and a lower fat percentage than less-trained competitors. However, the sport-influencing phase angle is debatable (Di Vincenzo et al., 2019b). This evidence strongly suggests that the link we observed in our study between a high BIA, PhA, and a higher VO_{2max} is explained by regular physical exercise.

Excess fat mass in sports affects endurance performance, whereas an increase in lean mass, particularly muscular mass, is related to greater power and strength (Campa et al., 2019).

Furthermore, determining localized body composition allows detecting changes in muscle mass and strength between different body sections, which may lower the risk of damage (assessment of contralateral limbs, agonist-antagonists (Ackland et al., 2012). When sprinting 2000 meters, Yoshiga and Higuchi (Yoshiga and Higuchi, 2003) discovered that fat-free mass (FFM) negatively correlated with time. This finding, which may be explained by the positive effects that increased FFM has on aerobic performance, is referred to as the inverse time-FFM relationship (Mujika et al., 2016; Silva, 2019). Because athletes' PhA and BIA values alter throughout the season, the BIA readings must be as detailed and informative as possible to provide proper body composition and physical fitness monitoring. Changes in body composition caused by the accumulation of fat could have a negative impact on the athletic performance of athletes or even cause them to compete in a heavier category, which would drastically reduce their performance in Olympic combat sports, where athletes compete in clearly defined weight categories. For example, an analysis of the anthropometric profiles of top karate competitors found that the proportion of body fat for men ranged from 7.5 to 18.6 per cent. In comparison, the body fat percentage for women was 18.6 per cent (3.2 per cent) (Chaabene et al., 2012).

In addition, participants in recent research of high-level karate competitors had a fat percentage of 18.6 (4.0 per cent), according to the study's findings (Rossi, 2019). Studying the relationship between body composition and phase angle in athletes of various sports modalities, including Olympic combat sports (OCS) (judo and karate), Marini et al. discovered similar values to those found in this study for karate athletes, with statistically significant differences between men and women: PhA was 7.7 (0.8) degrees for men and 6.8 (0.8) degrees for women (n=63) (Marini et al., 2020). For instance, in judo, the phase angle is related to magnesium status and can be used indirectly to measure muscle function. Furthermore, muscle function is linked to health, and as a consequence, athletic performance is affected by these factors (Matias et al., 2015).

In earlier research, various populations were found to correlate with levels of PhA and measures of muscle strength and aerobic fitness (da Silva et al., 2018; Gerken et al., 2021; Yamada et al., 2019) and because the relationship between PhA and muscle strength increased athletes' VO_{2max} values. Although a direct link between PhA and aerobic fitness has yet to be demonstrated, PhA has been linked to the number of cells in the body, the metabolically most active component capable of giving incredible energy and physical performance (Dittmar et al., 2015). Muscle tissue contains more significant quantities of water and electrolytes and is a good conductor with higher resistance values. (Mulasi et al., 2015). Strength training causes muscle hypertrophy, which leads to increased reactance (Ribeiro et al., 2018). Studies analyzing the relationship between PhA and muscle strength and aerobic fitness used different variables because the latter two can be influenced by body size (e.g., height, diameters, circumferences), components (e.g., muscle tissue), biological variables (sexual maturation), and lifestyle factors. Although age and gender have been identified as determinants of the divergence in the association between BIA, PhA, and VO_{2max} (Garlini et al., 2019), studies looking at the relationship between PhA and muscle strength

and aerobic fitness used different methods (Zeiher et al., 2019). PhA levels increase with age in both sexes in the general population until late adulthood, when they begin to fall (Koury et al., 2014; Torres et al., 2008). However, a growing gap between the sexes continues to widen through adolescence, and males have mean levels that are consistently higher than females by the time they reach adulthood (Barbosa-Silva et al., 2005). Veitia et al.used BIA to evaluate 943 Cuban athletes who competed in 26 sports. Males had a substantially higher (+15.5 per cent) mean PhA score than girls, with a difference for most sports studied (Veitia et al., 2017). In conclusion, a recent study on 202 athletes competing in 11 different sports was carried out by Marini and colleagues. The researchers found that the mean PhA was higher in males than in females (+ 13.2 per cent) (Marini et al., 2020). No data were available for comparing boys and females who competed in the same sport. According to our research, this rate was 9.11 per cent for the phase angle head to leg and 8.60 per cent for the phase angle leg to leg.

Recent research finds that regional BIA at the lower limb level provided essential information in soccer and cycling populations when PhA was studied regionally in female and male athletes. This information was gleaned from soccer players and cyclists. While Whole Body PhA did not change throughout the 2012 Giro d'Italia (Giorgi et al., 2018), Lower Body PhA (LPhA) decreased during a three-week stage race, according to a study of cyclists participating in the race (Marra et al., 2016). These figures allude to the gender difference, with male athletes having greater lower limb PhA values than female athletes (Mascherini et al., 2017). However, the application of regional PhA indicates athlete performance in many categories has yet to be determined. As the regression analysis results reveal, when assessing athletes' VO_{2max}, it can be highly informative to consider body composition values determined using population-specific equations in addition to PhA.

In light of the findings from this study, future research is encouraged to further explore the intricate relationship between body composition, phase angle, and VO2max across a broader spectrum of sports and athletic disciplines. Such investigations should aim to refine our understanding of how these variables interact to influence athletic performance, with a particular focus on developing gender-specific insights that can lead to more personalized and effective training and nutrition strategies. Additionally, the potential of regional phase angle measurements as a precise tool for assessing muscle quality and predicting athletic readiness warrants deeper examination. Embracing these areas of research will not only enhance the practical application of body composition and phase angle assessments in sports settings but also contribute to the broader knowledge base in sports science, ultimately benefiting athletes' training, recovery, and performance outcomes.

References

Ackland, T. R., Lohman, T. G., Sundgot-Borgen, J., Maughan, R. J., Meyer, N. L., Stewart, A. D., & Müller, W. (2012). Current status of body composition assessment in sport. *Sports medicine*, *42*(3), 227-249.

Barbosa-Silva, M. C. G., Barros, A. J., Wang, J., Heymsfield, S. B., & Pierson Jr, R. N. (2005). Bioelectrical impedance analysis: population reference values for phase angle by age and sex–. *The American journal of clinical nutrition*, *82*(1), 49-52.

Campa, F., Matias, C. N., Marini, E., Heymsfield, S. B., Toselli, S., Sardinha, L. B., & Silva, A. M. (2020). Identifying athlete body fluid changes during a competitive season with bioelectrical impedance vector analysis. *International Journal of Sports Physiology and Performance*, *15*(3), 361-367.

Campa, F., Semprini, G., Júdice, P. B., Messina, G., & Toselli, S. (2019). Anthropometry, physical and movement features, and repeated-sprint ability in soccer players. *International Journal of Sports Medicine*, *40*(02), 100-109.

Chaabene, H., Hachana, Y., Franchini, E., Mkaouer, B., & Chamari, K. (2012). Physical and physiological profile of elite karate athletes. *Sports medicine*, *42*(10), 829-843.

Cunha, P. M., Tomeleri, C. M., Nascimento, M. A. d., Nunes, J. P., Antunes, M., Nabuco, H. C., Quadros, Y., Cavalcante, E. F., Mayhew, J. L., & Sardinha, L. B. (2018). Improvement of cellular health indicators and muscle quality in older women with different resistance training volumes. *Journal of Sports Sciences*, *36*(24), 2843-2848.

da Silva, T. K., Perry, I. D. S., Brauner, J. S., Wender, O. C. B., Souza, G. C., & Vieira, S. R. R. (2018). Performance evaluation of phase angle and handgrip strength in patients undergoing cardiac surgery: Prospective cohort study. *Australian Critical Care*, *31*(5), 284-290.

Deutz, N. E., Ashurst, I., Ballesteros, M. D., Bear, D. E., Cruz-Jentoft, A. J., Genton, L., Landi, F., Laviano, A., Norman, K., & Prado, C. M. (2019). The underappreciated role of low muscle mass in the management of malnutrition. *Journal of the American Medical Directors Association*, *20*(1), 22-27.

Di Vincenzo, O., Marra, M., Sammarco, R., Speranza, E., Cioffi, I., & Scalfi, L. (2020). Body composition, segmental bioimpedance phase angle and muscular strength in professional volleyball players compared to a control group. *The Journal of Sports Medicine and Physical Fitness*, *60*(6), 870-874.

Di Vincenzo, O., Marra, M., & Scalfi, L. (2019a). Bioelectrical impedance phase angle in sport: A systematic review. *Journal of the International Society of Sports Nutrition*, *16*(1), 49.
Di Vincenzo, O., Marra, M., & Scalfi, L. (2019b). Bioelectrical impedance phase angle in sport: A systematic review. *Journal of the International Society of Sports Nutrition*, *16*(1), 1-11.

Dittmar, M., Reber, H., & Kahaly, G. (2015). Bioimpedance phase angle indicates catabolism in Type 2 diabetes. *Diabetic Medicine*, *32*(9), 1177-1185.

Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G* Power 3.1: Tests for correlation and regression analyses. *Behavior research methods*, *41*(4), 1149-1160.

Garlini, L. M., Alves, F. D., Ceretta, L. B., Perry, I. S., Souza, G. C., & Clausell, N. O. (2019). Phase angle and mortality: a systematic review. *European journal of clinical nutrition*, *73*(4), 495-508.

Genton, L., Mareschal, J., Norman, K., Karsegard, V. L., Delsoglio, M., Pichard, C., Graf, C., & Herrmann, F. R. (2020). Association of phase angle and running performance. *Clinical Nutrition ESPEN*, *37*, 65-68.

Gerken, A., Rohr-Kräutle, K., Weiss, C., Seyfried, S., Reissfelder, C., Vassilev, G., & Otto, M. (2021). Handgrip strength and phase Angle predict outcome after bariatric surgery. *Obesity surgery*, *31*(1), 200-206.

Giorgi, A., Vicini, M., Pollastri, L., Lombardi, E., Magni, E., Andreazzoli, A., Orsini, M., Bonifazi, M., Lukaski, H., & Gatterer, H. (2018). Bioimpedance patterns and bioelectrical impedance vector analysis (BIVA) of road cyclists. *Journal of Sports Sciences*, *36*(22), 2608-2613.

Koury, J. C., Trugo, N. M., & Torres, A. G. (2014). Phase angle and bioelectrical impedance vectors in adolescent and adult male athletes. *International Journal of Sports Physiology and Performance*, *9*(5), 798-804.

Langer, R. D., de Fatima Guimarães, R., Gonçalves, E. M., Guerra-Junior, G., & de Moraes, A. M. (2020). Phase angle is determined by body composition and cardiorespiratory fitness in adolescents. *International Journal of Sports Medicine*, *41*(09), 610-615.

Langer, R. D., Silva, A. M., Borges, J. H., Cirolini, V. X., Páscoa, M. A., Guerra-Júnior, G., & Gonçalves, E. M. (2019). Physical training over 6 months is associated with improved changes in phase angle, body composition, and blood glucose in healthy young males. *American Journal of Human Biology*, *31*(5), e23275.

Lukaski, H., & Raymond-Pope, C. J. (2021). New frontiers of body composition in sport. *International Journal of Sports Medicine*.

Marini, E., Campa, F., Buffa, R., Stagi, S., Matias, C. N., Toselli, S., Sardinha, L. B., & Silva, A. M. (2020). Phase angle and bioelectrical impedance vector analysis in the evaluation of body composition in athletes. *Clinical Nutrition*, *39*(2), 447-454.

Marra, M., Da Prat, B., Montagnese, C., Caldara, A., Sammarco, R., Pasanisi, F., & Corsetti, R. (2016). Segmental bioimpedance analysis in professional cyclists during a three week stage race. *Physiological measurement*, *37*(7), 1035.

Martins, P. C., Teixeira, A. S., Guglielmo, L. G. A., Francisco, J. S., Silva, D. A. S., Nakamura, F. Y., & Lima, L. R. A. d. (2021). Phase angle is related to 10 m and 30 m sprint time and repeated-sprint ability in young male soccer players. *International Journal of Environmental Research and Public Health*, *18*(9), 4405.

Mascherini, G., Castizo-Olier, J., Irurtia, A., Petri, C., & Galanti, G. (2017). Differences between the sexes in athletes' body composition and lower limb bioimpedance values. *Muscles, Ligaments and Tendons Journal*, *7*(4), 573.

Matias, C. N., Campa, F., Nunes, C. L., Francisco, R., Jesus, F., Cardoso, M., Valamatos, M. J., Homens, P. M., Sardinha, L. B., & Martins, P. (2021). Phase Angle Is a Marker of Muscle Quantity and Strength in Overweight/Obese Former Athletes. *International Journal of Environmental Research and Public Health*, *18*(12), 6649.

Matias, C. N., Monteiro, C. P., Santos, D. A., Martins, F., Silva, A. M., Laires, M. J., & Sardinha, L. B. (2015). Magnesium and phase angle: a prognostic tool for monitoring cellular integrity in judo athletes. *Magnes. Res*, *28*(3), 92-98.

Mattiello, R., Amaral, M. A., Mundstock, E., & Ziegelmann, P. K. (2020). Reference values for the phase angle of the electrical bioimpedance: Systematic review and meta-analysis involving more than 250,000 subjects. *Clinical Nutrition*, *39*(5), 1411-1417.

Mujika, I., Rønnestad, B. R., & Martin, D. T. (2016). Effects of increased muscle strength and muscle mass on endurance-cycling performance. *IJSPP*, *2015*(0405), 3.

Mulasi, U., Kuchnia, A. J., Cole, A. J., & Earthman, C. P. (2015). Bioimpedance at the bedside: current applications, limitations, and opportunities. *Nutrition in Clinical Practice*, *30*(2), 180-193.

Mundstock, E., Amaral, M. A., Baptista, R. R., Sarria, E. E., Dos Santos, R. R. G., Detoni Filho, A., Rodrigues, C. A. S., Forte, G. C., Castro, L., & Padoin, A. V. (2019). Association between phase angle from bioelectrical impedance analysis and level of physical activity: Systematic review and meta-analysis. *Clinical Nutrition*, *38*(4), 1504-1510.

Pollastri, L., Lanfranconi, F., Tredici, G., Burtscher, M., & Gatterer, H. (2016). Body water status and short-term maximal power output during a multistage road bicycle race (Giro d'Italia 2014). *International Journal of Sports Medicine*, *37*(04), 329-333.

Poole, D. C., & Richardson, R. S. (1997). Determinants of oxygen uptake. *Sports medicine*, *24*(5), 308-320.

Ribeiro, A. S., Nascimento, M. A., Schoenfeld, B. J., Nunes, J. P., Aguiar, A. F., Cavalcante, E. F., Silva, A. M., Sardinha, L. B., Fleck, S. J., & Cyrino, E. S. (2018). Effects of single set resistance training with different frequencies on a cellular health indicator in older women. *Journal of Aging and Physical Activity*, *26*(4), 537-543.

Rossi, L. (2019). Avaliação da composição corporal de atletas do sexo feminino do Projeto São Paulo Olímpico da Federação Paulista de Karatê. *Revista Brasileira de Nutrição Esportiva*, *13*(79), 373-377.

Scheer, V., Ramme, K., Reinsberger, C., & Heitkamp, H.-C. (2018). VO2max testing in trail runners: is there a specific exercise test protocol? *International Journal of Sports Medicine*, *39*(06), 456-461.

Silva, A. M. (2019). Structural and functional body components in athletic health and performance phenotypes. *European journal of clinical nutrition*, *73*(2), 215-224.

Tomeleri, C. M., Cavalcante, E. F., Antunes, M., Nabuco, H. C., de Souza, M. F., Teixeira, D. C., Gobbo, L. A., Silva, A. M., & Cyrino, E. S. (2019). Phase angle is moderately associated with muscle quality and functional capacity, independent of age and body composition in older women. *Journal of Geriatric Physical Therapy*, *42*(4), 281-286.

Torres, A. G., Oliveira, K. J., Oliveira-Junior, A. V., Gonçalves, M. C., & Koury, J. C. (2008). Biological determinants of phase angle among Brazilian elite athletes. *Proceedings of the Nutrition Society*, *67*(OCE8).

Toselli, S., Badicu, G., Bragonzoni, L., Spiga, F., Mazzuca, P., & Campa, F. (2020). Comparison of the effect of different resistance training frequencies on phase angle and handgrip strength in obese women: A randomized controlled trial. *International Journal of Environmental Research and Public Health*, *17*(4), 1163.

Veitia, W. C., Campo, Y. D., García, I. M. E., Chavez, D. A., Gutiérrez, L. R. E., & Cordova, A. (2017). Body composition analysis using bioelectrical parameters in the Cuban sporting population. *Arch Med*, *34*, 207-215.

Yamada, M., Kimura, Y., Ishiyama, D., Nishio, N., Otobe, Y., Tanaka, T., Ohji, S., Koyama, S., Sato, A., & Suzuki, M. (2019). Phase angle is a useful indicator for muscle function in older adults. *The journal of nutrition, health & aging*, *23*(3), 251-255.

Yoshiga, C., & Higuchi, M. (2003). Rowing performance of female and male rowers. *Scandinavian journal of medicine & science in sports*, *13*(5), 317-321.

Zeiher, J., Ombrellaro, K. J., Perumal, N., Keil, T., Mensink, G., & Finger, J. D. (2019). Correlates and determinants of cardiorespiratory fitness in adults: a systematic review. *Sports medicine-open*, *5*(1), 1-24.

International Journal of Sport Culture and Science
March 2024 : 12(1)
ISSN : 2148-1148
Doi : 10.14486/IntJSCS.2024.696

Examination of Mental Resilience Levels in Veteran Tennis Players

Yasin DEMİRCAN[1], Vedat AYAN[2], Selami YÜKSEK[3]

[1] Trabzon University, Trabzon, Türkiye
https://orcid.org/0000-0001-8062-8014
[2] Trabzon University, Trabzon, Türkiye
https://orcid.org/0000-0003-1887-5334
[3] Trabzon University, Trabzon, Türkiye
https://orcid.org/0000-0002-2162-8660

Email: yasin_demircan20@trabzon.edu.tr, vayan@trabzon.edu.tr, salami.yuksek@trabzon.edu.tr

Type: Research Article (Received: 24.10.2023 - Accepted: 14.03.2024)

Abstract

This research aimed to explore the disparities in mental resilience levels among veteran tennis players concerning age, gender, and weekly training frequency. The survey method was employed, utilizing a survey technique as part of the screening process. The study involved 358 volunteer veteran tennis players, with 85 females and 273 males, who completed the mental resilience scale. The "Sports Mental Resilience Scale" and a researcher-prepared personal information form were used. The scale showed good reliability with Cronbach's Alpha coefficients of 0.81 for Confidence, 0.74 for Persistence, and 0.71 for Control. Statistical analysis was conducted using SPSS 26.0. Normal distribution was confirmed through Skewness, Kurtosis values, and the Levene Test. Parametric tests, such as Independent Sample T Test and One Way ANOVA, were used when significant differences emerged between groups. The Scheffe test was applied to identify the sources of differences. Results revealed no statistically significant difference in average mental resilience scores based on gender ($p>0.05$). However, significant differences were found in Confidence and Persistence sub-dimensions based on age ($p<0.05$), as well as in the Confidence sub-dimension and total scores based on weekly training frequency ($p<0.05$). In summary, this study investigated the relationship between mental resilience levels and variables like gender, age, and weekly training frequency among veteran tennis players. It found that these factors indeed impact the mental resilience of veteran tennis players, contributing new insights to the field and future research.

Keywords: Veteran, Tennis, Mental Resilience

Introduction

Sport is a tool that facilitates the physical, mental, emotional and social development of individuals and enhancing their knowledge, skills and leadership abilities. Sports assist individuals in self-discipline and overcoming psychological and physiological challenges they may encounter. Furthermore, sports contribute positively to international friendship, peace and the national economy. In contemporary times, the approach to sports by both the media and the efforts of individuals to relieve stress, maintain their physical fitness and above all, the international successes achieved in sports have become highly significant in daily life and morale, thereby giving sports an additional dimension (Sunay, Saracaloğlu, 2003).

Tennis, a sport followed with interest worldwide, is a popular sport that can be played in all age groups. Matches are played according to the rules set by the International Tennis Federation (ITF). Competitions range from grand slam tournaments played at the highest level to tournaments for children, seniors and even wheelchair athletes (Fernandez, Mendez-Villanueva & Pluim, 2006). Tennis is a dynamic game that combines aerobic and anaerobic loads, involving repetitive strokes that require excellent biomotor skills (Gelen, Mengütay & Karahan, 2009; O'Donoghue & Ingram, 2001).

In tennis, as in all sports, it is well known that mental factors influence performance, alongside physical development. Weinberg and Gould (2015) have stated that in situations where athletes' skill levels are roughly equal, mental resilience is one of the most important factors determining victory. Graham, Hanton and Connaughton (2002) have defined mental resilience as the ability to cope with or manage stress, difficult situation or pressure. Jones and colleagues (2007) have described mental resilience in sports as the ability to enjoy stress and pressure, to recover and maintain confidence when faced with adversity and to sustain performance at the highest level under all circumstances.

Human beings are biological, psychological, social entities and sport performance is one of the actions they can perform. Sport performance can be achieved by having all four fundamental elements mentioned above together and working systematically with the necessary plan and program (Graham, Hanton & Connaughton, 2002). According to Loehr (1982), mentally strong athletes possess various reactions that enable them to remain emotionally relaxed, strong and calm. Similarly, Gibson (1998) strongly emphasizes that mental resilience is related to an internal locus of control and self-efficacy.

The European Federation of Sport Psychology (FEPSAC) states that sport psychology concerns the psychological bases, processes and consequences of the psychological regulation of movement activities of one or more individuals involved in sport. This definition suggests that sport psychology helps improve performance helps athletes concentrate better, cope effectively with competitive stress, and perform more efficiently. In addition, sport psychology seeks to understand the impact of long-term sports participation on the personal resources of athletes and attempts to understand the potential effects of systematic participation in competitive sports environments. Applied sport psychology aims to solve specific practical problems by enhancing athletic performance, thus helping athletes realize their potential in sports settings (Brewer, 2009).

Studies have defined mental resilience in various ways. It can involve believing in oneself, focusing on achieving set goals, controlling the environment and persisting in the face of pressure, regardless of whether individuals are positive, negative, or good-natured (Mack & Ragan, 2008). In another definition, individuals are described as regularly demonstrating their

best abilities regardless of the situations they face. In the light of this definition, researchers often observe a continuum of mental resilience, from low to high (Gucciardi & Gordon, 2011).

Mentally strong athletes tend to be more competitive, determined, capable of self-motivation under pressure and able to maintain and increase their self-belief even after failures (Crust & Clough, 2011). Being mentally resilient means feeling determined to overcome the toughest situations, sustaining emotions under stress and pressure and rejecting what is easy to achieve superiority. Athletes accustomed to mentally challenging struggles may view defeat and failure as feedback and opportunities for improvement.

In recent years, the field of sports psychology has made significant advancements and mental resilience holds a crucial place in it. Athletes, coaches and sports psychologists have often referred to mental resilience as one of the most important characteristics related to results and success in elite sports (Jones, Hanton & Connaughton, 2007). Mental resilience is one of the most widely used terms in sports psychology. However, due to the lack of sufficient research related to veteran tennis players in the literature, it is believed that the findings of this research will provide a different perspective to the relevant literature and researchers. Therefore, the aim of this study is to examine the levels of mental resilience of veteran tennis players in terms of various variables.

Material and Method

Research Design

This research has been designed within the framework of a survey (descriptive) model. Survey studies are generally larger-scale research projects where participants' opinions or characteristics, such as interests, skills, abilities, attitudes, etc., related to a subject or event, are determined, compared to other types of research (Büyüköztürk, Çakmak, Akgün, Karadeniz, Demirel, 2009).

Study Group

In this study, a convenient and easily accessible sampling method was utilized due to its practicality and cost-effectiveness. This method involves forming the research group from individuals who are close and readily available (Yıldırım, Şimşek, 2016). A total of 358 volunteer veteran tennis players, consisting of 85 females and 273 males, participated in the research and ethical approval was obtained for our study.

Data Collection Tools

In this research, two data collection instruments were used: the "Personal Information Form" and the "Sport Mental Toughness Questionnaire."

Personal Information Form: This form was created by the researchers and was designed to gather information such as the participants' gender, age and weekly tennis playing frequency.

Sport Mental Toughness Questionnaire: To determine the mental toughness levels of athletes, the "Sport Mental Toughness Questionnaire" (SMTQ-14), developed by Sheard, Golby and Van Wersch (2009), was employed. This questionnaire consists of a total of 14 items. In addition to assessing overall mental toughness, the scale comprises three sub-dimensions (confidence, persistence, and control) and uses a four-point likert scale. The Cronbach's Alpha values for the sub-dimensions of the scale are as follows: confidence ($\alpha = 0.81$), persistence ($\alpha = 0.74$) and control ($\alpha = 0.71$). The overall internal consistency coefficient is $\alpha = 0.81$ (Sheard et al., 2009). The adaptation of the scale to Turkish was conducted by Altıntaş and

Koruç (2016). Confirmatory Factor Analysis (CFA) revealed that all fit indices were at a "good fit" level, t-values for all items were significant at the 0.01 level and the model demonstrated a good fit. The scale consists of 14 items and three sub-dimensions: Confidence (Items 1, 5, 6, 11, 13, 14); Control (Items 2, 4, 7, 9); Persistence (Items 3, 8, 10, 12). It is important to note that items 2, 4, 7, 8, 9 and 10 in the Sport Mental Toughness Questionnaire are reverse-scored.

Data Analysis

The statistical analysis of the research data was performed using the SPSS 26.0 package program. The normality distribution of the data was examined through Skewness and Kurtosis (Skewness-Kurtosis) values and the Levene Test. It was determined that the Skewness and Kurtosis values of the data fell within the range of -1.5 to +1.5. In the literature, Skewness and Kurtosis values between -1.5 and +1.5 (Tabachnick; Fidell, Ullman, 2013) or -2.0 to +2.0 (George, Mellery, 2016) are considered indicative of normal data distribution. Within this context, it was observed that the research data exhibited a normal distribution, allowing the use of parametric test methods, including Independent Sample T Test and One Way ANOVA. In cases where significant differences emerged between groups, the Scheffe test was employed to determine the source of the differences. The significance level (α) for all statistical methods was set at 0.05.

Data Collection Process

Data collection from the participants took place during sessions conducted at specific dates and times. Participants were supported by a supervising observer while filling out the questionnaires, and explanations were provided when necessary. Prior to the research, approval was obtained from the Trabzon University Social and Human Sciences Scientific Research and Ethics Board (No: E-81614018-000-2300049779). The confidentiality and rights of the participants were protected.

Findings

Table 1. Descriptive statistics for mental toughness scores of veteran tennis players

	n	Min.	Max.	$\bar{X}$±S	Skewness	Kurtosis
Confidence	358	1,00	4,00	2,91±0,43	0,034	0,866
Control	358	1,00	4,00	2,63±0,58	0,076	-0,255
Persistence	358	1,00	4,00	3,15±0,42	0,032	-0,155
Total Mental Toughness Score	358	14,00	56,00	40,65±0,14	0,327	0,233

Table 1 presents the descriptive statistics for the levels of mental toughness and its subscales among veteran tennis players who participated in the research. The table includes the minimum and maximum values, mean scores with standard deviations, as well as skewness and kurtosis coefficients for each subscale.

Table 2. T-Test results for gender variable

		n	$\bar{X}$	Ss	t	p
Confidence	male	273	2,94	0,413	1,825	0,070
	female	85	2,83	0,486		
Control	male	273	2,65	0,565	0,599	0,549
	female	85	2,60	0,648		
Persistence	male	273	3,16	0,417	0,154	0,877
	female	85	3,15	0,465		
Total Mental Toughness Score	male	273	40,86	4,828	1,325	0,186
	female	85	40,01	6,031		

As observed in Table 2, there was no statistically significant difference in the confidence, control, persistence sub-dimensions and the total mental toughness score of veteran tennis players based on gender ($p>0.05$).

Table 3. ANOVA test results for age variable

			n	$\bar{X}$	Ss	Sd	F	p	Significant Difference
Mental Toughness Levels in Sports	Confidence	30-39 years	125	3,00	0,46	354	2,854	.037*	1>2
		40-49 years	122	2,86	0,46				
		50-59 years	62	2,88	0,34				
		60 and over	49	2,87	0,35				
	Control	30-39 years	125	2,62	0,57	354	1,635	.181	
		40-49 years	122	2,64	0,63				
		50-59 years	62	2,75	0,49				
		60 and over	49	2,51	0,62				
	Persistence	30-39 years	125	3,27	0,42	354	4,194	.006*	1>2 1>3
		40-49 years	122	3,11	0,43				
		50-59 years	62	3,08	0,37				
		60 and over	49	3,10	0,47				
	Total Mental Toughness Score	30-39 years	125	41,57	5,57	354	2,374	.070	
		40-49 years	122	40,17	5,13				
		50-59 years	62	40,56	4,03				
		60 and over	49	39,63	5,05				

Table 3 indicates that there is a statistically significant difference in the confidence sub-dimension of veteran tennis players concerning the age variable ($F=2.854$, $p=0.037$). Post-hoc

comparisons revealed that the significant difference is between the age range of 30-39 and 40-49, favoring the 30-39 age group. Similarly, there is a statistically significant difference in the persistence sub-dimension (F=4.194, p=0.006). Post-hoc comparisons showed that the significant difference is between the age range of 30-39 and both 40-49 and 50-59, favoring the 30-39 age group. However no statistically significant difference was found in the control sub-dimension and total mental toughness score (p>0.05).

Table 4. ANOVA results of test based on weekly tennis playing frequency

			n	$\bar{X}$	Ss	Sd	F	p	Significant Difference
Mental Toughness Levels in Sports	Confidence	1-2 times	126	2,82	0,46	355	2,854	.037*	1<2 1<3
		3-4 times	104	2,87	0,46				
		5 and above	128	3,02	0,34				
	Control	1-2 times	126	2,62	0,57	355	1,635	.181	
		3-4 times	104	2,61	0,63				
		5 and above	128	2,66	0,49				
	Persistence	1-2 times	126	3,14	0,42	355	4,194	.006*	
		3-4 times	104	3,10	0,43				
		5 and above	128	3,21	0,37				
	Total Mental Toughness Score	1-2 times	126	40,05	4,80	355	3,895	.021*	1<2 1<3
		3-4 times	104	40,14	5,13				
		5 and above	128	41,66	5,34				

When examining Table 4, statistically significant differences were found among veteran tennis players in terms of the frequency of weekly tennis playing in the confidence sub-dimension (F=2.854, p=0.037) and the total mental toughness score (F=3.895, p=0.021). In the post-hoc comparisons to determine the source of this difference, it was determined that the difference favored veteran tennis players who play tennis 5 times or more per week compared to those who play 1-2 and 3-4 times a week in both the confidence sub-dimension and the total mental toughness score. However no statistically significant differences were found in the control and persistence sub-dimensions (p>0.05).

Discussion and Conclusion

In our study, although there was no statistically significant difference in the level of mental toughness of veteran tennis players in terms of the gender variable, it can be said that male veteran tennis players have higher average scores of mental toughness compared to female veteran tennis players. When the relevant literature is examined Kalkavan, Acet and Çakır (2017) conducted a study to examine the level of mental toughness of athletes participating in the Turkish Table Tennis Championship and reported that there was no significant difference in the level of mental toughness of athletes by gender. Similarly, studies conducted by Bektaş and Özben (2016), İlhan (2015), Bayrakdaroğlu (2014), Gökmen (2014), Karaırmak and Güloğlu (2014) and Yalçın (2013) also did not report significant gender differences in mental

toughness scores. The results from the reviewed literature align with the findings of our study. On the other hand, Yarayan, Yıldız and Gülşen (2018) stated that the levels of mental toughness differed statistically according to the gender variable. Juan and Lopez (2015), Masum (2014), Nicholls, Levy, Polman and Crust (2009) also found in their studies that the levels of mental toughness showed statistically significant differences by gender. The results from the reviewed literature do not parallel the findings of our study. Based on the obtained data, it is believed that gender can influence mental toughness in conjunction with social and psychological dynamics. Furthermore, gender differences can be shaped not only by biological factors but also by societal expectations, cultural norms and individual experiences. In conclusion our research did not find a statistically significant difference in the level of mental toughness of veteran tennis players by gender, although male veteran tennis players tended to have higher average scores in mental toughness. The variability in findings in the literature suggests that mental toughness is a complex construct influenced by various factors and gender alone may not be a decisive factor. This study contributes to the existing body of knowledge regarding mental toughness in sports and highlights the importance of considering multiple factors when studying psychological attributes in athletes. Further research could explore other variables that might interact with gender to influence mental toughness in sports.

In our study, statistically significant differences were detected in the confidence and continuity sub-dimensions of mental toughness of veteran tennis players based on the age variable at a significance level of α=0.05. When the literature on this topic is examined, Parlak (2023) stated in their research that there was a statistically significant difference between the level of mental toughness of amateur athletes and the age variable. Ulaş (2022) reported that there was a statistically significant difference between the level of mental toughness of individuals engaged in sports and the age variable. Similarly, Koç and Gençay (2021) mentioned in their research that there was a statistically significant difference between the mental toughness levels of badminton players and the age variable. Şahinler and Beşler (2021) also stated in their research that there was a significant difference between the level of mental toughness of individuals participating in team and combat sports and the age variable. Similarly, Connaughton, Wadey, Hanton and Jones (2008) reported in their research that there was a statistically significant difference between the level of mental toughness of athletes and the age variable. The results from the reviewed literature align with the findings of our study. On the other hand, Kılınç and Gürer (2019) did not find a statistically significant difference between the level of mental toughness of individuals engaged in outdoor sports and the age variable in their research. The results from the reviewed literature do not parallel the findings of our study. Based on the obtained data, it is suggested that as the ages of veteran tennis players increase, their belief in their abilities, which is one of the fundamental attributes required to achieve common goals under challenging conditions, decreases. This situation can negatively affect motivation and make it difficult to sustain efforts towards the goal. Additionally, it is believed that the difficulties and obstacles in reaching goals are not only related to individuals' beliefs in their abilities and their beliefs in surpassing their competitors but also closely related to their abilities to positively utilize factors such as working together, taking responsibility and coping in the environment. The combination of these qualities may open a path for individuals to achieve their common goals even under challenging conditions. Therefore, in the study, it is observed that the average scores of the confidence and continuity sub-dimensions of veteran tennis players aged 30-39 are higher compared to other age groups.

In our study, statistically significant differences were detected in the confidence sub-dimension of mental toughness of veteran tennis players based on the variable of weekly tennis playing frequency at a significance level of α=0.05. When the literature on this topic is examined, Sarı, Sağ and Pınar Demir (2020) stated in their research that there was a statistically significant difference between the level of mental toughness of taekwondo athletes and the number of weekly training sessions. Şahinler and Beşler (2021) also mentioned in their research that there was a significant difference between the level of mental toughness of individuals participating in team and combat sports and the number of weekly training sessions. The results from the reviewed literature align with the findings of our study. On the other hand, Kalkavan, Özdilek and Çakır (2020) stated in their research that there was no statistically significant difference between the level of mental toughness of mountain bikers and the number of weekly training sessions. İlhan (2015) also reported in their research that there was no statistically significant difference between tennis players and the number of weekly training sessions. The results from the reviewed literature do not parallel the findings of our study. Based on the obtained data, it is suggested that individuals who regularly participate in tennis activities tend to have a positive effect on their confidence in their own abilities and the skills required by the sport. This increased sense of confidence can lead individuals to increase their interest and commitment to tennis, encouraging them to take to the court more frequently and regularly. Additionally, individuals who play tennis regularly can benefit from advantages such as staying physically fit, improving their coordination, and nurturing their competitive spirit. These positive outcomes, along with the sense of confidence, can create a positive cycle, strengthening individuals' belief in their abilities and the advantages provided by the sport, ultimately helping individuals increase their weekly tennis playing frequency and continue to engage in the sport more actively.

As a result, this study examined the relationship between the level of mental resilience in veteran tennis players and variables such as gender, age and the frequency of weekly training sessions. The findings indicate that factors such as gender, age and training frequency have an impact on the mental resilience of veteran tennis players. These results support the idea that coaches and athletes should take these factors into account when developing strategies to enhance mental resilience. Future research in this area may provide a deeper understanding of these relationships and contribute to the development of more effective methods for optimizing athlete performance.

REFERENCES

Altıntaş, A. & Koruç, P. B. (2016). Sporda zihinsel dayanıklılık envanteri'nin psikometrik özelliklerinin incelenmesi (SZDE). *Spor Bilimleri Dergisi*, 27(4), 163-171.

Bayrakdaroğlu, S. (2014). Taekwondocuların psikolojik sağlamlık ve öz-anlayış düzeylerinin takım sporcularıyla karşılaştırılması. Yayımlanmamış yüksek lisans tezi. Muğla Sıtkı Koçman Üniversitesi, Muğla.

Bektaş, M. & Özben, Ş. (2016). Evli bireylerin psikolojik dayanıklılık düzeylerinin bazı sosyo-demografik değişkenler açısından incelenmesi. *Celal Bayar Üniversitesi Sosyal Bilimler Dergisi*, 14(1). 216-240

Brewer, B. W. (2009). *International olympic committee handbook of sports medicine and science*. United Kingdom: John Wiley & Sons Ltd.

Connaughton, D., Wadey, R., Hanton, S. & Jones, G. (2008). The development and maintenance of mental toughness: perceptions of elite performers. *Journal of sports sciences*, *26*(1), 83–95. https://doi.org/10.1080/02640410701310958

Crust, L. & Clough, P. (2011). Developing mental toughness: from research to practice. *Journal of Sport Psychology in Action*, 2 (1), 21-32.

Fernandez, J., Mendez-Villanueva, A. & Pluim, B. M. (2006). Intensity of tennis match play. *British journal of sports medicine*, *40*(5), 387–391. https://doi.org/10.1136/bjsm.2005.023168.

Gelen, E., Mengütay, S. & Karahan, M. (2009). Teniste servis performansını belirleyen fiziksel uygunluk ve biyomekaniksel faktörlerin incelenmesi. *Uluslararası İnsan Bilimleri Dergisi*, 6(2):668.

Gibson, A. (1998). Mental Toughness. New York: Vantage Press.

Gökmen, B. (2014). Özel eğitim okulu yöneticilerinin psikolojik dayanıklılık ve iş doyumları arasındaki ilişkinin incelenmesi (İstanbul örneği). Yayınlanmamış yüksek lisans tezi. İstanbul Aydın Üniversitesi, Sosyal Bilimler Enstitüsü, İstanbul.

Gucciardi, D. F. & Gordon, S. (2011). *Mental toughness in sport: developments in theory and research*. United Kingdom: Routledge.

İlhan, A. (2015). Tenis oyuncularının zihinsel dayanıklılık düzeyleri. *Journal of Global Sport and Education Research, III (2):28-35.*

Jones, G., Hanton, S. & Connaughton, D. (2002). What is this thing called mental toughness? An Investigation of elite sport performers. *Journal of Applied Sport Psychology*, 14, 205-218. http://dx.doi.org/10.1080/10413200290103509.

Jones, G., Hanton, S. & Connaughton, D. (2007). A framework of mental toughness in the world's best performers. *The Sport Psychologist, 21*(2), 243–264. https://doi.org/10.1123/tsp.21.2.243.

Juan, M. V T. & Lopez, A. (2015). Mental Toughness of Scholar Athletes. *Researchers World*, 6(3), 22.

Kalkavan, A., Acet, M. & Çakır G. (2017). Investigation of the mental endurance levels of the athletes participating in the table tennis championship of universities in Turkey. *International Journal of Science Culture and Sport*, 5(4), 356-363.

Kalkavan, A. , Özdilek, Ç. & Çakır, G. (2020). Dağ bisikletçilerinin zihinsel dayanıklılık düzeylerinin araştırılması. *Beden Eğitimi ve Spor Bilimleri Dergisi*, 22 (2) , 31-43. Retrieved from https://dergipark.org.tr/tr/pub/ataunibesyo/issue/55659/745773

Karaırmak, Ö. & Güloğlu, B. (2014). Deprem deneyimi yaşamış yetişkinlerde bağlanma modeline göre psikolojik sağlamlığın açıklanması. *Çukurova Üniversitesi Eğitim Fakültesi Dergisi*, 43 (2), 01-18

Kılınç, Z. & Gürer, B. (2019). Doğa sporları yapanların temel psikolojik ihtiyaçlarının zihinsel dayanıklılığa etkisi. *CBÜ Beden Eğitimi ve Spor Bilimleri Dergisi*, 14 (2) , 222-233. DOI: 10.33459/cbubesbd.576242.

Koç, İ. & Gençay, Ö. A. (2021). Badminton sporcularının zihinsel dayanıklılık düzeylerinin çeşitli değişkenlere göre incelenmesi. *Beden Eğitimi ve Spor Bilimleri Dergisi*, 15 (1) , 110-124 . Retrieved from https://dergipark. org.tr/en/pub/bsd/issue/60685/873849

Loehr, J. E. (1982). *Athletic excellence: Mental toughness training for sport*. New York: Plume.

Mack, M. G. & Ragan, B. G. (2008). Development of the mental, emotional, and bodily toughness inventory in collegiate athletes and nonathletes. *Journal of athletic training*, *43*(2), 125–132. https://doi.org/10.4085/1062-6050-43.2.125.

Masum, R. (2014). A mixed method analysis of mental toughness in elite and sub-elite male and female tennis players in Pakistan. *Advances in Social Sciences Research Journal*, 1,110-122.

Nicholls, A. R., Levy, A. R., Polman, R. C. & Crust, L. (2011). Mental toughness, coping self-efficacy, and coping effectiveness among athletes. *International Journal of Sport psychology*, 42(6), 513-524.

O' Donoghue, P. & Ingram, B. (2001). A notational analysis of elite tennis strategy. *Journal of sports sciences*, *19*(2), 107–115. https://doi.org/10.1080/026404101300036299.

Parlak, N. (2023). Amatör futbolcularda zihinsel antrenmanın zihinsel dayanıklılığa etkisinin incelenmesi. *Adnan Menderes Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 10* (1) , 83-100. DOI: 10.30803/adusobed.1233266

Sarı, İ., Sağ, S. & Pınar Demir, A. (2020). Sporda zihinsel dayanıklılık: Taekwondo sporcularında bir inceleme . *Beden Eğitimi ve Spor Bilimleri Dergisi*, 22 (4) , 131-147 . Retrieved from https://dergipark.org.tr/tr/pub/ataunibesyo/issue/59137/820265

Sheard. M, Golby. J. & Van Wersch, A. (2009). Progress towards construct validation of the Sports Mental Toughness Questionnaire (SMTQ). *European Journal of Psychological Assessment*, 25, 186-193.

Sunay, H. & Saracaloğlu, A. S., (2003). Türk Sporcusunun Spordan beklentileri ile Spora Yönelten Unsurlar. *Spormetre Beden Eğitimi ve Spor Bilimleri Dergisi*, vol.1, no.1, 43-48.

Şahinler, Y. & Beşler, H. K. (2021). Takım ve mücadele sporları yapan bireylerin zihinsel dayanıklılık düzeylerinin incelenmesi. *Kilis 7 Aralık Üniversitesi Beden Eğitimi ve Spor Bilimleri Dergisi*, 5 (2) , 134-144. Retrieved from https://dergipark.org.tr/en/pub/besbid/issue/67297/1005657

Ulaş, T. (2022). Spor yapan bireylerin psikolojik iyi oluş düzeyleri ile zihinsel dayanıklılık düzeyleri arasındaki ilişki. KMÜ, Sosyal Bilimler Enstitüsü, Beden Eğitimi ve Spor Ana Bilim Dalı

Weinberg, R. S. & Gould, D. (2015). Foundations of Sport and Exercise Psychology (6th ed.). Champaign, IL: Human Kinetics.

Yalçın, S. (2013). İlköğretim okulu öğretmenlerinin mesleki tükenmişlik düzeyleri ile stres, psikolojik dayanıklılık ve akademik iyimserlik arasındaki ilişki. Yüksek lisans tezi. Gazi Üniversitesi Eğitim Bilimleri Enstitüsü, Ankara.

Yarayan, Y. E., Yıldız, A. B. & Gülşen, D. B. A. (2018). Elit düzeyde bireysel ve takım sporu yapan sporcuların zihinsel dayanıklılık düzeylerinin çeşitli değişkenlere göre incelenmesi. *Uluslararası Sosyal Araştırmalar Dergisi*, 11(57), 1307-9581.

International Journal of Sport Culture and Science
March 2024 : 12(1)
ISSN : 2148-1148
Doi : 10.14486/IntJSCS.2024.697

I Was an Elite Tennis Athlete; I Played, I Won, I'm Forced and I Left*

Ülfet YAVUZ[1], Özge BAYDAR ARICAN [2], Ecem TÜRKMEN [3]
[1] Gazi University, Ankara, Türkiye
https://orcid.org/0000-0002-5518-8288
[2] Gazi University, Ankara, Türkiye
https://orcid.org/0000-0001-8509-3266
[3] Gazi University, Ankara, Türkiye
https://orcid.org/0000-0003-0059-2037

Email: ulfetyavuz3@gmail.com, ozgebydr@hotmail.com, ecemturkmen@gazi.edu.tr

Type: Research Article (Received: 16.01.2024 - Accepted: 28.02.2024)

Abstract

Tennis players may encounter many physical and mental difficulties on the way to becoming a performance athlete by focusing on their careers and having to sacrifice their educational experiences, work opportunities and social lives. While this situation leads to an increase in their tendency to quit sports at an early age, it also shows that there is a need for studies to determine the factors that affect sports behavior. In this direction, the aim of the study is to examine and evaluate the reasons for starting and continuing tennis, the difficulties they encounter as athletes and the reasons for quitting tennis. This research, which was conducted with qualitative methodology, was carried out within the scope of phenomenology pattern. In this study, in which convenience sampling and criterion sampling, one of the purposive sampling methods, were used together, a screening was carried out according to the pre-established criteria in the process of determining the participant. In line with these criteria, the study group consists of 22 athletes, male and female, who have played elite tennis in clubs affiliated to the Turkish Tennis Federation and who have quit tennis. From the participants; They were asked to answer questions about the reasons for starting tennis, the reasons for becoming an elite tennis player, the difficulties they encountered while playing tennis, and the reasons for quitting tennis. The data obtained were coded within the framework of questions and sub-questions using content analysis, and then themes and sub-themes were determined. As a result, the majority of the participants stated that they started tennis with the support of their parents, they expected to have a reputation/status and to have social/educational opportunities thanks to tennis. In addition, it was concluded that they could not be motivated enough to train-competition due to the lack of knowledge of their trainers and they stopped playing tennis due to permanent injuries, surgical operations and mental fatigue.

Keywords: Tennis, Elite tennis player, Phenomenology, Qualitative research

Introduction

Tennis is an important mass sport, which is among the popular branches because it is a competitive branch with high spectator pleasure consisting of aesthetic movement forms and offers millions of people the opportunity to participate both as spectators and participants (Ölçücü et al., 2012). Since its inception, tennis has gained an important place in the world with many different milestones such as updates to the rules, the organization of various cups and participation in the Olympics (ITF, 2023). The increasing number of tournaments and financial rewards, especially towards the end of the 1960s, accelerated the transition from amateurism to professionalism and caused tennis to turn into a large industry that promises a full-time job for athletes in this branch (Örnek and Biçer, 2021). Although the increase in opportunities is a factor that triggers the reason for preference, the fact that tennis athletes do this sport professionally, as in almost every branch, may cause them to become individuals who sacrifice other areas of their lives.

When we look at the development of a tennis athlete, we can say that the age range of 3 to 6 is the first step towards becoming a professional tennis player. While the age of showing advanced skills is accepted as around 12 years old, it is expected to participate in regional and national tournaments at the age of 14 to 16 years old, and to play tennis in international tournaments around the age of 18, transitioning to a professional career after the age of 16. In addition to the age-based scale, a tennis athlete who aims to become a professional must not only have the right technique and a certain talent, but also be successful in many parameters such as hard work, dedication, perseverance, athleticism and social support. Although all these parameters are seen as some motivational sources for tennis athletes to continue in this branch, especially being a player in the league status or playing tennis for financial gain can be considered as the main factors that increase the success motivation of athletes (Martin, 2015; Oršolić, et al., 2023; Oruç, 2018; United States Tennis Association, 2004). Despite many different motivational factors, the reason why elite level tennis athletes quit this sport is a question mark in mind.

Looking at the literature, in a study conducted with elite athletes in the transition process after quitting tennis, it is seen that a combination of burnout, financial distress and general unhappiness on tour was the most common reason for athletes to quit tennis, in addition to many different reasons individually (Uberoi, 2012). In 2002, in another study conducted with Australian female athletes who quit tennis, it was concluded that 66% of the athletes who left the tour did not regret leaving the tour and none of the remaining athletes attempted to return despite regretting leaving the tour (Young, et al., 2006). In another study on career problems and retirement conducted with female elite tennis athletes, it was found that the athletes did not find it traumatic to leave the competitive years and even saw it as an opportunity to re-establish more traditional social roles and lifestyles (Allison & Meyer, 1998).

Considering the small number of studies in the literature on the reasons why elite tennis athletes quit the sport, this study was designed to contribute to the literature by examining and evaluating elite tennis athletes' experiences of starting and continuing tennis, the difficulties they face as an athlete and the reasons for quitting tennis in the Turkish sample.

Material and Method

Research Model

This research, which was designed with qualitative methodology, was conducted within the scope of phenomenology design. "In phenomenological studies, there are gems of essence in assumptions and shared experiences. These gems are often the main meanings understood through an experienced phenomenon. Different people's experiences are bracketed, analyzed and compared to define the reality of the phenomenon" (Patton, 2002). In this study, we tried to make sense of how elite level tennis players experience tennis, how they codify these experiences individually and collectively in their consciousness, and why they quit tennis.

The study was conducted by obtaining the ethics commission evaluation and approval certificate of Gazi University, numbered E-77082166-604.01.02-653768 and dated 12.05.2023 (Research code: 2023-648).

Study Group

In qualitative research, the researcher "carefully and rigorously seeks to understand the particular or unique in depth, rather than to find out what the general truth about the majority is. For this purpose, a single case or a small, non-random, purposeful sample is selected" (Merriam, 2015). In this study, in which convenience sampling and criterion sampling, which are among the purposive sampling methods, were used together, a screening was carried out according to pre-established criteria in the process of determining the participants. In line with these criteria, the study group consisted of a total of 20 male and female athletes who started tennis between the ages of 3 and 6, participated in national team selection tournaments at the age of 12, and quit tennis at the elite level despite achieving degrees in Turkish championships.

The ages of the athletes participating in the study vary between 25 and 36 years. For ease of interpretation in the analysis, the age variable was divided into three groups: 25 years and younger, 26-35 years and 36 years and older. The youngest member of the research group is 21 years old and the oldest member is 36 years old and the average age of the participants is 25.68. Descriptive statistics of the research group are given in the table below. In addition to the table, it was observed that the participants had been playing tennis for an average of 14 years and had been away from tennis professionally for an average of 8 years.

Table 1. Descriptive Statistics of the Study Group (n=20)

	Groups	f	%
Gender	Female	12	59,1
	Male	8	40,9
Age	25 years and below	15	72,7
	26-35 years old	3	18,2
	36 years and older	2	9,1
Education Status	Associate Degree	3	13,7
	Undergraduate	15	77,3
	Master's Degree	1	4,5
	PhD	1	4,5

When the descriptive statistics of the study group are analyzed, it is revealed that a total of 20 tennis athletes, male and female, were included in the research. There are 15 athletes in the 25 and under age group, 3 athletes in the 26-35 age group and 2 athletes in the 36 and over age group. 3 of these athletes completed their associate degree, 15 completed their undergraduate education and 2 completed their graduate education.

Data Collection Tool

A semi-structured interview form prepared by the researchers was used as a data collection tool. Semi-structured interview is a form in which the questions are determined beforehand, These are the types of questions that are filtered through information filtering, where answers can be open-ended (Yıldırım & Şimşek, 2013). Before preparing the interview form, the second researcher made field observations and took field notes. Based on these observations and field notes, 4 open-ended questions were formed by utilizing the relevant literature within the framework of the purpose of the research. Care was taken to ensure that the interview questions were clear and understandable, and attention was paid to the order of meaning of the questions. Then, the athletes were first contacted by phone and informed about the purpose, content and method of the study, and the athletes were informed that the interviews would be used only for this study and that voice recordings would be taken in line with their permission. Individual face-to-face interviews of approximately 30 minutes each were conducted with those who volunteered to participate in the study. In the interviews, probing questions were also asked to the athletes when deemed necessary.

Data Analysis

Content analysis (Patton, 2002) was used to analyze the data obtained from the athletes. The related codes obtained from the analysis were thematized within the framework of questions and sub-questions and transformed into findings. Excerpts from the statements given by the athletes participating in the study were used in the findings section. In the sample sentences for the statements given by the athletes in order to protect their identities, codes such as S1, S2, S3 were used instead of the names of the participants. In addition, inter-rater reliability was performed for the rigour of the study (Campbell at all, 2013). Inter-rater reliability is the process of two or more researchers independently coding the data in order to reach an agreement on the accuracy of the codes and the codes in order to check whether the coding is reproducible and therefore of high quality.

Findings

Table 1. Reasons Why Athletes Started Tennis

Theme	Sub Theme	Code	f
Reasons to start tennis	Family	mother, father, sister, cousin, uncle	15
	Social environment	friends, desire to become a national athlete	3
	Education environment	physical education teacher, obtaining a	2

		scholarship	
	Visual platform	tennis matches broadcast on television, tennis athletes on social media	2

When Table 1 is examined, it is seen that the theme of the reasons why athletes started tennis consists of four sub-themes and the codes belonging to these sub-themes. The majority of the athletes emphasize that they started tennis with the support of their families. In this direction, it can be interpreted that the presence of individuals interested in tennis in the families of the athletes plays an important role in the athletes' orientation towards tennis. In addition, another factor in the athletes' tendency towards tennis is the recommendation of the friend group and the physical education teacher, in other words, it can be said that they started tennis by being influenced by the educational environment and social environment. The statements obtained from the athletes regarding this information are as follows;

- "I started tennis thanks to my mom and dad and influenced by my sister." (S2)

- "...my brother went to soccer and my sister went to tennis. I would like to play tennis with my sister." (S6)

- "...my cousin is one of the most important people here, after my father..." (S10)

- "...my friends were going to tennis in summer school. I was also enthusiastic." (S19)

- "The tennis matches my father watched on TV attracted my attention. As I watched those matches, I became curious about playing." (S13)

- "...I used to watch people playing tennis on the tennis court of the complex and I wanted to play tennis like them." (S16)

- "... my uncle loved tennis matches. I discovered this branch thanks to him" (S1)

Table 2. Motivations of Athletes to Continue Tennis

Theme	Sub Theme	Code	f
Motivations to continue tennis	Profession/Job	desire to become a tennis coach, desire to become a physical education teacher, desire to earn financial income	6
	Fame/Status	the desire to become a well-known athlete, desire to become a national athlete	6
	Social/educational opportunities	having the opportunity to go abroad thanks to tennis, hope of getting into university related to sports	8
	Health situation	to remain physically and mentally healthy throughout life, gain a good physical appearance	4
	Mood	satisfaction with achieving success, feeling happy while playing tennis, be discharged, getting away from negative emotions and thoughts	4

When Table 2 is examined, it is seen that the theme of motivations to continue tennis is divided into five sub-themes and the codes representing these sub-themes in line with the data obtained from the athletes. When the findings obtained from the athletes are examined, it is seen that the most recurring codes are concentrated in the sub-themes of obtaining

social/educational opportunities through tennis, gaining fame/status and the expectation of obtaining a profession, while it is noteworthy that the codes in the sub-themes related to health and emotional state are equally repeated. In the light of all this information, sample statements obtained from athletes are as follows;

- "...continuing tennis at an elite level with intensive training made me feel better mentally and physically every day." (S5)

- "When I was playing tennis at a professional level, I felt happier than I was. It was a real happiness. The crowd of spectators..." (S13)

- "...I get the opportunity to go abroad, even if not all the time..." (S7)

- "...Thinking that I was being watched while playing used to motivate me incredibly. When I had a fight with a friend, I would be free from the negative effects and thoughts of that incident..."(S12)

Table 3. Challenges Athletes Face While Playing Tennis

Theme	Sub Theme	Code	f
Challenges they face while playing tennis	Material conditions	lack of sponsors	2
	Training	lack/insufficient knowledge of coaches, very challenging training, lack of motivation to go to training	10
	Educational environment	inability to attend school, decline in academic success	3
	Time	not being able to participate in social activities, not being able to spend time with family members	5
	Health situation	injuries, illnesses, delayed recovery	3

When Table 3 is examined, it is seen that the theme of difficulties encountered while playing tennis is divided into five sub-themes in line with the data obtained from the athletes and the relevant codes representing these sub-themes. Considering the information obtained from the Athletes, in addition to the findings in the sub-themes of financial conditions, time and health status, in the sub-theme of "training", where the codes are the most intense, it is seen that the majority of the athletes emphasize that the lack of or insufficient knowledge of the coach increases the loss of motivation and this situation paves the way for injuries. Participant statements representing this situation and other codes are as follows;

- "...it was incredibly difficult days, not being able to leave the house for days because of the knee injury I had...I couldn't continue school..." (S8)

- "...I didn't even have the opportunity to go on a picnic with my family...it was a fact that I was an unsuccessful student, especially in science classes because I couldn't study after the trainings and I felt very tired." (S17)

- "...My parents were already living separately. I was having a hard time making time for them..."(S3)

- Tennis was an important part of my life, but I was always arguing with my coach and we usually didn't agree on anything. Over time, I moved away from tennis..."(S11)

Table 4. Reasons Why Athletes Quit Tennis

Theme	Sub Theme	Code	f
Reasons for quitting tennis	Health situation	injuries, surgical operations, mental fatigue, burnout	16
	Material conditions	economic conditions, tournaments being expensive	6

When Table 4 is examined, it is seen that the theme of reasons for quitting tennis is divided into two sub-themes and the related codes representing these sub-themes according to the data obtained from the athletes. A strong majority of the athletes emphasize that they quit tennis due to health conditions. In addition, the athletes also clearly stated that they moved away from tennis due to financial conditions. Representative statements obtained from the athletes related to the relevant theme are as follows;

- "Tournament expenses were very difficult for me and my family. I could not participate in the tournaments I was supposed to participate in, I could not recognize my opponents, my performance was negatively affected, of course, my injuries were also effective." (S14)

- "The surgeries and the recovery process afterwards, sometimes full recovery, sometimes no recovery at all..." (S15)

- "I had a surgical operation and the process was very difficult..."(S9)

- "Each tournament was a separate financial burden..."(S20)

Discussion and Conclusion

It was carried out to examine and evaluate the reasons why elite tennis athletes started and continued playing tennis, the difficulties they encountered as athletes, and the reasons for quitting tennis.

Many theories have been developed to explain the factors that motivate individuals to take up tennis. Crandall (1980) argued that the individual's personality and the situation he/she is in are effective, while Levy (1979) tried to explain tennis playing with the interaction between the individual's personality and the environment and social conditions he/she is in. In addition, Deci and Ryan (1985) defined this situation as intrinsic motivation, extrinsic motivation and motivation. Maslow (1943) argued that the factors that motivate an individual to play tennis correspond to the need for belonging, the need for love and the need for values in the pyramid of needs; Pintrich (2000) tried to explain this with the individual's competition with himself or others. Engeström et al. (1999) tried to explain the Activity Theory as the individual's mental, physical, or emotional readiness to compete and self-sufficiency. In addition to these, Frederick Herzberg's Dual Factor approach and Clayton Alderfer's Existence, Relatedness, and Development approach, which expresses Maslow's hierarchy of needs in a different way, have also tried to explain the factors that motivate individuals to

start tennis. Apart from these, it is also possible to explain the individual's starting tennis with physical motivators, social motivators, and psychological motivators.

When the findings related to the reasons why the athletes started tennis are examined in this study, the majority of the athletes emphasize that they started tennis with the support of their families. At the end of the research, it is seen that the participants turned to tennis with a tradition from their families. Therefore, it was seen that one or both of the participants' parents were previously interested in tennis. This situation also reveals that athletes are influenced by their families in turning to tennis. Looking at the literature, it is noticeable that there are studies that support this finding (Yılmaz & Kartal, 2022; Örnek & Biçer, 2021; Aras and Asma, 2020). As a matter of fact, in the study on the reasons for starting tennis and expectations of performance tennis players in Turkey, it was observed that the influence of mother, father, and siblings was high in the reasons why athletes started tennis. On the other hand, in the literature, Yüksel (2019) examined the relationship between the family's participation in sports and their children's orientation towards elite sports and found that parents who do sports in the family direct their children to elite sports or support them more to become an elite athlete compared to their parents who do not do sports. In the study by Tunçel (2021), in which the effect of family, environment, and society elements on the orientation of professional athletes playing in the women's volleyball first league to the volleyball branch was investigated, it was determined that the presence of individuals interested in sports in the families of volleyball players had a significant effect on their orientation to volleyball.

In addition, another factor in the athletes' orientation towards tennis is the friend group, the recommendation of the physical education teacher, and obtaining scholarships. In other words, it can be said that they started tennis because of influences from their educational and social environments. In support of this finding, Ölçücü et al. (2012) conducted a study with athletes participating in the Turkish Interuniversity Tennis Tournament and concluded that most of the athletes were trying to get educational scholarships from foreign universities through tennis.

When the findings regarding the motivations of the athletes to continue tennis are evaluated, it is seen that the most recurring codes are concentrated in the sub-themes of obtaining social/educational opportunities through tennis, gaining fame/status, and the expectation of obtaining a profession, while it is noteworthy that the codes in the sub-themes related to healthy status and emotional state are equally repeated. This finding can be explained by the dual-factor theory developed by Frederick Herzberg. The dual factor theory argues that needs are the basis of motivation (Akdeniz and Ardahan, 2020; Alshmemri et al., 2017; Okholm Kryger et al., 2015). In addition, the individual aims to protect and improve his/her physical and mental health while continuing to play tennis. Physically, they play tennis to protect and improve their health and to be more energetic and fit. Mentally, they play tennis to relax, to get away from the stress of work/school life and daily life, to renew and refresh themselves, and to protect their mental health. In the context of social motivators, the individual continues to play tennis in line with the need to socialize, establish new relationships, make new friends,

make a new partner, feel that they belong to a group, or do the same activity with the group they are in.

When the findings regarding the difficulties encountered by the athletes while playing tennis are analyzed, it is seen that the majority of the athletes emphasized that the lack of or insufficient knowledge of the coach increases the loss of motivation, and this situation paves the way for injuries. In support of this finding, Örnek and Biçer (2021), in their study conducted with twelve athletes between the ages of 16-30 who played tennis at the elite level and quit tennis, emphasized that athletes generally encountered financial difficulties while evaluating their views on the difficulties they faced while playing tennis.

When we look at the findings that try to explain the reasons why the athletes quit tennis, the majority of them emphasize that they quit tennis due to health conditions. In addition, the athletes also stated that they moved away from tennis due to financial conditions. In support of this finding, Okholm Kryger et al. (2015), in a study conducted with female and male elite tennis athletes, emphasized that athletes quit tennis mostly due to thigh and back injuries. Again, Young et al. (2006), in their study on elite tennis athletes' quitting professional tennis tournaments, reached twenty-eight women who quit tennis in Australia and applied a questionnaire. As a result of the study, it was determined that the women who quit tennis with a plan characterized this period as easy, while the women who quit tennis without a plan characterized this period as difficult.

When the results of this study are evaluated in general, it is seen that the majority of the athletes started tennis with the support of their parents and that they expected to gain fame/status and social/educational opportunities through tennis. In addition, it was concluded that the athletes could not be motivated enough for training competitions due to incomplete or insufficient information from their coaches and that they quit tennis due to permanent injuries, surgical operations, and mental fatigue.

Based on the results of this study, which was designed for the main purpose of the reasons why athletes quit tennis:

It is recommended that tennis coaches should not only train their athletes with technical information about their branch, but also make training programs in which psychological processes that will create a source of motivation are also at the forefront.

Studies can be carried out for economic support plans such as scholarships for professional tennis athletes who have financial problems so that they can continue playing tennis.

**It was presented as an oral presentation at the 15th National Sports Sciences Student Congress. Congress "08-10 May 2023", Ankara/Türkiye).*

REFERENCES

Akdeniz, Y., & Ardahan, f. (2020). Bireyleri rekreasyonel tenise başlamaya motive eden faktörler ölçeğinin geliştirilmesi ve geçerlilik güvenirlilik çalışmasının yapılması. *Avrasya Sosyal ve Ekonomi Araştırmaları Dergisi*, *7*(4), 188-207.

Allison, M. T., & Meyer, C. (1988). Career problems and retirement among elite athletes: The female tennis professional. *Sociology of Sport Journal, 5*(3), 212-222.

Alshmemri, M., Shahwan-Akl, L., & Maude, P. (2017). Herzberg's two-factor theory. *Life Science Journal*, *14*(5), 12-16.

Aras, L. & Asma, M. B. (2020). Farklı türdeki ortaöğretim kurumlarında okuyan öğrencilerin beden eğitimi ve spor dersine yönelik tutumlarının incelenmesi. *Gaziantep Üniversitesi Spor Bilimleri Dergisi*, *5*(1), 27-39

Campbell, J. L., Quincy, C., Osserman, J., & Pedersen, O. (2013). Coding in-depth semi-structured interviews: Problems of unitization and inter-coder reliability and agreement. Sociological Methods and Research, 42, 294–320. doi: 10.1177/0049124113500475

Crandall, R. (1980) Motivation for Leisure. *Journal of Leisure Research,* 12(1), 45-53. https://doi.org/10.1080/00222216.1980.11969418

Deci, E. L., & Ryan, R. M. (1985). The general causality orientations scale: Self determination in personality. *Journal of research in personality*, *19*(2), 109-134.

Engeström, Y. (1999). Activity theory and individual and social transformation. *Perspectives on activity theory*, *19*(38), 19-30.

ITF. (2023). International tennis federation. Erişim: 15.10.2023 https://www.itftennis.com/en/about-us/

Levy, J. (1979). *Motivation for leisure: An intereactionist approach. Leisure: A psychological approach.* Los Alamitos, CA: Hwong Publishing, 12-42.

Martin, L. (2015). Is socioeconomic status a contributing factor to tennis players' success. *Journal of Medicine and Science in Tennis, 20*(3), 116-121.

Maslow, A. H. (1943). A theory of human motivation. *Psychological review*, *50*(4), 370.

Merriam, S. B. (2015). Nitel araştırma: Desen ve uygulama için bir rehber. Ankara: Nobel.

Okholm Kryger, K., Dor, F., Guillaume, M., Haida, A., Noirez, P., Montalvan, B., & Toussaint, J. F. (2015). Medical reasons behind player departures from male and female professional tennis competitions. *The American journal of sports medicine*, *43*(1), 34-40.

Oršolić, M., Barbaros, P., & Novak, D. (2023). Research on negative life events among tennis players of differing success levels:The participants' perspectives. *Collegium antropologicum, 47*(1), 1-10.

Oruç, N. (2018). Üniversiteler arası 1., 2. ve süper lig tenis müsabakalarına katılan sporcuların spora özgü başarı motivasyon düzeyinin bazı değişkenlere göre incelenmesi (yüksek lisans tezi). İstanbul Gelişim Üniversitesi Sağlık Bilimleri Enstitüsü.

Ölçücü, B., Erdil, G., Bostancı, Ö., Canikli, A., & Aybek, A. (2012). Üniversiteler arası tenis müsabakalarına katılan sporcuların tenise başlama nedenleri ve beklentileri. *Spor ve Performans Araştırmaları Dergisi, 3*(2), 5-12.

Örnek, S., & Biçer, T. (2021). Üst düzey tenis sporcularının tenisi bırakma nedenlerinin incelenmesi. *Eurasian Research in Sport Science 6*(1), 15-28.

Patton, M. Q. (2002). *Qualitative research and eveluation methods* (3rd ed.). Thousand Oaks, CA: Sage.

Pintrich, P. R. (2000). Multiple goals, multiple pathways: The role of goal orientation in learning and achievement. *Journal of educational psychology*, *92*(3), 544.

Tunçel, E. (2021). Kadınlar voleybol 1. Liginde oynayan profesyonel sporcuların voleybol branşına yönelmesinde aile, çevre ve toplum unsurlarının etkisinin araştırılması (yüksek lisans tezi). İstanbul Gelişim Üniversitesi Lisansüstü Eğitim Enstitüsü.

Uberoi, N. (2012). *After tennis: Professional athletes in transition. United States Tennis Association. Coaching tennis successfully.* Human Kinetics: 2004.

United States Tennis Association. (2004). *Coaching tennis successfully*. Human Kinetics.

Yıldırım, A. & Şimşek, H. (2013). *Sosyal bilimlerde nitel araştırma yöntemleri*. (9. Baskı). Ankara: SeçkinYayıncılık.

Yılmaz, O., & Kartal, R. (2022). Tenis sporunda ailenin rolü ve önemi. *Gaziantep Üniversitesi Spor Bilimleri Dergisi*, *7*(3), 277-286.

Young, J. A., Pearce, A. J., Kane, R., & Pain, M. (2006). Leaving the professional tennis circuit: Exploratory study of experiences and reactions from elite female athletes. *British Journal Of Sports Medicine*, *40*(5), 477.

Yüksel, M. (2019). Ailenin spora katılımı ile çocuklarının elit spora yönelmesi arasındaki ilişki. *Ordu Üniversitesi Sosyal Bilimler Enstitüsü Sosyal Bilimler Araştırmaları Dergisi, 9(2), 319-326.*

International Journal of Sport Culture and Science
March 2024 : 12(1)
ISSN : 2148-1148
Doi : 10.14486/IntJSCS.2024.698

Investigation of Digital Game Playing Time and Motivation of Sport Sciences Students

Mehmet CEBI[1], Yucel INAC[2], Ali Ihsan CEBI[3]
[1]Ondokuz Mayis University Yasar Dogu Faculty of Sport Sciences, Samsun, Turkey.
https://orcid.org/0000-0002-4055-728X
[2] Ondokuz Mayis University Graduate School of Education, Samsun, Turkey.
https://orcid.org/0000-0002-4093-1462
[3] Ondokuz Mayis University Graduate School of Education, Samsun, Turkey.
https://orcid.org/0000-0003-2773-7312

Email: mehmet.cebi@omu.edu.tr, inacyucel@gmail.com, 23280784@stu.omu.edu.tr

Type: Research Article (Received: 20.07.2023 - Accepted: 25.02.2024)

Abstract

The aim of this study was to investigate the time spent playing digital games and the motivation of Sports Sciences students. A total of 192 students (122 males, 70 females) who are studying at the Faculty of Physical Education of Ondokuz Mayıs University Yasar Dogu took part in the study. The data collection instruments used in this study were the digital game playing motivation scale and the digital game playing attitude scale. For data analysis, SPSS 21 package was used. Independent samples t-test and ANOVA tests were used for data evaluation. Significance was set at 0.05 to compare all variables. There was no significant difference in attitude and motivation to play digital games according to gender, class, height, age and father's educational level among the students of Sports Sciences ($p > 0.05$). A significant difference was found between the behavioural sub-dimensions of attitude towards digital games and the curiosity and social acceptance sub-dimensions of motivation towards digital games according to the level of education of the mothers ($p<0.05$). As a result, the curiosity-social acceptance sub-dimensions of the digital game playing motivation scale increase as the level of parental education increases, according to the data obtained from the parental education variable. It can be said that students are influenced by extrinsic sources of motivation in line with their desires and needs in the direction of the target behaviour, as the level of curiosity-social acceptance increases.

Keywords: Sport Sciences, Digital Game, Motivation, Attitude, Duration.

Introduction

Many conveniences due to the development of social facilities over time has been achieved. Electronic and technological elements are undoubtedly at the forefront of these conveniences (Uzun et al., 2022). The development of information technology and the transfer of games to the computer environment has led to the widespread use of the concept of digital games; however, the rapid dissemination of information has brought digital game tools such as computers, tablets and phones, which are products of technology, to the forefront, especially instead of family and peer groups, which are in the first place in socialization (Gulcek, 2018: 22). Digital games have become one of the life activities of children in the 21st century world and have become an important part of leisure time. Therefore, young people preferred to play digital games as an activity to be done at the first opportunity (Hazar et al., 2017: 230-232).

The widespread use of computers and the internet has brought many changes in human life. At the beginning of these negativities are the concepts of internet, social media and digital game addiction, especially in children and adolescents. It would not be wrong to say that children are moving away from traditional play activities and turning to digital games as a result of factors such as the increasing urbanization in parallel with the increase in population and the gradual decrease in playgrounds as a result of this situation. It is seen that especially young people and children show great demand for digital games that appeal to all age groups, and the time they spend for games is increasing day by day (Rideout et al., 2010: 10).

In addition to people's distraction, entertainment, getting away from the social environment, being challenged, getting away from the environment, being able to do what they cannot do in real life in a virtual environment, using time fluently, the desire to move to the next level in the game, the curiosity and interest in the environment at the new level, and the pleasure and happiness they give; factors such as the fact that digital games have become the subject of daily conversation, the effort to win prizes in games (trophies, power-ups, etc.), the feeling of playing digital games at every opportunity have become determinants of attitudes towards digital games (Demir & Mutlu Bozkurt, 2019: 1-18). At this point, one of the important questions to be asked is why children are so enthusiastic about playing digital games. Although this question can be analyzed under different headings, the fact that digital games offer a surreal world where players have extraordinary powers and abilities and can achieve many things that cannot be achieved in real life is an important factor in playing these games. In addition to the sense of unknown, curiosity and excitement in these games, game scenarios designed to constantly level up are another important factor (Demir & Hazar, 2018: 1-18).

Attitude can be expressed as one of the important psychological characteristics that reveal the state, attitude and behavior of individuals and their social interests (Alıcı, 2013: 318-331), in other words, the attitudes and behaviors that a person may exhibit when faced with an event, phenomenon and situation (Inceoglu, 2010: 212). The reasons for the existence of attitudes, the effect of attitudes on people's attitudes and the changes in these attitudes over time have attracted the attention of the society in the technological age and have become the focus of many studies (Demir et al., 2017: 120-128). Attitudes towards playing digital games are individuals' desire to clear their heads, seek entertainment, move away from social lifestyles, escape from the conditions they are in, and apply what they cannot achieve in life in the digital realm (Demir & Mutlu Bozkurt, 2019: 1-18). At the same time, most studies show that long-term gaming and addiction have negative physical and psychosocial effects and that digital game addicts have higher levels of depression and anxiety than non-addicted individuals (Kuss, 2012: 278-296; Griffiths, 1993: 401-407; Mehroof, 2010: 313-316). Motivation is defined as the process of encouraging, mobilizing, directing and maintaining

participation in activities (Demir & Cicioglu, 2018: 2479-2492; Pintrich & Schunk, 1996: 33-34; Lumsden, 1994: 92).

The three main triggers that encourage a person to take action to achieve a goal are intrinsic motivation, extrinsic motivation and amotivation (Demir & Ilhan, 2019; Deci & Ryan, 1985). The factors that motivate and guide people from all walks of life from childhood to adulthood to play digital games at least once a day using technological tools such as cell phones, tablets and computers are curious (Demir & Mutlu Bozkurt, 2019: 1-18). In this context, the study aimed to examine the digital game playing times and motivations of sport sciences students according to various variables.

Material and Method

Working Group

The study population consisted of a total of 192 participants, 122 males and 70 females, studying at Ondokuz Mayis University Yasar Dogu Faculty of Sports Sciences. Prior to the start of the study, approval was obtained from Ondokuz Mayis University Social and Human Sciences Research Ethics Committee (Date: 30/12/2022 Decision Number: 2022/1116).

Data Collection Tools

In the study, "Digital Game Playing Motivation Scale", the validity and reliability study of which was conducted by Demir and Hazar (2018), "Digital Game Playing Attitude Scale", the validity and reliability study of which was conducted by Demir and Mutlu Bozkurt (2019), and "Personal Information Form" were used.

The 19-item Digital Gaming Motivation Scale, consisting of 3 dimensions and a total of 19 items, was used. The first 5 items in the scale are "Achievement and Revitalization", 9 items are "Curiosity and Social Acceptance", and the last 5 items are collected in three sub-dimensions "Uncertainty in Gaming Desire". The Uncertainty in Play Desire sub-dimension consists of reverse items. The cronbach alpha value of the Digital Gaming Motivation Scale (DGMS) was found to be 88. The scores of the participants indicate that they have motivation to play digital games in the "success and revitalization sub-dimension and uncertainty in game desire sub-dimension 5-12.49 low, 12.5-17.49 medium, 17.5-25 high" and "curiosity and social acceptance sub-dimension 9-22.49 low, 22.5-31-49 medium, 31.5-45 high".

In the scale developed by Demir and Bozkurt (2019), three sub-dimensional structures consisting of 18 items were obtained as a result of the Exploratory Factor Analysis (EFA). Cognitive first 5 items, Affective second 5 items and Behavioral sub-dimension consists of 8 items. In line with the data collected from the participants, the Cronbach's alpha value of the Digital Gaming Attitude Scale (DGAS) was found to be 86. The scores of the participants indicate that they have a motivation to play digital games in the "cognitive sub-dimension, 5-12,49 low, 12,5-17,49 medium, 17,5-25 high in the affective sub-dimension, and 9-22,49 low, 22,5-31,49 medium, 31,5-45 high in the behavioral sub-dimension.

The scores in both scales were arranged between 1 and 5 as "1 = Strongly Disagree", "2 = Disagree", "3 = Undecided", "4 = Agree", "5 = Strongly Agree".

Statistical Procedures

Statistical analysis of the data was performed using the SPSS 21 package. To determine whether the data met the requirements of parametric tests for normality, skewness and kurtosis values were used. Independent samples t-test and ANOVA tests were used to compare variables. For the comparison of all variables, the significance level was set at 0.05.

Findings

Table 1. Comparison of digital game playing attitude and motivation of students studying at the Faculty of Sport Sciences according to gender

Scales	Subscales	Gender	N	'X̄'±Ss	f	t	p
Digital Gaming Attitudes	Cognitive	Female	70	16,2±4,40	0,501	0,352	0,735
		Male	122	16,0±3,83			
	Affective	Female	70	15,5±3,74	2,945	1,593	0,113
		Male	122	14,7±3,09			
	Behavioral	Female	70	22,3±8,12	3,795	-1,664	0,098
		Male	122	24,1±7,06			
Motivation to Play Digital Games	Success and Revitalization	Female	70	14,9±4,86	0,549	-0,663	0,508
		Male	122	15,3±4,56			
	Curiosity and Social Acceptance	Female	70	27,9±9,98	0,777	0,795	0,428
		Male	122	29,0±8,94			
	Ambiguity in Game Demand	Female	70	15,3±5,28	0,520	0,862	0,390
		Male	122	14,7±4,91			

According to the gender variable of the students of the Faculty of Sports Sciences, there was no significant difference between the subdimensions of attitude towards digital games and motivation (p>0.05).

Table 2. Comparison of digital game playing attitude and motivation of students studying at the Faculty of Sport Sciences according to grades

Scales	Subscales	Class	N	'X̄'±Ss	f	t	p
Digital Gaming Attitudes	Cognitive	1st Grade	47	16,7±3,49	1,274	0,285	1,274
		2nd Grade	30	15,4±3,62			
		3rd Grade	37	15,3±4,25			
		4th Grade	78	16,4±4,36			
		Total	192	16,1±4,04			
	Affective	1st Grade	47	15,3±2,95	0,514	0,673	0,514
		2nd Grade	30	14,8±2,88			
		3rd Grade	37	14,4±3,32			
		4th Grade	78	15,2±3,77			
		Total	192	15,0±3,35			
	Behavioral	1st Grade	47	23,1±6,96	1,275	0,284	1,275
		2nd Grade	30	25,8±5,61			
		3rd Grade	37	22,5±8,50			
		4th Grade	78	23,2±7,88			
		Total	192	23,4±7,50			
Digital Gaming Attitudes	Success and Revitalization	1st Grade	47	16,0±4,90	2,453	0,065	2,453
		2nd Grade	30	16,5±4,02			
		3rd Grade	37	14,9±4,09			
		4th Grade	78	14,3±4,86			
		Total	192	15,2±4,66			
	Curiosity and	1st Grade	47	29,6±9,18	0,906	0,439	0,906
		2nd Grade	30	30,3±7,28			

	Social Acceptance	3rd Grade	37	28,7±9,23			
		4th Grade	78	27,4±10,1			
		Total	192	28,6±9,33			
	Ambiguity in Game Demand	1st Grade	47	14,5±5,46			
		2nd Grade	30	14,7±4,57			
		3rd Grade	37	16,0±4,46	0,718	0,542	0,718
		4th Grade	78	14,7±5,23			
		Total	192	14,9±5,04			

There is no significant difference (p>0.05) in the sub-dimensions of attitude and motivation towards digital games between the classes of students studying at the Faculty of Sports Sciences.

Table 3. Comparison of digital game playing attitude and motivation of students studying at the faculty of sport sciences according to height

Scales	Subscales	Height	N	'X̄'±Ss	f	t	p
Digital Gaming Attitudes	Cognitive	170 and below	76	16,6±4,05	0,302	1,342	0,181
		171 and above	116	15,8±4,02			
	Affective	170 and below	76	15,4±3,52	0,844	1,339	0,182
		171 and above	116	14,7±3,23			
	Behavioral	170 and below	76	23,3±7,70	1,255	-0,232	0,817
		171 and above	116	23,5±7,40			
Motivation to Play Digital Games	Success and Revitalization	170 and below	76	15,7±4,60	0,075	1,202	0,231
		171 and above	116	14,8±4,69			
	Curiosity and Social Acceptance	170 and below	76	30,0±9,06	0,252	1,658	0,099
		171 and above	116	27,7±9,42			
	Ambiguity in Game Demand	170 and below	76	15,1±5,31	0,796	0,419	0,676
		171 and above	116	14,8±4,88			

There is no significant difference between the sub-dimensions of digital gaming attitude and motivation according to the height of the students studying at the Faculty of Sport Sciences (p>0.05).

Table 4. Comparison of digital gaming attitude and motivation of students studying at the faculty of sport sciences according to age

Scales	Subscales	Age	N	'X̄'±Ss	f	t	p
Digital Gaming Attitudes	Cognitive	21 years and younger	100	16,2±4,04	0,057	0,515	0,607
		22 years and older	92	15,9±4,06			
	Affective	21 years and younger	100	15,0±3,24	0,324	0,297	0,767
		22 years and older	92	14,9±3,49			
	Behavioral	21 years and younger	100	23,6±7,68	0,650	-0,431	0,667
		22 years and older	92	23,7±7,33			
Motivation to Play Digital Games	Success and Revitalization	21 years and younger	100	15,6±4,66	0,006	1,196	0,233
		22 years and older	92	14,8±4,66			
	Curiosity and Social Acceptance	21 years and younger	100	29,3±9,57	0,022	1,018	0,310
		22 years and older	92	27,9±9,05			
	Ambiguity in Game Demand	21 years and younger	100	15,3±5,39	1,092	1,283	0,201
		22 years and older	92	14,4±4,61			

There is no significant difference between the sub-dimensions of digital gaming attitude and motivation according to the age of the students studying at the Faculty of Sport Sciences (p>0.05).

Table 5. Comparison of digital gaming attitude and motivation of students studying at the Faculty of Sport Sciences according to their mothers' education levels

Scales	Subscales	Education Status	N	'X̄'±Ss	f	t	p
Digital Gaming Attitudes	Cognitive	High School and Below	88	16,1±4,63	4,098	-0,104	0,919
		Associate's Degree and Above	104	16,1±3,49			
	Affective	High School and Below	88	15,1±3,77	3,389	0,610	0,543
		Associate's Degree and Above	104	14,8±2,97			
	Behavioral	High School and Below	88	22,0±7,84	1,965	-2,517	**0,013**
		Associate's Degree and Above	104	24,7±7,00			
Motivation to Play Digital Games	Success and Revitalization	High School and Below	88	14,8±5,11	2,953	-0,922	0,358
		Associate's Degree and Above	104	15,5±4,25			
	Curiosity and Social Acceptance	High School and Below	88	27,1±9,84	2,531	-2,162	**0,032**
		Associate's Degree and Above	104	30,0±8,69			
	Ambiguity in Game Demand	High School and Below	88	15,0±5,34	0,715	0,288	0,774
		Associate's Degree and Above	104	14,8±4,80			

According to the educational level of the mothers of the students of the Faculty of Sports Sciences, a significant difference was found between the behavioural sub-dimensions of attitude towards digital games and the sub-dimensions of curiosity and social acceptance of motivation to play digital games ($p<0.05$).

Table 6. Comparison of digital gaming attitude and motivation of students studying at the Faculty of Sport Sciences according to the education level of fathers

Scales	Subscales	Education Status	N	'X̄'±Ss	f	t	p
Digital Gaming Attitudes	Cognitive	High School and Below	97	15,8±4,52	7,636	-0,827	0,409
		Associate's Degree and Above	95	16,3±3,49			
	Affective	High School and Below	97	14,7±3,52	0,490	-1,292	0,198
		Associate's Degree and Above	95	15,3±3,17			
	Behavioral	High School and Below	97	23,1±7,52	0,011	-0,614	0,540
		Associate's Degree and Above	95	23,8±7,50			
Motivation to Play Digital Games	Success and Revitalization	High School and Below	97	15,2±4,37	2,381	0,070	0,944
		Associate's Degree and Above	95	15,2±4,96			
	Curiosity and Social Acceptance	High School and Below	97	28,7±8,82	0,781	0,090	0,929
		Associate's Degree and Above	95	28,6±9,86			
	Ambiguity in Game Demand	High School and Below	97	15,1±4,51	2,726	0,702	0,484
		Associate's Degree and Above	95	14,6±5,55			

There is no significant difference between the sub-dimensions of digital game playing attitude and motivation according to the education level of the fathers of the students studying at the Faculty of Sports Sciences ($p>0.05$).

Discussion and Conclusion

Nowadays, the reason why people's desire to play digital games is high is the feeling of having most of the things they cannot have in real life in the game, pleasure and that it will not fulfill the responsibilities in real life (Dogu, 2006). When we look at the gender variable in our study, there is no significant difference in the sub-dimensions of digital game playing attitude and digital game playing motivation ($p>0.05$). However, when we look at the averages, it is seen that women have an average of 16,2±4,40 and men have an average of 16,0±3,83 in the cognitive sub-dimension of digital game playing attitude, women have an

average of 15,5±3,74 and men have an average of 14,7±3,09 in the affective sub-dimension, and women have an average of 22,3±8,12 and men have an average of 24,1±7,06 in the behavioral sub-dimension. In the success and revitalization sub-dimension of the motivation to play digital games, women have a mean of 14,9±4,86, men have a mean of 15,3±4,56, in the curiosity and social acceptance sub-dimension, women have a mean of 27,9±9,98, men have a mean of 29,0±8,94, and in the uncertainty in game desire sub-dimension, women have a mean of 15,3±5,28, men have a mean of 14,7±4,91.

In the cognitive, affective and uncertainty in play desire sub-dimensions, women have higher mean scores than men. In behavioral, achievement and revitalization, curiosity and social acceptance sub-dimensions, males have higher mean scores than females (Table 1). It can be said that this difference is due to the fact that male students have higher motivation (such as reward, competition level jumping, winning, purpose, ambition) to play digital games than female students. In their study, Mutlu Bozkurt and Tamer (2020: 105-120) found a significant difference in favor of males in terms of gender in digital game playing motivation. The results of the study, which stated that men's achievement and revitalization levels, curiosity and social acceptance levels are higher than women, are similar to our findings. Namli and Demir (2020: 40-52) found in their research that men are more inclined to play digital games than women. Demirel et al. (2019: 128-137) examined the motivation of high school students to play digital games and found that the motivation of girls to play digital games is lower than that of boys, and stated that the reason for this is that the emotional aspects of girls are more dominant, they are easily affected by the environment, and they communicate quickly with their peers and fellow students. Boys, on the other hand, were influenced by reasons such as their dominance and their desire to win lives by enjoying the game and their desire to compete. In a study conducted, it was determined that men play more digital games than women and that men's success in games motivates them more in their next games (Griffiths & Davies, 2005: 359- 368).

When Table 2 is examined, there is no significant difference between the sub-dimensions of digital gaming attitude and motivation according to grades ($p>0.05$). In the cognitive (16,4±4,36), affective (15,2±3,77) and behavioral (23,2±7,88) sub-dimensions of digital game playing attitude, it is seen that 4th grade students have higher mean scores than other grades. In the sub-dimensions of achievement and revitalization (16.5±4.02), curiosity and social acceptance (30.3±7.28) in the motivation to play digital games, it was found that the mean scores of 2nd grade students were higher compared to other grades. In the sub-dimension of uncertainty in the desire to play, 3rd grade students (16.0±4.46) had higher mean scores compared to other grades. Considering the height variable, no significant difference was found between the sub-dimensions of digital game attitude and motivation ($p>0.05$). However, when the mean scores are examined, it is seen that participants with a height of 170 and below had higher mean scores than participants with a height of 171 and above in the cognitive sub-dimension (16.6±4.05), affective sub-dimension (15.4±3.52), achievement and revitalization sub-dimension (15.7±4.60), curiosity and social acceptance sub-dimension (30.0±9.06), and uncertainty in play desire sub-dimension (15.1±5.31). In the behavioral sub-

dimension (23.5±7.40), participants with a height of 171 and above had higher mean scores than participants with a height of 170 and below (Table 3).

In Table 4, there is no significant difference between age and digital game attitude and motivation sub-dimensions (p>0.05). When the mean scores are examined, it is seen that participants aged 21 and under have higher mean scores than participants aged 22 and over in the cognitive sub-dimension (16,2±4,04), affective sub-dimension (15,0±3,24), achievement and revitalization sub-dimension (15,6±4,66), curiosity and social acceptance sub-dimension (29,3±9,57), uncertainty in game desire (15,3±5,39). In the behavioral sub-dimension (23.7±7.33), it was found that participants aged 22 years and over had a higher mean score than those aged 21 years and under. Cebi and Albay (2022: 78-81) did not find a significant difference between the digital game addiction of sports sciences faculty students according to age. In another study examining the motivation to play digital games according to age, they said that there was a significant positive difference in the curiosity and social acceptance sub-dimensions (Mutlu Bozkurt & Tamer, 2020: 105-120). In the study of Tekkursun Demir and Cicioglu (2019: 23-34), no significant difference was found between the age variable and high school students' motivation to play digital games. In addition, they stated that the closest factor in terms of the barrier to participation in leisure time activities of students, which is one of the causes of digital game addiction, is the lack of friends, and that friends, acting together and encouragement are important in participation in physical activities (Cebi et al., 2018: 23-30).

When Table 5 is examined, a significant difference was found between the education levels of the mothers in the behavioral sub-dimensions of digital game playing attitude, curiosity and social acceptance sub-dimensions of digital game playing motivation (p<0.05). Mutlu Bozkurt and Tamer (2020: 105-120) found that in the uncertainty sub-dimension of game desire, the scores of those with mothers with secondary school graduates were higher than those with mothers with high school and university graduates. Gokcearslan and Durakoglu (2014: 419-435) emphasized in their study that those whose mothers had master's/doctoral degrees had higher game addiction scores than those whose mothers had primary school, secondary school, high school graduates and university/college graduates. They stated that those whose fathers were doctoral graduates had higher game addiction scores than those whose fathers were primary school, high school and university/high school graduates. There is no significant difference between the educational status of their fathers and the sub-dimensions of digital game attitude and motivation (p>0.05). When the mean scores are examined, it is seen that those with high school and below education have higher averages in the curiosity and social acceptance sub-dimension (28,7±8,82) and the uncertainty in the desire to play sub-dimension (15,1±4,51) than those with associate's degree and higher education. In the cognitive sub-dimension (16,3±3,49), affective sub-dimension (15,3±3,17), and behavioral sub-dimension (23,8±7,50), those with associate's degree and higher education had higher averages than those with high school and lower education (Table 6). In the study on the motivation to play digital games, it was stated that a significant difference was found between the father's education variable, and it was stated that the mean scores of the people with primary school

graduate fathers were higher than the mean scores of the people with university graduate fathers with the sub-dimension of uncertainty in game desire (Mutlu Bozkurt & Tamer, 2020: 105-120). The variables of computer game addiction and father's education level were examined and it was stated that the scores increased as the father's education level decreased (Erboy & Vural, 2010: 39-58).

Sahin and Tugrul (2012: 115-130) stated in their study that as the education level of the students' mothers increased, their computer game addiction levels increased both in terms of the overall scale and its sub-dimensions. They stated that the computer game addiction scores were very close to each other according to the education level of the fathers and that there was no difference between the scores in terms of both the sub-dimensions and the overall scale, and concluded that the levels of game addiction differed significantly in terms of the level of education of the mother and father, and that as the level of education increased, the level of game addiction of the students increased.

As a result, according to the data obtained from the mother's education level variable, it is seen that as the mother's education level increases, the level of curiosity-social acceptance, one of the sub-dimensions of the motivation to play digital games scale, also increases. It can be said that the increase in curiosity-social acceptance is influenced by extrinsic motivation sources in line with the students' desires and needs towards their target behaviors. This shows the importance of the effect of family education on children. Digital games can be effective in relieving the mental and physical fatigue caused by active sports. Although digital games are effective on students in strategic applications and activities other than sports, too much time should not be allocated to these games. In order to reduce the time students spend on digital games, they can be recommended to do other activities.

REFERENCES

Alıcı, D. (2013), Okula yönelik tutum ölçeğinin geliştirilmesi: güvenirlik ve geçerlik çalışması. Eğitim ve Bilim, 38(168), 318-331.

Cebi, M., Albay, F. (2022). Spor bilimleri fakültesi öğrencilerinin dijital oyun bağımlılığına ilişkin farkındalığının incelenmesi. The Journal of Academic Social Science, 10(127) 72-81. DOI: 10.29228/ASOS.57951

Cebi, M., Elioz, M., Yamak, B. & Satici, A. (2018). Spor bilimleri ve diğer fakülte öğrencilerinin boş zaman faaliyetlerine katılım engellerinin incelenmesi. Gaziantep Üniversitesi Spor Bilimleri Dergisi. 3(1), 23-30.

Deci EL, Ryan RM. (1985). Self-determination and intrinsic motivation in human behavior. New York: Plenum Press.

Demir, G. T, Cicioglu, H. I, Ilhan, E. L. ve Arslan, Ö. (2017), Sınıf öğretmeni adaylarının beden eğitimi dersine yönelik tutumları. International Journal of Sport, Exercise and Training Sciences -Ijsets, 3(4), 120-128. Doı: 10.18826/Useeabd.319676.

Demir, G. T., & Hazar, Z. (2018). Dijital oyun oynama motivasyonu ölçeği (doomö): geçerlik ve güvenirlik çalışması. Journal Of Physical Education & Sports Science/Beden Egitimi Ve Spor Bilimleri Dergisi, 12(2) 1-18. https://dergipark.org.tr/tr/pub/bsd/issue/53467/711639

Demir, G. T., & Mutlu Bozkurt, T. M. (2019). Dijital oyun oynama tutumu ölçeği (dootö): geçerlik ve güvenirlik çalışması. sportif bakış: Spor ve Eğitim Bilimleri Dergisi, 6(1), 1-18. https://dergipark.org.tr/tr/pub/sbsebd/issue/44966/492076

Demirel HG, Cicioglu HI, Demir GT. (2019) Lise öğrencilerinin dijital oyun oynama motivasyonu düzeylerinin incelenmesi. Beden eğitimi ve spor bilimleri dergisi, 21(3):128-137. https://dergipark.org.tr/tr/pub/ataunibesyo/issue/48912/614554

Dogu, B. (2006). Popüler kültürün tüketim aracı olarak bilgisayar oyunlarında sunulan yaşam tarzı. Yüksek Lisans Tezi, Ege Üniversitesi Sosyal Bilimler Enstitüsü.

Erboy E, Vural RA. (2010). İlköğretim 4 ve 5 sınıf öğrencilerinin bilgisayar oyun bağımlılığını etkileyen faktörler. Ege Eğitim Dergisi, 11(1), 39-58. https://dergipark.org.tr/tr/pub/egeefd/issue/4908/67233

Gokcearslan, Ş., & Durakoglu, A. (2014). Ortaokul öğrencilerinin bilgisayar oyunu bağımlılık düzeylerinin çeşitli değişkenlere göre incelenmesi. Dicle Üniversitesi Ziya Gökalp Eğitim Fakültesi Dergisi, (23), 419-435. https://dergipark.org.tr/tr/pub/zgefd/issue/47938/606448

Griffiths MD, Davies MNO. (2005). Video game Addiction: Does't exist? handbook of computer game studies. J. Goldstein, J. Raessens (Eds), Boston. MIT Pres, 359– 368.

Griffiths MD. (1993). Are computer games bad for children? Psychologist, 6(1): 401-407.

Gulcek, E. (2018). Çocuk kültürü ve dijital oyunlar: Elazığ FMD kursu öğrencileri üzerine sosyolojik bir çalışma. Children's culture and Dijital games: A sociological study on Elazığ FMD course students.

Hazar, Z., Tekkurşun, D. G., Namlı, S. ve Türkeli, A. (2017). Ortaokul öğrencilerinin dijital oyun bağımlılığı ve fiziksel aktivite düzeyleri arasındaki ilişkinin incelenmesi. Niğde Üniversitesi. Beden Eğitimi ve Spor Bilimleri Dergisi, 11(3), 320-332.

Inceoglu, M. (2010). Tutum algı iletişim, Ankara: Beykent Üniversitesi Yayınevi, 212.

Kuss DJ, Griffiths MD. Internet gaming addiction: A systematic review of empirical research. Int J Ment Health Addict 2012; 10(2): 278-296.

Lumsden LS. (1994). Student motivation to learn. ERIC Digest, 92. ED370200.

Mehroof M, Griffiths MD. Online gaming addiction: The role of sensation seeking, self-control, neuroticism, aggression, state anxiety, and trait anxiety. Cyberpsychol Behav Soc Netw 2010; 13(3): 313-316.

Mutlu Bozkurt TM, Tamer K. (2020). Dijital oyun oynama motivasyonu ile beden kitle indeksi ilişkisi. Gaziantep Üniversitesi Spor Bilimleri Dergisi, 5(2), 105-120. https://doi.org/10.31680/gaunjss.730904

Namli S, Demir GT. (2020). The relation ship between attitudes towards dijital gaming and sports. Turkish Online Journal of Educational TechnologyTOJET, 19(1), 40-52.

Pintrich PR, Schunk DH. (1996). Motivation in education theory, research, and applications. Englewood Cliffs, NJ Prentice Hall, 33-34.

Rideout VJ, Foehr UG, Roberts DF. (2010). Generation M2: media in the lives of 8- to 18-year olds. Kaiser Family Foundation. Retrieved from.

Sahin, C., & Tugrul, V. M. (2012). İlköğretim öğrencilerinin bilgisayar oyunu bağımlılık düzeylerinin incelenmesi. Journal of World of Turks, 4(3), 115-130.

Tekkursun Demir, G., & Cicioglu, H. I. (2018). Fiziksel aktiviteye katılım motivasyonu ölçeği (fakmö): geçerlik ve güvenirlik çalışması. Journal of Human Sciences, 15(4), 2479-2492.

Tekkursun G, Cicioglu, HI. (2019).Fiziksel aktiviteye katılım motivasyonu ile dijital oyun oynama motivasyonu arasındaki ilişkinin incelenmesi, Spormetre Beden Eğitimi ve Spor Bilimleri Dergisi, 17(3), 23-34.

Uzun, R. N., Cebi, M., Sahin, T., & Ceylan, L. (2022). Elektronik Spor'un Yönetim\Gelişim\Bileşenler Açisindan Yüzeysel İncelenmesi. Ankara: Artikel Akademi Yayınları

International Journal of Sport Culture and Science
March 2024 : 12(1)
ISSN : 2148-1148
Doi : 10.14486/IntJSCS.2024.699

Investigation of the Effect of Ramadan Fasting on Sleep Patterns, Nutritional Characteristics, and Physical Activity Levels in Young Individuals Doing Active Sports

Hakan YARAR[1], Ali ÖZKAN[2], Ece ERVÜZ[3], İzzet KIRKAYA[4]
[1] Yozgat Bozok University, Faculty of Sports Sciences, Yozgat, Türkiye
https://orcid.org/0000-0003-4652-5307
[2] Yozgat Bozok University, Faculty of Sports Sciences, Yozgat, Türkiye
https://orcid.org/0000-0002-2859-2824
[3] Yozgat Bozok University, Faculty of Sports Sciences, Yozgat, Türkiye
https://orcid.org/0000-0002-6458-4370
[4] Yozgat Bozok University, Faculty of Sports Sciences, Yozgat, Türkiye
https://orcid.org/0000-0002-0468-8434
Email: hakan.yarar@bozok.edu.tr, ali.ozkan@bozok.edu.tr, ece.ervuz@bozok.edu.tr, izzetkirkaya@bozok.edu.tr

Type: Research Article (Received: 11.01.2024 - Accepted: 25.02.2024)

Abstract

Fasting during Ramadan causes significant changes in important features of human life, such as sleep behaviors, nutrition, and physical activity. This study aimed to investigate the effects of Ramadan fasting on sleep patterns, nutritional characteristics, and physical activity levels in young individuals doing active sports. Twenty-six individuals (14 males-12 females) between the ages of 19-25 and doing active sports participated in the study voluntarily. In the study, the athletes' sleep patterns, nutrition, and physical activity characteristics were determined using a questionnaire. Participants answered a questionnaire about their sleep patterns, nutritional characteristics, and physical activity levels one week before and during the first week of Ramadan. Comparisons between before and Ramadan answers were made by paired t-tests. Wilcoxon's z was calculated for comparisons between the non-parametric variables. According to the statistical comparisons, the number of workouts per week, and daily training time, were significantly ($p<0.05$) decreased during Ramadan. In addition, it has been determined that the sleeping and waking hours have changed. It is seen that there is no statistically significant difference in total sleep times. There was no significant difference was found in the high-intensity, moderate-intensity physical activity and sitting times of the athletes ($p>0.05$). Significant decreases were found in walking and total calorie (MET) parameters ($p<0.001$). Moreover, no significant difference was found in the total calorie, carbohydrate, fat, protein, and liquid consumption. Ramadan fasting was affected by the number of workouts per week, daily training number, bedtime, waking-up time, walking, and total calorie (MET) parameters.

Keywords: Ramadan fasting, sleep patterns, nutrition, and physical activity characteristics

Introduction

One of Islam's five pillars is the month of Ramadan. According to this condition, healthy pubertal Muslim adolescents and adult men and women are required to fast (Abaidia, Daab & Bouzid, 2020). During Ramadan, fasting should not be eating, drinking, smoking, or having sexual intercourse from sunrise (Sahour) to sunset (iftar). Every year, during the ninth month of the Islamic calendar, Ramadan, Muslims fast for around 29 to 30 days. (Kocaaga et al., 2019; Chaouachi et al., 2009). The duration of fasting varies between 10-19 hours depending on the geographical location (Al-Hourani & Atoum, 2007). Ramadan fasting causes significant changes in nutrition, sleep patterns, physical activity, and some life habits. At this time; Sleeping and waking times, daily sleep time (Roky, Herrera & Ahmed, 2012), eating habits, meal times, and numbers vary significantly.

In order to fast in Ramadan, waking up and eating for at sahour at night or waiting to sleep until sahour and eating after eating can cause disruptions in sleep patterns (Wilson, Drust & Reilly, 2009). This causes a shorter nighttime sleep duration during Ramadan (Rocky et al., 2003) and an increase in daytime sleep duration (Margolis and Reed, 2004). Although some studies show that the decrease in total sleep time may cause performance loss; It has been emphasized that this performance loss can be seen at different levels concerning stress, mood, and psychomotor characteristics (Reilly & Edwards, 2007). In addition, the inability to consume food and liquid for about 10-19 hours between sunrise and sunset, as well as intense training for athletes who do active sports, can cause an energy deficit and dehydration (Waterhouse et al., 2009).

Because the Islamic year is based on the lunar calendar, the Ramadan month can occur at various times of the year and in various seasons. (Spring, summer, autumn, and winter). The month of Ramadan takes place at different times each year. It also occurs in different seasons every nine years. Due to this circumstance, those who fast during Ramadan have different consequences from those of the season as a whole. Day and night duration, temperature, and humidity are important variables. Ramadan fasting can have different effects depending on the situation of the variables listed above. Assuming that the fasting period can be 19 hours a day and the average duration is 12 hours (Chaouachi et al., 2009), doing sports in addition to this affects the fasting athletes. When arranging sports events, the sporting calendar does not take religious observances into account, therefore Muslim athletes must deal with this fasting period while training and participating (Abaidia, Daab & Bouzid, 2020). The purpose of this study is to investigate the sleep patterns, dietary habits, and levels of physical activity of people who fast and participate in sports. Informing the athletes, coaches, and relevant institutions and organizations in line with the information obtained.

Material and Method

Research Model

In order to determine the relationship or degree between two or more variables in this study, which was conducted to examine the sleep habits, dietary habits, and physical activity levels of people who fast and participate in active sports, instant scanning and relational scanning models from the general scanning model were used. (Karasar, 2002).

Study Group

A total of twenty-one (13 males-8 females) subjects doing active sports and regularly fasting in Ramadan [(Mean±SD) age: 21.04±1.39 years; stature: 171.47±9.70 cm; sports age: 6.52±4.45 years] subject have participated voluntarily.

Data Collection Tools

Sleep Behavior

In the study, sleep behavior data of the athletes (bedtime, wake-up time, total sleep time, and the views of the athletes about their sleep attitudes in Ramadan) were collected through a questionnaire created by the researchers.

Diet

By developing a nutrition form one week before Ramadan and during the first week of Ramadan, daily food consumption data were gathered. Following that, from these data, the total calorie, carbohydrate, protein, fat, and fluid consumption was estimated. BEBIS (Nutrition Data System) was used for nutritional assessment.

International Physical Activity Questionnaire (IPAQ)

IPAQ is a validated tool for determining participants' physical activity level (Craig et al., 2003). IPAQ assesses the frequency, duration, and intensity of physical activity over the previous seven days in all circumstances and calculates metabolic equivalents (MET). The weekly amount of physical exercise is represented by MET. It is determined by the frequency, duration, and intensity of physical activity over the previous seven days. Physical activity levels were determined as hours per week (MET-hours/week) using established criteria (IPAQ, 2005). Based on self-reported MET, frequency, and intensity of physical activity, people can be divided into low, moderate, and high levels of physical activity groups. Less than 600 MET-min/week of exercise was reported by participants in the inactive (sedentary, low) group, between 601 and 3,000 MET-min/week was reported by participants in the minimally active (moderate level of physical activity), and over 3,000 MET-min/week was reported by participants in the physically active (high, recommended level) group. The Turkish short version of IPAQ was used to measure the PA levels of the study's participants (Saglam et al., 2010; Ozkan et al., 2021). Evidence for construct validity, criterion validity (accelerometer-IPAQ short form) (r=0.30), and test-retest stability (r=0.69) was found in the translation and validation studies for the Turkish version for university students (Saglam et al., 2010).

Data Collection Procedure

After giving detailed information about the study. Participants were asked to fill out the Athlete Sleep Behavior form, Daily food consumption form, and International Physical Activity Level Questionnaire (IPAQ). The week before Ramadan and the first week of Ramadan were used to collect all the data. Ethics committee approval for this research was given by Yozgat Bozok University Social and Human Sciences Ethics Committee (Date: 20.07.2023, Decision No: 05/05). The study conformed to all ethical standards, and participants were informed of the study's name, subject, purpose, and use of the collected personal data for scientific purposes. Furthermore, it was noted that individuals have the right to withdraw from the study at any time during the research if they so desire.

Data Analysis

A statistical tool for the social sciences (SPSS version 20.0, SPSS Inc., Chicago, IL, USA) was used for all analyses. For the statistical study, descriptive statistics mean and

standard deviations (SD) were computed for each variable. If normality assumptions were met, paired t-tests were used to compare quantitative data (dietary intake (total calorie, liquid, protein, fat, and CHO), physical activity levels, and sleep behavior) between Ramadan (fasting) and non-Ramadan (non-fasting). The level of significance was 0.05.

Findings

A total of twenty-one (13 males-8 females) subjects doing active sports and regularly fasting in Ramadan [(X±SS) age: 21.04 ± 1.39 years; stature: 171.47 ± 9.70 cm; weight: 65.09 ± 11.11 kg; sports age: 6.52 ± 4.45 years] subject participated voluntarily.

Table 1. Sleep Behaviors of Participants Before and During Ramadan

Variable	BR (mean ± SD)	DR (mean ± SD)	t	df	P
Bedtime (24 hour)	00:45 ± 1.41	01:36 ± 2.15	-2.275 (Z)		**0.023***
Wake-up time (24 hours)	09:10 ± 1.18	10:57 ± 1.94	-4.365	20	**0.000***
Total Sleep time (min)	505.00 ± 64,23	561.60 ± 101.36	-1.983	20	0.061

BR: Before Ramadan, DR: During Ramadan

As a result of the statistical analysis, a statistically significant increase was found in the bedtime (Z= -2.275, p<0.05) and the Wake-up time (t=-4.365, p<0.001) of the athletes. However, there was no significant difference in total sleep times (t=-1.983, p>0.05) (Table 1).

At the same time, 100% of the athletes stated that sleep is important for sportive performance. 76.2% (n=16) reported that their sleep pattern was disrupted during Ramadan, and 57.1% (n=12) experienced a loss of performance due to sleep patterns during Ramadan. It was stated that 52.4% (n=11) had difficulty in training due to sleep patterns during Ramadan.

Table 2. Nutritional Behaviors of the Participants Before and During Ramadan

Variable	BR (mean ± SD)	DR (mean ± SD)	t	df	P
Total Calories (kcal/day)	1838.64 ± 739.05	1571.13 ± 556.93	1.218	20	0.238
Carbohydrate (gr/day)	217.55 ± 120.98	178.35 ± 86,67	-1.199 (Z)		0.230
Fat (gr/day)	71.81 ± 30.49	61.90 ± 24.68	1.222	20	0.236
Protein (gr/day)	74.30 ± 29.43	71.53 ± 25.89	-0.226 (Z)		0.821
Liquid (ml/day)	1239.69 ± 664.80	1561.59 ± 680.19	-1.755 (Z)		0.079

As a result of the statistical analysis, no significant difference was found in the total calorie (t=1.218), carbohydrate (Z=-1.199), fat (t= 1.222), protein (Z=-0.226), and liquid (Z=-1.755) consumption in the nutritional consumption values of the athletes (p>0.05).

Table 3. Physical Activity Behavior of Participants Before and During Ramadan

Variable	BR (mean±SD)	DR (mean±SD)	t	df	P
High-intensity Physical Activity (MET/Week)	2260.95 ± 1767.69	1506.67 ± 1461.80	-1.270 (Z)		0.204
Moderate-intensity Physical Activity (MET/Week)	682.29 ± 838.01	750.48 ± 919.82	-0.383 (Z)		0.702
Walking(MET/Week)	1881.79 ± 1613.53	570.43 ± 697.48	-3.605 (Z)		**0.000***
Sitting duration (MET/Week)	458.00 ± 731.10	278.57 ± 182.76	0.993 (Z)		0.321
Total calorie (MET/Week)	4825.02 ± 2686.97	2432.05 ± 1923.83	3.706	20	**0.001***
Number of workouts per week (Week/day)	3.33 ± 1.35	2.38 ± 1.35	4.074	20	**0.001***
Daily training time(min)	83.09 ± 35.86	51.66 ± 34.03	3.529	20	**0.002***

As a result of the statistical analysis, no significant difference was found in the high-intensity (Z=-1.270) and moderate-intensity physical activity (Z=-0.383) levels and sitting times (Z=0.993) of the athletes (p>0.05). Significant decreases were found in walking (Z=-3.605) and total calorie parameters (p<0.001). At the same time, there is a statistically significant decrease was found number of workouts per week (t=4.074, p<0.001) and daily training time (t=3.529, p<0.002).

Discussion and Conclusion

When the results obtained within the scope of this study are examined, it is seen that Ramadan causes many changes in sleep, physical activity, and nutrition characteristics. Within the parameters of the study, the most significant results were attained; it was found that the sleeping and waking hours had changed. It can be shown that the total amount of sleep time is not statistically different. In addition, there was no significant difference was found in the high-intensity, moderate-intensity physical activity and sitting times of the athletes. Significant decreases were found in walking and total calorie (MET) parameters. The number of workouts per week, and daily training time, were significantly decreased during Ramadan. Moreover, no significant difference was found in the total calorie, carbohydrate, fat, protein, and liquid consumption.

Participants in the study went to bed 51 minutes later during Ramadan and stayed in bed for an additional 1 hour 47 minutes. When the total sleep time is examined, it is seen that they sleep fifty-one minutes more during Ramadan (Table 1). Likewise, Wilson, Drust & Reilly (2009) found that the participants' bedtimes, wake-up times, and total sleep duration changed during Ramadan Bahammam et al. (2013). When the study he has done is

examined demonstrating a delay in bedtime and wake-up time during Ramadan. Similarly, Roky et al. (2001) in their study, delayed sleep during Ramadan. Karli et al. (2007) showed that the daily routine sleep duration of the participants increased during Ramadan. Lipert et al. (2021) stated that the sleep quality of the athletes deteriorated during Ramadan. In some studies (Margolis and Reed 2004; Roky et al., 2001), it has been determined that the duration of sleep at night decreases and the duration of sleep during the day increases (Tian et al., 2011).

Human circadian rhythms are fundamentally based on sleep-wake cycles, and their disruption can affect behavior and performance (Reilly & Edwards, 2007). Athletes should avoid sleep deficits and chronic sleep deprivation, which frequently go hand in hand with the lifestyle changes occurring during Ramadan (Chamari, et al., 2019). Sleep is crucial for sports performance as well as injury prevention. There are noticeable alterations in the sleeping and waking hours of the sportsmen, according to the current study previous studies looking at sleep habits throughout Ramadan.

The total calorie, carbohydrate, fat, protein, and liquid intake in this study did not differ in a manner that could be considered statistically significant (Table 2). Similar results were found in the study by Al-Hourani & Atoum (2007) where estimations of energy, carbohydrates, protein, fat, and sugar remained constant despite fewer meals being taken. This study found that overall energy intake did not differ significantly between pre-Ramadan and Ramadan, which was consistent with many other studies (Rahman et al., 2004; Norouzy et al., 2013; Karli et al., 2007; Chaouachi et al., 2009). Contrary to these studies, Amir-Hossein Memari et al. (2011) found that the total calories taken during Ramadan decreased in their study. According to Farooq et al. (2015), although there was a rise in protein and fat consumption during Ramadan, there was no change in energy usage. According to Kocaaga et al. (2019), Ramadan intermittent fasting was successful in terms of total calorie intake and meal consumption, with the exception of drink and fat intake.

When the above study results are examined, it is observed that different results are obtained. It is thought that these differences vary depending on characteristics such as eating culture, being an athlete, gender, and age. Ramadan fasting is distinguished by variations in meal frequency and scheduling. It is customary to have two meals, one before dawn (Sahour) and one shortly after dusk (Iftar). Meals are exclusively nocturnal and less frequent, which may have an impact on energy and nutrient consumption. Furthermore, experienced athletes can maintain enough energy intake as well as appropriate training loads during Ramadan fasting. Athletes who train during the Ramadan fasting should carefully periodize their training load and monitor their food intake.

In the present study, no significant difference was found in the high-intensity and moderate-intensity physical activity levels and sitting times of the athletes. Significant decreases were found in walking and total calorie parameters. At the same time, there is a statistically significant decrease was found number of workouts per week and daily training time (Table 3). The average level of physical activity was 1.54 before Ramadan and 1.51 during Ramadan, according to the study by Al-Hourani & Atoum (2007), and there was no statistically significant difference between the two. On the other hand, Kocaaga et al. (2019) found a substantial decrease in total calorie expenditure, moderate-intensity physical activity, and high-intensity physical activity during Ramadan. Additionally, Aziz, et al. (2018) discovered that Ramadan fasting had a negative impact on players' physical activity profiles during a soccer match. According to Lessan, et al. (2018), Ramadan is correlated with decreased physical activity. According to Chtourou et al. (2011), Ramadan fasting had an

impact on teenage soccer players' anaerobic and aerobic performance during the Yo-Yo, RSA, and Wingate tests. As we know that Ramadan fasting leads to changes in nocturnal sleep pattern disturbances, daytime sleepiness, physical activity, nutrition intake, meal time, and daily habits (Waterhouse et al., 2009). Due to these reasons when the above study results are examined, it is seen that different results are obtained. Athletes who maintain their total caloric and macronutrient intake, training load, body composition, and sleep time and quality throughout Ramadan are unlikely to experience significant performance declines, according to recent evidence from well-controlled research (Chaouachi et al., 2012).

In conclusion, a significant decrease was found in walking and total calorie (MET) parameters, the number of weekly training and daily training time during Ramadan. Moreover, while sleeping and waking hours varied, there was no statistically significant difference in overall sleep time. Total calorie, carbohydrate, fat, protein, and hydration intake in the participants' diets did not differ significantly from one another. In addition, no significant difference was found in the high-intensity, moderate-intensity physical activity and sitting times of the athletes before and during Ramadan.

REFERENCES

Abaidia, A. E., Daab, W., & Bouzid, M. A. (2020). Effects of Ramadan fasting on physical performance: a systematic review with meta-analysis. *Sports Medicine*, *50*(5), 1009-1026. https://doi.org/10.1007/s40279-020-01257-0

Al-Hourani, H. M., & Atoum, M. F. (2007). Body composition, nutrient intake and physical activity patterns in young women during Ramadan. *Singapore Medical Journal, 48*(10), 906-910.

Aziz, A. R., Che Muhamed, A. M., Ooi, C. H., Singh, R., & Chia, M. Y. H. (2018). Effects of Ramadan fasting on the physical activity profile of trained Muslim soccer players during a 90-minute match. *Science and Medicine in Football, 2*(1), 29-38. https://doi.org/10.1080/24733938.2017.1393550

Bahammam, A. S., Alaseem, A. M., Alzakri, A. A., & Sharif, M. M. (2013). The effects of Ramadan fasting on sleep patterns and daytime sleepiness: An objective assessment. *Journal of Research in Medical Sciences: The Official Journal of Isfahan University of Medical Sciences*, *18*(2), 127-131.

Chamari, K., Roussi, M., Bragazzi, N. L., Chaouachi, A., & Abdul, R. A. (2019). Optimizing training and competition during the month of Ramadan: Recommendations for a holistic and personalized approach for the fasting athletes. *Tunis Med, 97*(10), 1095-1103.

Chaouachi, A., Coutts, A. J., Chamari, K., Wong, D. P., Chaouachi, M., Chtara, M., Roky, R., & Amri, M. (2009). Effect of Ramadan intermittent fasting on aerobic and anaerobic performance and perception of fatigue in male elite judo athletes. *Journal of Strength & Conditioning Research, 23*(9), 2702-2709. https://doi.org/10.1519/JSC.0b013e3181bc17fc

Chaouachi, A., Leiper, J. B., Chtourou, H., Aziz, A. R., & Chamari, K. (2012). The effects of Ramadan intermittent fasting on athletic performance: recommendations for the maintenance of physical fitness. *Journal of Sports Sciences, 30*(Suppl. 1), S53-S73. https://doi.org/10.1080/02640414.2012.698297

Chtourou, H., Hammouda, O., Souissi, H., Chamari, K., Chaouachi, A., & Souissi, N. (2011). The effect of Ramadan fasting on physical performances, mood state and perceived exertion in young footballers. *Asian Journal of Sports Medicine, 2*(3), 177-185. https://doi.org/10.5812/asjsm.34757

Farooq, A., Herrera, C. P., Almudahka, F., & Mansour, R. (2015). A prospective study of the physiological and neurobehavioral effects of Ramadan fasting in preteen

and teenage boys. *Journal of the Academy of Nutrition and Dietetics, 115*(6), 889-897. https://doi.org/10.1016/j.jand.2015.02.012

IPAQ. (2005). IPAQ Research Committee Guidelines for data processing and analysis of the International Physical Activity Questionnaire (IPAQ). Consultado em, 20.

Karasar, N. (2002). Bilimsel araştırma yöntemi. 16. Basım. Nobel Yayıncılık. Ankara

Kocaaga, T., Tamer, K., Karli, U., & Yarar, H. (2019). Effects of Ramadan fasting on physical activity level and body composition in young males. *International Journal of Applied Exercise Physiology, 8*(3), 2322-3537.

Lessan, N., Saadane, I., Alkaf, B., Hambly, C., Buckley, A. J., Finer, N., Speakman, J. R., & Barakat, M. T. (2018). The effects of Ramadan fasting on activity and energy expenditure. *The American Journal of Clinical Nutrition, 107*(1), 54-61. https://doi.org/10.1093/ajcn/nqx016

Lipert, A., Kozłowski, R., Rasmus, P., Marczak, M., Timler, M., Timler, D., Kaniecka, E., Nasser, A., Ghaddar, M. & Ghaddar, A. (2021). Sleep quality and performance in professional athletes fasting during the month of Ramadan. *International Journal of Environmental Research and Public Health, 18*(13), 6890. https://doi.org/10.3390/ijerph18136890

Margolis, S. A., & Reed, R. L. (2004). Effect of religious practices of Ramadan on sleep and perceived sleepiness of medical students. *Teaching and Learning in Medicine, 16*(2), 145-149. https://doi.org/10.1207/s15328015tlm1602_5

Memari, A. H., Kordi, R., Panahi, N., Nikookar, L. R., Abdollahi, M., & Akbarnejad, A. (2011). Effect of Ramadan fasting on body composition and physical performance in female athletes. *Asian Journal of Sports Medicine, 2*(3), 161-166. https://doi.org/10.5812/asjsm.34754

Norouzy, A., Salehi, M., Philippou, E., Arabi, H., Shiva, F., Mehrnoosh, S., Mohajeri, S. M. R., Reza Mohajeri, S. A., Motaghedi Larijani, A., & Nematy, M. (2013). Effect of fasting in Ramadan on body composition and nutritional intake: a prospective study. *Journal of Human Nutrition and Dietetics, 26*(Suppl. 1), 97-104. https://doi.org/10.1111/jhn.12042

Özkan, A, Bozkuş, T., Özkan, A., Kayıhan, G. (2021). Determination of energy intake and dietary habits and their relationship with physical activity levels and healthy lifestyle behaviours of primary education and pre-service teachers. *Baltic Journal of Health and Physical Activity, 13*(4), 17-27.

https://doi.org/10.29359/BJHPA.13.4.03

Rahman, M., Rashid, M., Basher, S., Sultana, S., Nomani, M. Z. (2004). Improved serum HDL cholesterol profile among Bangladeshi male students during Ramadan fasting. *EMHJ-Eastern Mediterranean Health Journal, 10*(1-2), 131-137.

Reilly, T., & Edwards, B. (2007). Altered sleep–wake cycles and physical performance in athletes. *Physiology & Behavior, 90*(2-3), 274-284.

Roky, R., Chapotot, F., Benchekroun, M. T., Benaji, B., Hakkou, F., Elkhalifi, H., & Buguet, A. (2003). Daytime sleepiness during Ramadan intermittent fasting: polysomnographic and quantitative waking EEG study. *Journal of Sleep Research, 12*(2), 95-101.

Roky, R., Chapotot, F., Hakkou, F., Benchekroun, M. T., & Buguet, A. (2001). Sleep during Ramadan intermittent fasting. *Journal of Sleep Research, 10*(4), 319-327.

Roky, R., Herrera, C. P., & Ahmed, Q. (2012). Sleep in athletes and the effects of Ramadan. *Journal of Sports Sciences, 30*(Suppl 1), S75-S84. http://dx.doi.org/10.1080/02640414.2012.693622

Saglam, M., Arikan, H., Savci, S., Inal-Ince, D., Bosnak-Guclu, M., Karabulut, E., & Tokgozoglu, L. (2010). International physical activity questionnaire: reliability and validity of the Turkish version. *Perceptual and Motor Skills, 111*(1), 278-284. https://doi.org/10.2466/06.08.PMS.111.4.278-284

Tian, H. H., Aziz, A. R., Png, W., Wahid, M. F., Yeo, D., & Png, A. L. C. (2011). Effects of fasting during Ramadan month on cognitive function in Muslim athletes. *Asian Journal of Sports Medicine, 2*(3), 145-153. https://doi.org/10.5812/asjsm.34753

Waterhouse, J., Alabed, H., Edwards, B., & Reilly, T. (2009). Changes in sleep, mood and subjective and objective responses to physical performance during the daytime in Ramadan. *Biological Rhythm Research, 40*(5), 367-383. https://doi.org/10.1080/09291010902863438

Wilson, D., Drust, B., & Reilly, T. (2009). Is diurnal lifestyle altered during Ramadan in professional Muslim athletes?. *Biological Rhythm Research, 40*(5), 385-397. https://doi.org/10.1080/09291010903015996

International Journal of Sport Culture and Science
March 2024 : 12(1)
ISSN : 2148-1148
Doi : 10.14486/IntJSCS.2024.700

The Effect Of Organızatıonal Culture Levels Perceıved By Sports Facılıty Employees In Local And Prıvate Sectors On Job Satısfactıon

Erdem AYYILDIZ[1], Mustafa Yasar ŞAHIN[2]
Tekirdag Namık Kemal University, Tekirdag, Turkiye
https://orcid.org/0000-0002-0805-1529
[2] Gazi University, Ankara, Turkiye
https://orcid.org/0000-0002-4194-2358

Email: eayyildiz@nku.edu.tr, mysahin@gmail.com

Type: Research Article (Received: 07.10.2023 - Accepted: 19.02.2024)

Abstract

The purpose of this research is to determine the organizational culture perceptions and job satisfaction levels of sports facility employees in different sectors, to compare them in terms of demographic variables and to determine the relationship between them. 303 people working in private sports enterprises and sports facilities belonging to local governments on the Anatolian side of Istanbul participated in the study, which was a relational screening model. As data collection tools, the Job Satisfaction Scale developed by Spector (1985) and adapted into Turkish by Meydan and Basım (2010) and the Organizational Culture Scale developed by Ogbonna & Haris (2000) and adapted into Turkish by Karadeniz (2010) were used. Frequency and percentage distributions, t-test for paired groups, OneWay-ANOVA analyzes for multiple groups and Pearson Correlation analysis were used as statistical methods in evaluating the research data. In cases where the variances were not homogeneous, the Kruskal Wallis test was calculated. As a result, it was determined that the competitive and innovative culture sub-dimensions, in which the participants had a high level of organizational culture perception, were more evident. It was determined that job satisfaction levels were at medium level. As a result of the correlation analysis, a moderate positive relationship was found between organizational culture and job satisfaction. The highest relationship between job satisfaction and organizational culture sub-dimensions is in the competitive culture sub-dimension. When the findings obtained from the research were examined in terms of demographic variables, the organizational culture of the participants who were married, were in a managerial position, had low years of service, worked in the local sector, and had 3 workplaces was found to be high. According to the scores obtained on the job satisfaction scale, it is seen that the participants who are married, in a managerial position and in their local sector are higher.

Keywords: Sport, Sport sciences, Sport Management

Introduction

It is argued that job satisfaction may be the result of a behavioral approach, reflecting the individual's orientation towards attractive outcomes. This refers to the way individuals understand the degree to which positive and negative outcomes to be achieved or avoided in the future are attractive (Kroupis et al., 2019; Schmidt, 2007). Job satisfaction refers to a collection of attitudes that employees have about their jobs (Mokoena and Dhurup, 2019; Bowden, 2002).

Job satisfaction remains the most common topic examined relative to work. They are treated as both independent and dependent variables. Job satisfaction, an independent variable, is seen as the cause of other phenomena such as productivity and motivation (O'Malley, 2004). It is also a subject of wide interest for both people working in organizations and people studying them. It is one of the most frequently studied topics in organizational research. It is a central variable in the research and theory of organizational phenomena, from job design to control. Indeed, thousands of job satisfaction studies can be found in journals of organizational behavior and related fields (Spector, 1997; Abos et al., 2019).

Job satisfaction is generally related to taking part in the organization, being related to colleagues, customers, managers, attachment, motivation, tendency to slow down the work, taking over the work, etc. It is related to workplace attitudes such as These attitudes are important for creating the "atmosphere" in a workplace and jointly contributing to the formation of worker satisfaction and performance. Therefore, the overall level of job satisfaction in a given work environment can be considered a “social” variable, which in turn affects job satisfaction at the individual level (Tümen and Zeydanli, 2016). In addition, it shows that intense emotional experiences in the work environment shape employees' work-related attitudes (Kafetsios and Zampetakis, 2008). Overall satisfaction can be thought of as the average of a worker's degree of satisfaction with all aspects of the job (Bowden, 2002).

Management of sports facilities has become a profession that can be carried out full-time in local and private businesses. In this respect, for contemporary facility managers (sports managers, teachers, coaches, physical fitness program managers) to manage sports facilities and make all decisions regarding the provision of services that increase the ability of the organization or program to create and develop and raise all standards regarding the execution of physical education, recreation and sports programs. and it means leading in all these matters (Sunay, 2009).

As an economic unit, whether the business is in the private sector or the local sector; Whether single or multi-owner, individual or capital company; Whether it operates in a capitalist or socialist economic order, it has to provide a net income to the entrepreneur or the state above its expenditure on production factor (Marín-Farrona et al., 2021). There may be deviations from the main principle regarding what the level of this net income (profit) will be - especially in local businesses. But profitability and efficiency are still the basic principles. Essentially, the "purpose" or "objective" plays an important role in distinguishing social purpose charities, foundations, state organization (which, in broad terms, is the largest business) and various state organizations from the business model we will focus on (Mucuk, 2008).

Participation in physical activity provides both health and social benefits. Therefore, the importance of sports facilities that allow physical activity for the welfare of the society cannot be denied. Especially in developed countries such as Germany, efforts are made to have a

significant impact on the sports culture of the society through sports facilities. In order for sports facilities to be used effectively, employees must be specialized in their field, have a high sense of satisfaction with their job, and have a positive culture within the institution.

Management must create an environment where employees can increase their job satisfaction and have a pool of leaders who can sustain and benefit the organization through successful business results (Edgar et al., 2017) and develop trust in the organization. Organizational trust becomes the drive to integrate new employees, manage them effectively, and inspire the business to perform at its best. It is claimed that trust increases organizational performance, team performance and productivity, and has an effect on strengthening organizational commitment, justice and organizational citizenship behavior. Moreover, it is an essential component in increasing employees' job satisfaction (Ha and Lee, 2022).

The subject of this research is to examine whether there is a difference between the job satisfaction levels of local and private sector employees in sports facilities that are becoming widespread today. Although there are studies in the field of job satisfaction today, there are very few scientific studies in the field of physical education and sports. For this reason, it is thought that this study may serve as a resource for those who will conduct research on this subject in the future.

Material and Method

Population and Sample

The study population of this research consists of sports facility employees working in local government and private sports facilities on the Anatolian side of Istanbul. The sample of the study consists of 303 sports facility employees determined by random method. Demographic information are gender, age, marital status, educatinal status, sector in work and job position.

Analysis of Data

Quantitative research method was used in the research. A normality test was performed in our study. Within the scope of the research, it was determined that the kurtosis and skewness coefficients of the scores obtained from the scales varied between ±1. In other words, it was determined that the scores obtained from the scale showed a normal distribution.

Data Collection Tool

The data of this research were collected with the Personal Information Form, Job Satisfaction Scale and Organizational Culture Scale. General information about data collection tools is given under headings.

An informed consent form was used in the study. According to the consent form, the participant was asked to fill out the forms by hand in approximately 20 minutes. In addition, their approval was obtained by stating that the data would be used for academic studies and that participation in the study was voluntary.

Personal Information Form: A personal information form has been prepared to determine the gender, age, marital status, educational status of sports facility employees, the type of workplace they work in and their positions in the workplace.

Job Satisfaction Scale: In this study, the Job Satisfaction Scale developed by Spector (1985) and adapted into Turkish by Meydan (2010) was used to determine the level of job satisfaction of employees. The original form of the scale includes 36 items rated on a 6-point Likert type. Meydan (2010) adapted the scale again and, as a result of the factor analysis performed during the adaptation process, decided that 10 items should be removed from the scale. In this regard, the job satisfaction scale, which has 26 items in its final form, was also rated on a 6-point Likert type. The unidimensional structure of the scale was tested with confirmatory factor analysis. Model data fit values calculated as a result of confirmatory factor analysis (X2/df=2.02; RMSEA= 0.071; CFI=0.96; IFI=0.96; GFI=0.93) indicate that the scale items are collected in a single dimension. In order to determine the reliability of the scale, the Cronbach alpha reliability coefficient was calculated and found to be 0.91. In this context, it has been determined that the job satisfaction scale provides valid and reliable results (Meydan, 2010). Meydan (2010) determined the job satisfaction level of teachers in his research. Since the job satisfaction scale was applied to sports facility employees in this study, it was first tested whether the sports facility employees participating in the research gave reliable answers to the scale items. In this regard, the Cronbach's alpha coefficient was calculated in line with the answers given to the scale items by the 303 sports facility employees who participated in the research and was found to be 0.705. Kalaycı (2009) states that depending on the alpha (α) coefficient, the reliability of the scale can be interpreted as follows:

* If $0.00 \leq \alpha < 0.40$, the scale is unreliable.

* If $0.40 \leq \alpha < 0.60$, the scale reliability is low.

* If $0.60 \leq \alpha < 0.80$, the scale is highly reliable.

* If $0.80 \leq \alpha < 1.00$, the scale is highly reliable.

It was determined that the sports facility employees who participated in the research gave reliable answers to the job satisfaction scale items (Kalaycı, 2009).

Organizational Culture Scale: Within the scope of this study, the Organizational Culture Scale developed by Ogbonna and Haris (2000) and adapted into Turkish by Karadeniz (2010) was used to determine the organizational cultures of sports facility employees. The scale includes a total of 16 items rated on a 5-point Likert type. The items are collected in four dimensions in total. The dimensions included in the scale are as follows:

Karadeniz (2010) calculated explanatory factor analysis within the scope of the validity of the scale and determined that the items in the scale explained 71.5% of the total variance. It was determined that the factor load values of the items varied between 0.644 and 0.819. In the reliability study of the scale, the Cronbach alpha (α) coefficient was calculated as 0.90 for the entire scale. On the basis of sub-dimensions, the Cronbach alpha coefficient is 0.85 in innovative culture; 0.75 in competitive culture; 0.78 in bureaucratic culture; It was calculated as 0.87 in community culture. The organizational culture scale was found to be valid and reliable (Karadeniz, 2010). Cronbach's alpha coefficient was calculated in order to determine the reliability of the answers given by 303 sports facility employees, whose opinions were taken in this research, to the items in the organizational culture scale. The coefficient is 0.749

for innovative culture; 0.652 for competitive culture; It was calculated as 0.691 for bureaucratic culture and 0.634 for community culture. The Cronbach alpha reliability coefficient calculated for the entire scale was found to be 0.839. It was determined that sports facility employees responded reliably to the scale items.

Findings

Table 1. Distribution of employees participating in the research according to their demographic characteristics

	Categories	*f*	%
Gender	Female	136	44,9
	Male	167	55,1
Marital status	Married	140	46,2
	Single	163	53,8
Age	20 years and under	26	8,6
	21-35 age	222	73,3
	36 years and above	55	18,2
Educational Status	Primary school-secondary school	24	7,9
	High school	67	22,1
	Associate Degree	22	7,3
	Bachelor degree	168	55,4
	Master	22	7,3
Sector in which he/she works	Local Sector	132	43,6
	Private sector	171	56,4
Job position	Manager	30	9,9
	Trainer	130	42,9
	Front Office Staff	87	28,7
	Service staff	56	18,5
Toplam		303	100,0

Looking at Table.1, it can be seen that the frequency distributions are examined according to the demographic characteristics of sports facility employees. When the distribution of youth leaders by gender is examined, it is seen that there are 136 (44.9%) women and 167 (55.1%) men. When the distribution of sports facility employees according to their marital status is examined, 140 (46.2%) are married and 163 (53.8%) are single. When we look at the distribution of sports facility employees according to their age levels, there are 26 (8.6%) employees who are "20 and under", 222 (73.3%) employees who are "21-35" and "36 and over". There are 55 (18.2%) employees at the age level.

Job satisfaction scale and organizational culture scale were applied to the sports facility employees participating in the research. Descriptive statistics calculated based on the participants' answers to the scale items are shown below.

It was determined whether the job satisfaction and organizational culture of the employees participating in the research showed a significant change according to their gender, age, marital status, educational status, the type of sector they work in, the workplace of the

institution they work for, years of service, position in the workplace, and welfare level. According to the job satisfaction scale of the study's findings; There is a significant difference according to the demographic information of marital status, institution and position. According to the findings of the organizational culture variable; It has been determined that there is a significant difference according to the variables of marital status, institution, position, number of workplaces and years of service. Information about these findings is given below.

Table 2. Descriptive statistics calculated to determine the job satisfaction and organizational culture levels of sports facility employees

Ölçek	Number of items	N	Minimum	Maximum	$\bar{X}$	SS
Job satisfaction	26	303	60	142	100	14,5
Organization culture	16	303	31	80	55,1	10,3

When the information in Table 4.1 was examined, it was determined that the job satisfaction scores of sports facility employees varied between 60.00 and 142.00. The average job satisfaction score of the employees participating in the research was calculated as 100.07±14.55. The calculated average value shows that the job satisfaction of the sports facility employees participating in the research is generally at an average level. It is seen that organizational culture scores vary between 31.00 and 80.00. The average organizational culture scores of the employees participating in the research were calculated as 55.12±10.34. The calculated average value shows that the organizational culture of sports facility employees is above the average value. In other words, the organizational culture of the sports facility employees whose opinions were taken within the scope of the research is above average.

Table 3. T-test results of sports facility employees' job satisfaction scale and organizational culture scale on unrelated measurements calculated according to marital status

Scale	Marital status	N	$\bar{X}$	SS	p
Organization culture	Married	140	57,5	10,1	0,000*
	Single	163	53,0	10,0	
Innovative Culture Sub-Dimension	Married	140	14,5	3,4	0,002*
	Single	163	13,2	3,5	
Competitive Culture Sub-Dimension	Married	140	13,8	3,6	0,001*
	Single	163	12,4	3,2	
Bureaucratic Culture Sub-Dimension	Married	140	15,0	3,1	0,004*
	Single	163	14,0	3,2	
Job Satisfaction Scale	Married	140	103,1	15,2	
	Single	163	97,4	13,4	0,001*

p<0,05*

When the information in Table 3 was examined, it was determined that there was a significant difference in the job satisfaction scale and organizational culture and the sub-dimensions of organizational culture, namely innovative culture, competitive culture and bureaucratic culture, according to the marital status of sports facility employees ($p < 0.05$).

Table 4. T-test results on unrelated measurements of sports facility employees' organizational culture and job satisfaction calculated according to the characteristics of the institution they work for

Scale	Sector	N	$\bar{X}$	SS	p
Organization culture	Private	132	52,7	10,7	0,000*
	Local	171	56,9	9,66	
Innovative Culture Sub-Dimension	Private	132	13,1	3,49	0,003*
	Local	171	14,3	3,55	
Competitive Culture Sub-Dimension	Private	132	12,4	3,42	0,005*
	Local	171	13,5	3,47	
Bureaucratic Culture Sub-Dimension	Private	132	13,7	3,21	0,000*
	Local	171	15,0	3,09	
Community Culture	Private	132	13,3	3,80	0,194
	Local	171	13,9	3,06	
Job satisfaction	Private	132	96,6	13,3	
	Local	171	102,7	14,8	3,662

p<0,05*

When the information in Table 4 was examined, it was determined that sports facility employees showed a significant difference in the job satisfaction scale and organizational culture, and the sub-dimensions of organizational culture, namely innovative culture, competitive culture and bureaucratic culture, depending on the characteristics of the institution (p <0.05).

Table 5. Descriptive statistics calculated regarding organizational culture and job satisfaction of sports facility employees based on their positions

Scale	Job Position	N	Min	Max	$\bar{X}$	SS	p
Organization culture	Manager	30	38,0	75,0	60,0	9,76	0,024*
	Trainer	130	32,0	75,0	54,7	9,63	
	Front Office Staff	87	31,0	74,0	53,4	10,5	
	Service staff	56	34,0	80,0	55,9	11,2	
Innovative Culture Sub-Dimension	Manager	30	10,0	20,0	15,8	3,34	0,009*
	Trainer	130	5,00	19,0	13,4	3,41	
	Front Office Staff	87	5,00	20,0	13,7	3,52	
	Service staff	56	5,00	20,0	13,8	3,82	
Competitive Culture Sub-Dimension	Manager	30	10,0	19,0	14,7	3,19	0,022*
	Trainer	130	4,00	20,0	12,8	3,53	
	Front Office Staff	87	4,00	19,0	12,6	3,47	
Job Satisfaction Scale	Manager	30	78,0	134	108,2	15,7	0,004*
	Trainer	130	66,0	138	98,9	14,4	
	Front Office Staff	87	60,0	142	100,8	14,1	
	Service staff	56	62,0	129	97,0	13,5	

p<0,05*

When the information in Table 5 was examined, it was determined that sports facility employees showed a significant difference in the job satisfaction scale and organizational culture, and the innovative culture and competitive culture sub-dimensions of the organizational culture sub-dimensions, depending on the position they work in (p < 0.05).

Table 6. Descriptive statistics calculated regarding organizational cultures of sports facility employees based on the number of workplaces they work in

Scale	What is the	N	Min	Max	$\bar{X}$	SS	p

	institution you work for at your workplace?						
Organization culture	1.	44	35,0	74,0	54,3	9,89	0,024*
	2.	48	34,0	80,0	56,5	11,7	
	3.	66	32,0	80,0	57,2	10,6	
	4.	74	34,0	76,0	53,7	9,87	
	5th and above	71	31,0	73,0	54,0	9,65	

When the information in Table 5 was examined, it was determined that there was a significant difference in the organizational culture levels of sports facility employees depending on the number of institutions they worked for ($p < 0.05$).

Table 6. Descriptive statistics calculated for organizational culture sub-dimensions based on years of service of sports facility employees

Scale	**Years of service**	**N**	**Min**	**Max**	$\bar{X}$	**SS**	**p**
Organization culture	less than 1 year	37	38,0	75,0	59,6	10,3	0,037*
	1-4 years	89	31,0	80,0	53,9	10,6	
	5-8 years	109	32,0	75,0	54,8	9,50	
	9 year ve above	68	33,0	80,0	54,6	10,7	
Innovative culture Sub-Dimension	less than 1 year	37	8,00	20,0	15,0	3,19	0,017*
	1-4 years	89	5,00	20,0	13,0	3,85	
	5-8 years	109	5,00	20,0	14,1	3,40	
	9 year ve above	68	8,00	20,0	13,7	3,46	

p<0,05

When the information in Table 6 was examined, it was determined that there was a significant difference in the organizational culture and innovative culture sub-dimensions of the sports facility employees according to their years of service ($p < 0.05$).

Table 7. Relationships between organizational culture sub-dimensions and job satisfaction of sports facility employees

Scale	**Values**	**Innovative culture**	**Competitive culture**	**Bureaucratic culture**	**Community culture**	**Job satisfaction**
Innovative culture	r	1	,383*	,346*	,409*	,301*
	p		,000	,000	,000	,000
	N	303	303	303	303	303
Competitive culture	r	,383*	1	,480*	,467*	,354*
	p	,000		,000	,000	,000
	N	303	303	303	303	303
Bureaucratic culture	r	,346*	,480*	1	,503*	,280*
	p	,000	,000		,000	,000
	N	303	303	303	303	303

Community culture	r	,409*	,467*	,503*	1	,248*
	p	,000	,000	,000		,000
	N	303	303	303	303	303
Job satisfaction	r	,301*	,354*	,280*	,248*	1
	p	,000	,000	,000	,000	
	N	303	303	303	303	303

Considering the information in Table 7, it was determined that there were positive and moderate relationships between the job satisfaction of sports facility employees and innovative culture (r=0.354; p<0.01) and competitive culture (r=0.301; p<0.01).

It was determined that there were positive and low-level relationships between bureaucratic culture (r=0.280; p<0.01) and community culture (r=0.248; p<0.01) and job satisfaction of the sports facility employees participating in the research.

Discussion and Conclusion

In this part of the study, which was conducted to determine the job satisfaction levels of personnel working in local governments and private sports enterprises and to determine their differences according to demographic variables, the data obtained from the scale used were interpreted and discussed on a literature basis.

Organizational culture is very important in achieving results in businesses (Cicea et al., 2022). Especially in order to achieve a corporate structure, importance should be given to organizational culture and academic studies should be carried out (Mingaleva et al., 2022). In addition, job satisfaction can provide a significant advantage on the road to success in environments where organizational culture is created (Lee et all., 2022).

Organization Culture

It appears that organizational culture is perceived at a high level by employees. Organizations can successfully overcome today's rapid change process, increase their effectiveness, and ensure employee loyalty to the business only by having a strong organizational culture. Organizational culture is the common values that hold organizational members together. Organizational culture regulates attitudes, behaviors and relations of information, values, norms collected in the memory of the organization, relations with the environment, activities, in other words, organizational life (Sevinç et al., 2001). Based on this information, the high level of organizational culture in the sports facilities included in the research can be considered as an important element in terms of organizational efficiency and performance.

In our study, the organizational culture of the sports facility employees participating in the research varies significantly depending on the institution they work for. When the results were examined, it was determined that people working locally had a higher level of organizational culture than people working in the private sector. Likewise, Yıldırım (2013) concluded in his

study that there is a significant difference in the local and private sectors. Karakışla (2012) did not find a statistical difference between the local and private sectors in his study.

When these results are examined, it is thought that situations such as the diversity of the service sector, manager attitudes, working conditions and sectoral differences affect the level of perception of organizational culture among employees.

It was determined that the organizational cultures of the sports facility employees participating in the research showed a significant change depending on the number of institutions they worked for. When the results are examined, the organizational culture of the employees whose current workplace is the first institution they work for; It was determined that the level of employment in the workplace was lower than that of people working in the second, third, fourth, fifth and subsequent workplaces. When the literature was scanned, no findings were found regarding the number of workplaces in which employees work. When the results are examined, it is thought that those who work in their first workplace are just starting their business life and try to adapt to business life in this process, causing the organizational culture to be lower than those working in their second and third workplace.

It has been determined that the organizational cultures of sports facility employees show a significant change according to their years of service. When the results are examined, the organizational cultures of employees with less than 1 year of service; It was found that this rate was higher than that of employees with 1-4 years of service, 5-8 years, 9 years and above. In parallel, Yıldırım (2013) and Köse (2014) found in their studies that organizational cultures show significant changes according to the years of service of employees. However, in his study, Sönmez (2006) concluded that teachers' perceptions did not differ according to their years of professional service. When these results are examined, a new person entering the organization makes an effort to include himself in the organization. Since this effort is a process of adapting to the organizational culture within the institution and showing that they belong to this institution, employees who have newly joined the organization may have a higher organizational culture than others during this process. In addition, it was determined that the innovative cultures of the participants showed a significant difference according to their years of service. As a result of the calculation, the innovative cultures of employees with 1-4 years of service; It was determined that the level of service was lower than that of employees with less than one year of service and 5-8 years. When the results are examined, the adaptation period of an employee starting a new job in a company can be difficult at first. As a result, it is thought that employees with 1-4 years of service who are better adapted to the business can follow the change better and are more open to innovations. In addition, it is thought that employees with 5-8 years of service have a less innovative culture within the company than employees with 1-4 years of service, as they do not have an adaptation period.

It is seen that the organizational cultures of the participants whose opinions were taken within the scope of the research show significant changes depending on the positions they work in. In his study, Köse (2014), which supports our study, concluded that there is a significant difference between the organizational culture and working position variable. However,

Karadeniz (2010) concluded in his study that there is no significant difference in organizational culture between managers, civil servants and technical personnel. These different results obtained according to the positions of the employees are thought to indicate that the employees who are more controlled by their managers in the organization have a lower organizational culture than the managers. On the other hand, it seems that the organizational culture is perceived equally among employees in businesses that are aware of their duties and responsibilities and require little supervision.

Job satisfaction

It was determined that the job satisfaction of the employees participating in the research did not differ significantly according to their gender. When the literature was reviewed, İşcan and Timuroğlu (2007) and Rosenfeld et al. (2004) concluded in their studies that there was no significant difference between gender in job satisfaction in organizations. However, Okpara et al. (2005) and Gumasing and Llo (2023), in their study, found that when the differences in job satisfaction levels were compared based on gender, women's job satisfaction levels were lower than men. In addition, İşcan and Sayın (2010) concluded in their study that female employees have higher job satisfaction regarding human relations than male employees. In light of these results, factors such as the perception that there is a performance difference between men and women despite doing the same job within businesses and giving more priority to one group may cause one party to be less satisfied with the work done by the other.

It was determined that the job satisfaction of the sports facility employees participating in the research did not show a significant change according to their age. When the literature was reviewed, Leppel et al. (2012) tried to understand the factors affecting the job satisfaction of the aging workforce and the importance of job training for older employees, and concluded that there was a significant difference between age and job satisfaction in their study. This is due to the aging population of some countries, and it can be said that studies conducted on the elderly population have provided them with positive discrimination, which has led to increased job satisfaction. However, since such a situation does not exist in our country, it is extremely normal that there is no significant relationship between age and job satisfaction. Yerlisu and Çelenk's (2008) study on job satisfaction supports both our study and this result.

According to the marital status of the employees participating in the research, it is seen that the job satisfaction of the employees varies significantly according to their marital status. When the results were examined, it was determined that married employees had higher levels of organizational culture and job satisfaction than single employees. In parallel with our study, Özaydın and Özdemir (2014) concluded in their study that the satisfaction level of married employees is higher than single employees. However, in their studies, Kargün (2011) and Leppel et al. (2012) did not find a statistically significant difference between the marital status of employees and their job satisfaction levels. In addition, according to Özaydın and Özdemir (2014), married employees and single employees; It is thought that the absence of a significant difference in terms of satisfaction is a consistent result since there are no factors that can be considered an advantage or disadvantage in terms of salary, title and other issues.

Okpara (2007) emphasizes that in order to increase employee satisfaction, family problems and their effects on employees' behavior should be understood. When the results are examined, the fact that single employees can change jobs more easily due to their lack of family responsibilities can be stated as a reason for the decrease in satisfaction level.

It has been determined that the job satisfaction of the employees of this sports facility does not show a significant change according to their education level. When a literature search was conducted, Çimen et al. (2012) concluded in their study of employees in private care centers that there was no significant difference in job satisfaction in educational status. Likewise, Leppel et al. (2012) and Villa and Garcia-Mora (2005) support this study in their studies. However, İşcan and Sayın (2010) concluded in their study that as the level of education increases, job satisfaction will increase. According to Incir (1990), one of the most important individual factors affecting job satisfaction is education. What is important here is to find a balance between factors such as knowledge, work values, aspiration levels, organizational expectations, and the environment and opportunities provided by the work. For example, it is known that in some jobs, employees with higher education are less satisfied than employees with secondary, high school and primary school education. However, our study shows that educational status does not have a significant change in job satisfaction. The reason for this is that in today's businesses, the expectations of employees are at the same level according to their education level, and as a result, it affects the job satisfaction of employees at the same level.

It shows that the job satisfaction of sports facility employees participating in the research varies significantly depending on the institution they work for. When the results were examined, it was determined that the job satisfaction of people working locally was higher than those working in the private sector. In his study, Yıldırım (2013) found a difference between organizational culture and employees in the local and private sectors and showed parallelism with our study. Villa and Garcia-Mora (2005) suggest that local sector workers are likely to be more satisfied with their jobs because they serve the local interest and their level of uncertainty in their jobs is reduced. However, in Karakışla's (2012) study titled "Job Satisfaction and Organizational Culture Perceptions of Nurses Working in the Local and Private Sector", it is seen that nurses working in the private sector have higher levels of organizational culture and job satisfaction than nurses working in the local sector. In another study, Leppel et al. (2012) found no significant difference in job satisfaction in the local and private sectors. When these results are examined, it is clearly seen that differences between sectors affect organizational culture and job satisfaction. These different results experienced between different sectors may cause differences in job satisfaction between sectors due to the diversity of working conditions, expectations and wishes of employees.

It is seen that the job satisfaction of the participants whose opinions were taken within the scope of the research varies significantly depending on the positions they work in. When the results are examined, people working as managers; It has been determined that their organizational culture and job satisfaction are at higher levels than those who work as coaches and front office employees. Likewise, İşcan and Sayın (2010) concluded in their study that

people in the management of the business have a higher level of job satisfaction perception compared to technical personnel. However, in the study conducted by Özdemir and Özaydın (2014), when the sub-dimensions and overall job satisfaction scale were examined, it was concluded that there was no significant difference in the job satisfaction of bank personnel according to the unit they worked in. The reason why the results differ is that people working at the managerial level embrace their jobs more and spread them throughout the organization, and since this feeling of satisfaction is the starting point, the job satisfaction of those working in managerial positions is expected to be higher. However, the perception level of job satisfaction does not differ in businesses where the manager does not interfere much with the employees and everyone is aware of their duties and responsibilities.

As a result, it is seen that the organizational culture and job satisfaction of the employees are above average. This result indicates that organizational culture and job satisfaction are important for the efficient operation of sports facilities in both public institutions and the private sector.

Conclusion And Recommendations

- It is seen that the job satisfaction of sports facility employees participating in the research does not show a significant change according to the gender of the employees.
- It was determined that the job satisfaction of the sports facility employees participating in the research did not differ significantly according to their age.
- It was determined that the job satisfaction of the sports facility employees participating in the research showed a significant change according to their marital status.
- It was determined that the organizational cultures did not show a significant change according to the education levels of the sports facility employees participating in the research.
- It has been determined that the job satisfaction of sports facility employees participating in the research varies significantly depending on the institution they work for.
- It has been determined that the job satisfaction of sports facility employees participating in the research varies significantly depending on the positions they work in.

Conducting this study in other provinces and regions will make significant contributions as geographical features may differ due to cultural differences. In addition, making the working hours of sports facility employees in the private sector more suitable and their wages more satisfactory will contribute positively to increasing job satisfaction.

This article was produced from the master's thesis. It was also presented as a poster presentation at the 15th International Sports Sciences Congress in 2017.

REFERENCES

Abós, Á., Haerens, L., Sevil-Serrano, J., Morbée, S., Julián, J. A., & García-González, L. (2019). Does the level of motivation of physical education teachers matter in terms of job satisfaction and emotional exhaustion? A person-centered examination based on self-determination theory. International journal of environmental research and public health, 16(16), 2839.

Akpınar, Ö. (2015) *Liderlerin İletişim becerilerinin örgüt kültürü oluşturmadaki etkisiyle ilgili yönetici ve çalışanların algıları*. Yüksek Lisans Tezi, Türk Hava Kurumu Üniversitesi Sosyal Bilimler Enstitüsü, Ankara, 151.

Bowden, A. G. (2002). *Collaborative Leadership in Middle Schools and Teacher Job Satisfaction: A Search For Relationships*. Doctoral Dissertation University of San Diego, USA, 19.

Cicea, C., Ţurlea, C., Marinescu, C., Pintilie, N. (2022). Organizational culture: a concept captive between determinants and its own power of influence. *Sustainability*, *14*(4), 2021.

Çimen, M., Şahin, B., Akbolat, M., Işık, O. (2012). Özel bakım merkezinde çalışan personelin tükenmişlik ve iş doyum düzeylerine yönelik bir çalışma. *Acıbadem Üniversitesi Sağlık Bilimleri Dergisi*, *3*(1).

Edgar, F., Geare, A., Saunders, D., Beacker, M., & Faanunu, I. (2017). A transformative service research agenda: A study of workers' well-being. *The Service Industries Journal*, *37*(1), 84-104.

Gumasing, M. J. J., & Ilo, C. K. K. (2023). The impact of job satisfaction on creating a sustainable workplace: an empirical analysis of organizational commitment and lifestyle behavior. *Sustainability*, *15*(13), 10283.

Ha, J. C., Lee, J. W. (2022). Realization of a sustainable high-performance organization through procedural justice: the dual mediating role of organizational trust and organizational commitment. *Sustainability*, *14*(3), 1259.

İncir, G. (1990). *Çalışanların iş doyumu üzerine bir inceleme*. Ankara: Milli Prodüktivite Merkezi Yayınları, 53.

İşcan, Ö. F., Timuroğlu, M. K. (2007). Örgüt kültürünün iş tatmini üzerindeki etkisi ve bir uygulama. *Atatürk Üniversitesi İktisadi ve İdari Bilimler Dergisi*, *21*(1), 119-135.

İşcan, Ö. F., Sayın, U. (2010). Örgütsel adalet, iş tatmini ve örgütsel güven arasındaki ilişki. *Atatürk Üniversitesi İktisadi ve İdari Bilimler Dergisi*, 24(4).

Kalaycı, Ş. (2009). SPSS uygulamalı çok değişkenli istatistik uygulamaları. *Ankara: Asil Yayınevi*, 39-50.

Kafetsios, K., Zampetakis, L. A. (2008). Emotional intelligence and job satisfaction: Testing the mediatory role of positive and negative affect at work. *Personality and individual differences*, *44*(3), 712-722.

Karadeniz, D. (2010). *Örgüt kültürünün örgütsel bağlılık ve örgütte kalma niyeti açısından incelenmesi* (Master's thesis, Sosyal Bilimler Enstitüsü).

Karakışla, Y. (2012). *Kamu ve özel hastanelerde çalışan hemşirelerin iş doyumu ve örgüt kültürü algıları.* Yayınlanmış Yüksek Lisans Tezi, Haliç Üniversitesi, Sağlık Bilimleri Enstitüsü, İstanbul.

Kargün, M. (2011). *Futbol hakemlerinin iş tatmini ve mesleki tükenmişlik düzeylerinin çeşitli faktörler açısından incelenmesi*. Yayınlanmış Yüksek Lisans Tezi, İnönü Üniversitesi Sağlık Bilimleri Enstitüsü, Malatya.

Kroupis, I., Kouli, O., Kourtessis, T. (2019). Physical Education Teacher's Job Satisfaction and Burnout Levels in Relation to School's Sport Facilities. *International Journal of Instruction*, *12*(4), 579-592.

Köse, O. (2014). *Örgüt kültürü ve örgütsel bağlılık arasındaki ilişkinin incelenmesi: bir kamu kurumunda alan araştırması*. Yayınlanmış Doktora Tezi, Sakarya Üniversitesi, Sosyal Bilimler Enstitüsü, Sakarya.

Marín-Farrona, M. J., León-Jiménez, M., García-Unanue, J., Gallardo, L., Liguori, G., & López-Fernández, J. (2021). Influence of non-occupational physical activity on burnout syndrome, job satisfaction, stress and recovery in fitness professionals. International Journal of Environmental Research and Public Health, 18(18), 9489.

Lee, B., Lee, C., Choi, I., Kim, J. (2022). Analyzing determinants of job satisfaction based on two-factor theory. *Sustainability*, *14*(19), 12557.

Leppel, K., Brucker, E., Cochran, J. (2012). The importance of job training to job satisfaction of older workers. *Journal of Aging Social Policy*, *24*(1), 70, 73.

Meydan C.H., Basım H.N., (2010*) Örgüt kültürü, örgütsel güç ve örgütsel adalet algılarının bireyin iş tatmini ve örgüte bağlılığı üzerine etkisi: Kamuda bir araştırma*. Yayınlanmış Doktora Tezi. Ankara: Kara Harp Okulu Savunma Bilimleri Enstitüsü.

Mingaleva, Z., Shironina, E., Lobova, E., Olenev, V., Plyusnina, L., & Oborina, A. (2022). Organizational culture management as an element of innovative and sustainable development of enterprises. Sustainability, 14(10), 6289.

Mokoena, B. A., Dhurup, M. (2019). Self-efficacy, organisational commitment, job satisfaction and satisfaction with life relationships: A study among amateur sport coaches in South Africa. *International Journal of Social Sciences and Humanity Studies*, *11*(1), 19-34.

Mucuk, İ. (2008). *Modern işletmecilik* (On Altıncı Baskı), İstanbul: Türkmen Kitapevi, 25, 26.

Ogbonna, E., & Harris, L. C. (2000). Leadership style, organizational culture and performance: empirical evidence from UK companies. *international Journal of human resource management*, *11*(4), 766-788.

O'Malley, R. J. (2004). *a study of perceived job satisfaction factors among superintendents in two new Jersey counties*. Doctoral Dissertation, Seton Hall University, New Jersey, 16.

Okpara, J. O., Squillace, M., Erondu, E. A. (2005). Gender differences and job satisfaction: A study of university teachers in The United States. *Women in Management Review*, *20*(3), 177-190.

Özaydın, M. M., Özdemir, Ö. (2014). Çalışanların bireysel özelliklerinin iş tatmini üzerindeki etkileri: bir kamu bankası örneği, *İşletme Araştırmaları Dergisi*, 251-281.

Schmidt, S. W. (2007). The relationship between satisfaction with workplace training and overall job satisfaction. *Human Resource Development Quarterly*, *18*(4), 483.

Sönmez, S. (2006). Toplumsal değişme ve öğretmen. *Atatürk Üniversitesi Kazım Karabekir Eğitim Fakültesi Dergisi*, (13), 301-310.

Spector, P. E. (1997). *Job satisfaction*. USA: Sage Publications, 1, 5.

Sunay, H. (2009). *Spor yönetimi* (1. Baskı). Ankara: Gazi Kitabevi, 326, 327.

Vila, L. E., García-Mora, B. (2005). Education and the determinants of job satisfaction. *Education Economics*, *13*(4), 421.

Tumen, S., Zeydanli, T. (2016). Social interactions in job satisfaction. *International Journal of Manpower*, *37*(3), 427.

Yerlisu, T., Çelenk, B. (2008). Liglerde görev yapan voleybol antrenörlerinin iş doyum düzeylerinin değerlendirilmesi. *Spormetre Beden Eğitimi ve Spor Bilimleri Dergisi, 6*(29), 87-93.

Yıldırım, C. (2013) *Örgüt külütürü ve insan kaynakları yönetimi arasındaki ilişki: kamu ve özel sektör bankacılığında bir ilişki*. Yüksek Lisans Tezi, Atatürk Üniversitesi Sosyal Bilimler Enstitüsü, Erzurum, 115, 117.

International Journal of Sport Culture and Science
March 2024 : 12(1)
ISSN : 2148-1148
Doi : 10.14486/IntJSCS.2024.701

The Sport Applications and Implementations of Augmented Reality(AR) Technologies

Hakan ATEŞ[1]
[1]Technische Hochschule Deggendorf, Deggendorf, Almanya
https://orcid.org/0000-0001-5855-2009
Email: hakan.ates@stud.th-deg.de

Type: Review Article (Received: 29.09.2022 - Accepted: 29.02.2024)

Abstract:

New generation digital technologies are being applied in new areas every day. Augmented Reality (AR) technology is already being actively used in many different sectors from healthcare to art and education. Recently, studies about AR technologies supported by Artificial Intelligence (AI) were detected. In this study, AR technologies used in sports were studied and research was carried out on the steps of implementation and application with Unity software and briefly demonstrated. In addition, the first AR applications in sports were analysed and information about their development processes was given. Then, AR development software development kits are explained. In addition, some researches in the literature about athletes and AR applications are also mentioned in this study. Information was also given about Unity Mars, a special application development software for AR, which will be published in the following years.

Keywords: Augmented reality, AR, Sports informatics, AR applications, Unity, AI

Introduction:

Mainly, Augmented Reality (AR) is a technology that overlays computer generated visuals on real world images. So it is mixture of real world and virtual images (Goebert, 2020).

As seen in Figure 1, AR technologies are used in many different ways in professional sports. AR technologies such as "FoxTrack" AR technology in ice hockey to make it easier for spectators to follow the ball, "Hawkeye" to accurately detect points in tennis, and different AR technologies are actively used in different sports branches. All of that applications depend on sensing from environment and software processes (Cavallaro, 1997).

Figure 1. Different Broadcast AR Sport Applications

AR technologies used in sports can be classified in 4 classes. They are classified as “Head-Mounted Display AR, Projector Based AR, Broadcast AR and Smartphone-Based AR” (Goebert, 2020).

According to a study and survey conducted in Nuremberg, 53% of 227 athletes said that AR-like technologies could be useful in sports training. In this study, some sample AR sports applications are proposed such as combinations of single player training with AR, game object tracking (e.g. the ball in hockey or football). Another sample is the coach can analyze the team and give advices or commands inside of AR helmet (Gradl et al., 2016).

In another study, the relationship between Artificial Intelligence (AI) and AR in sports was investigated. According to the real world applications in sport field, it is stated that AI works for data collection and processing in the background, while AR is a tool for its representation (Victor et al., 2023).

In another review article, the guide AR project for the sport of climbing by projectors is mentioned. In this project, a guide route is created according to the previously collected and processed climbing visuals. Then guide route is projected to the real climbing track with the AR projector system. Thus provide AR guidence system to athletes (Bozyer, 2015).

In an alternative literature study, the applications of AR tools in sport and sport education were analysed. In general, it was determined that AR technologies have a positive effect on training of athletes (Soltani & Morice, 2020).

Aim of this study is improving general technical understanding about AR application development processes with sample applications. Therefore, various examples of AR sports

applications are shown and information about their development processes is given. In addition, the use of Unity software used to develop AR applications has been researched and some information has been given.

Method:

There are 3 different AR development software kits published by Google, Apple and Microsoft for these different classes of AR technologies. ARKit for Apple devices was released in 2015. Microsoft Hololens was announced in 2015. ARCore was annnounced and pre realesed in 2018. Unity software supports all these AR kits and platforms.

In this software section, the AR winter olympics article and app published in "The New York Times" are taken as an example. As seen in Figure 2. That iOS app provides, 3D models of athletes are displayed on the smartphone with camera environment and also information about the athletes is shared. In such application as this, the movements of the athletes can be recorded with “Motion Capture (MOCAP)” technology and processed on the computer with "Unity" software for various AR platforms.

Figure 2. Sample iOS AR Application about 2018 Winter Olympics

Motion Capture (MOCAP) technology was first used in the 90s. There are 3 different motion capture technologies. First technique of motion capture is mechanical one and depend on the use of an exoskeleton. Each joint is connected to an angular encoder devices. Second technique of motion capture is magnetic motion capture with electro magenta field type sensors to determine positions. Third technique of motion capture is optical motion capture with synchronized cameras (Rahul, 2018).

3D athlete models recorded with MOCAP can be processed with Unity and developed as an AR application. Unity software has a user-friendly interface. On the left side there is a

hierarchy section for application objects. At the bottom, there is a bar with the details of various assests and worked objects. On the right side there is a bar for detailed configurations.

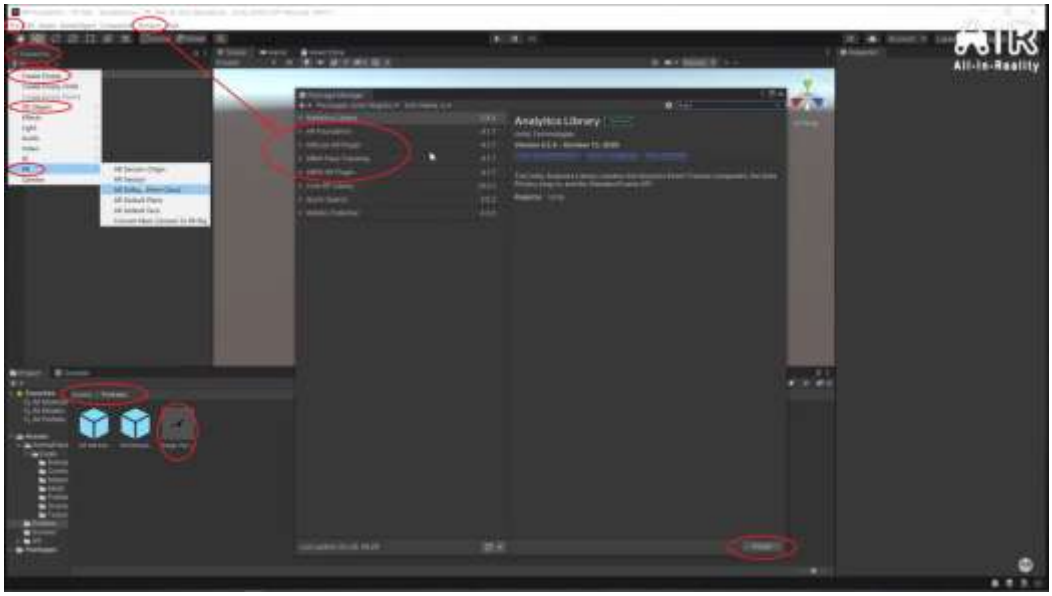

Figure 3. Unity Interface and Related Settings for AR Applications

In order to install AR-related packages in Unity software, the "Window/Package Manager/Unity Registry" section on the top left can be selected and the relevant AR-XR contents can be downloaded and installed from the menu that opens. AR Foundation is Unity's own AR package. ARKit is the package for Apple devices. ARCore is developed for android devices.

As seen in Figure 2, with the menu that comes by right clicking on the “Hierarchy” section on the left, objects can be added with "Create Empty" or "3D Object". To configure these objects, it may be necessary to drag them from “Hierarchy” to the bottom "Assest" bar.

When we click right click in the “hierarchy”, an options menu appears, Time periods, sessions can be added by clicking “XR/Session”.

With the bar at the left bottom, various assests and 3D objects could be configured. There are important options such as scenes, textures and materials in this left bottom bar.

From the "File/Build Settings" section at the top left, the Android and iOS platform can be selected as the output-output device and the AR unity application could run on the phone with the "Run in Device" option.

For the see how AR application works on smartphone; click the "File/Build Settings" section at the top left. In this section, Android or iOS platform can be selected as the output device and then AR unity application could run on the phone automatically when you click "Run Device/Build and Run" options.

Additionally, in june 2020 Unity Technologies announced “Unity MARS” for AR developers. With this platform, developing advanced AR contents will be easier in the future. It has more compact and accessible interface than normal Unity interface.

Assesment and Result:

AR technology application areas continue to diversify and increase in recent years. Today, AR technology is used in many different areas from different television broadcasts to smartphone applications.

In the near future, AR applications are expected to become more diversified because AR application development tools are becoming easier and more accessible. Beside, AI technologies start to support AR technologies. These situations will make AR technologies more accessible and feasible for the end user. Just as smart technologies become widespread in a short time, it is predicted that AR technologies will accelerate in the coming years and find different usage areas.

In this study, AR sports applications have been researched and how these applications can be developed has been studied and examined. Some basic information for AR application development steps with Unity software, it is also demonstrated.

REFERENCES

Bozyer, Z. (2015). Augmented Reality in Sports: Today and Tomorrow. *International journal of Science Culture and Sport*, 3, 314-325.

Goebert, C. (2020). Augmented Reality in Sport Marketing: Uses and Directions. *Sports Innovation Journal*, 1, 134-151.

Gradl, S., Eskofier, D., Mutschler, C., Otto, S. (2016). Virtual and Augmented Reality in Sports - An Overview and Acceptance Study. *ACM International Joint Conference*, 1, 885-888.

Rahul,M. (2018). Review on Motion Capture Technology. *Global Journal of Computer Science and Technology: Graphics & Vision*, 18(1), 22-26.

R. Cavallaro, (1997). The FoxTrax Hockey Puck Tracking System. IEEE *Computer Graphics and Applications*, 17, 6-12.

Silva, A., Albuquerque, G., Medeiros, F. (2021). A Review on Augmented Reality applied to Sports. *16th Iberian Conference on Information Systems and Technologies*, 1-6.

Soltani, P., Morice, H.P.A. (2020). Augmented reality tools for sports education and training, *Computers & Education*, 155, 103923.

Victor C.R.A., Carlgren D., Holash, D.R., Katz, L. (2023). Technological Breakthroughs in Sport: Current Practice and Future Potential of Artificial Intelligence, Virtual Reality, Augmented Reality, and Modern Data Visualization in Performance Analysis, *Applied Sciences*, 23, 12965.

URL-1: https://en.wikipedia.org/wiki/List_of_augmented_reality_software , (Access Date: 02.07.2022).

URL-2: https://sporttomorrow.com/10-great-ways-ar-will-impact-the-world-of-sports/, (Access Date: 02.07.2022).

URL-3: https://www.youtube.com/watch?v=pRjXRX9CEjI, (Access Date: 27.06.2022).

URL-4: https://www.youtube.com/watch?v=lelX8GGh_S8, (Access Date: 21.06.2022).

URL-5: https://www.youtube.com/watch?v=Ml2UakwRxjk&t=1475s, (Access Date: 21.06.2022).

URL-6 https://www.auganix.org/unity-mars-augmented-and-mixed-reality-authoring-studio-now-available/, (Access Date: 21.06.2022).

International Journal of Sport Culture and Science
March 2024 : 12(1)
ISSN : 2148-1148
Doi : 10.14486/IntJSCS.2024.702

Training Management Styles in Physical Education and Sports

Ahmet TURGUT[1], Muhsin HAZAR[2]
[1]Gazi University, Ankara, Turkey
https://orcid.org/0000-0002-3985-9416
[2]Gazi University, Ankara, Turkey
https://orcid.org/0000-0002-5300-9581

Email: ahmet2785@hotmail.com , muhsin@gazi.edu.tr

Type: Review Article (Received: 03.11.2023 - Accepted: 15.03.2024)

Abstract
The aim of this research is to discover a theoretical structure that expresses the styles in which coaches manage their training in Turkey. For this purpose, the research was carried out using the Grounded Theory Research model. The number of participants was determined by the theoretical sampling method. In order to ensure the theoretical saturation of the categories, the research was completed with 11 coaches. "Semi-Structured Interview Questionnaire" developed by the researcher was used as a data collection tool in the study. Categories were discovered by analyzing the data with 'open, selective, and theoretical coding' processes. As a result of the research, the theoretical structure of Training Management Styles in Physical Education and Sports consisting of the core categories of Contemporary, Situational, Liberal, Authoritarian, and Planned Training Management was discovered.

Keywords

Coach, Training, Management, Theory.

Introduction

Individuals who support the development of the physical, emotional, mental and social skills of athletes through purposeful behavior and fulfill the scientific objectives of training in this direction are called coaches (Konter, 1996).

The majority of coaching-related research in the literature consists of research on the leadership styles of coaches (Chelladurai & Saleh, 1980; Zhang, Jensen & Mann, 1997; Frew 1977). In addition, studies that are considered to be close to the topic of coaching styles are also included in the literature (Konter, 1996; Sevim, 2010; Martens 1998). However, no study similar to the research topic and content (only management style during training) has been found in the literature.

Green; Quoting Cassel and Symon, Mil (2007) emphasized that Grounded Theory, one of the qualitative research methods, is a method of creating a theory. Janos and Alony (2011) say that researchers begin studies using the Grounded Theory method to discover anything, without prejudice or prior ideas. Jones and Alony (2011) In Glaser's developing/classic Grounded Theory method, the coding and analysis processes consist of three stages. These; It is open, selective and theoretical coding. In this context, the fact that no study similar to the model (grounded theory) regarding the training management styles of coaches has been found in the literature has increased the originality and value of this study.

For these reasons, it has been evaluated that this research will contribute to the field. The aim of this research is to discover a theoretical structure that expresses the styles in which coaches manage their training in Turkey.

Material and Method

Transparency and Openness

This article is derived for the first and last time from the doctoral study "A study on training management styles in physical education and sport" by the lead author. Materials for this article are available and all materials are preserved by the lead author. Furthermore, the materials of this article will be shared when legal and ethical permission is sought.

Grounded theory is a method of forming a theory **(**Mil, 2007, as cited in Green, Cassel, and Symon). The data collection, coding, and analysis stages of this research were carried out using classic grounded theory procedures. The literature review, grounded theory, and its structure have been established. After the categories reached theoretical saturation, the number of participants was terminated with 11 coaches (Glaser & Strauss, 1967,; Charmaz, 2015,). The most basic method of data collection in the research grounded theory was conducted by interview (Creswell, 2016). Active listening, empathic reflection, minimal encouragement, sounding questions, silence, and conscious purity were used in the interview. From the first to the last stage of data collection, the semi-structured interview questionnaire was used as a data collection method (Yıldırım & Şimşek, 2016).

The participants' statements were fully transcripted without any correction (Glaser & Strauss, 2006). The transcripts were transferred to the data analysis program NVIVO 10 trial version and all transferred data were encoded (Jones & Alony, 2011). When analyzing the data during the initial coding process, the researchers asked themselves the following questions "What is this data a study of?", "What category does this incident indicate?", "What is actually happening in the data?", "What is the main concern being faced by the participants?", and "What accounts for the continual resolving of this concern?", which contributed to the

theoretical sensitivity of the research and its ability to maintain its theoretical sensitivity (Glaser & Holton, 2004).

The initial sampling of the study consisted of coaches who have been or have been doing the coaching profession for at least 10 years. The criteria for theoretical sampling, with the clarification of core categories after the third interview; (Glaser & Strauss, 1967; Jones & Alony, 2011) was composed of coaches with at least 10 years of experience and coaching experience in the national team.

Theoretical saturation determines the number of participants (Glaser & Strauss, 1967; Charmaz, 2015). As a result of constant comparative analysis conducted after interviews with coaches, the categories started to take their final form with the increasing frequency of data repetition until the 6th participant and the absence of different categories. As a result of the theoretical saturation achieved with the 10th participant, the study was concluded by evaluating that the theory was formed with the 11th participant. This study received a research authorization board approval and participants gave informed consent.

The data obtained in the open coding process was analyzed without applying any filter. No data has been excluded from coding (Jones & Alony, 2011, as cited in Glaser). Memos have been written after each interview with the participants (Çelik & Ekşi, 2015, as cited in Glaser). The conceptual labels and core categories in the data have been identified and reached the first level of abstraction (Çelik & Ekşi, 2015, as cited in Strauss & Corbin). Constant comparative analysis was performed by coding the data using sentence by sentence, line by line, word by word, and in vivo methods (Çelik & Ekşi, 2015, as cited in Charmaz; Corbin & Strauss; Strauss & Corbin). As a result of this process, which was carried out with 5 participants, 46 pages of data consisting of 17,348 words were obtained. 873 codes have been generated from these data without any intervention. The data was reduced to 402 codes by performing constant comparative analysis operations and eliminating the codes that were considered to be unrelated to the subject. The open coding process has resulted in a structure of 5 core categories consisting of 44 subcategories.

In the process of selective coding, interview questions were constantly formulated to give more importance to concepts and to reach places where research needs to be focused (Jones & Alony, 2011). The core categories are saturated through these operations (Glaser & Holten, 2004). Constant comparative analysis method and memo writing continued. (Çelik & Ekşi, 2015, as cited in Glaser). As a result of this process, which was carried out with 6 participants, 66 pages of data consisting of 20,577 words were obtained. As a result of constant comparative analysis operations, the data was reduced to 357 codes. The selective coding process has resulted in a structure of 5 core categories consisting of 26 subcategories.

Saturated categories have been examined with theoretical coding. Conceptual relationships between categories have been developed. Cross-comparisons have been made with the literature (Jones & Alony, 2011, as cited in Glaser). As a result of the theoretical coding process of the research reaching saturation, 5 core-category (contemporary, situational, authoritarian, planned, liberal) theoretical coding was discovered, consisting of 24 subcategories formed by 281 codes.

Findings

Codes and categories were found from the data and the following core and subcategories were revealed:

1. Core Category: Contemporary Training Management

Individuals who live in the same era (Türk Dil Kurumu, 2014; Devellioğlu & Kılıçkını, 1975; Köktürk, 1986) and act in accordance with the understanding and conditions of the current era are called ‘contemporary’ (Türk Dil Kurumu, 2014; Tercüman 1985a). Contemporary training management is the training management carried out to contribute to the physical, mental and performance development of athletes by taking advantage of the possibilities of the era. Coaches who practice this training management style are active in training. They inform their athletes about scientific developments and innovations. Then they show the movements to their athletes and ask them to do so. In order for the movement to be carried out successfully, they follow their athletes and provide them with instant feedback and provide physical and psychological support. They make the training atmosphere positive by showing positive behavior towards athletes.

The core category of contemporary training management consists of 6 sub-categories: "active", "applying scientific developments and innovations", "narrator, practitioner and implementer", "supportive", "informing the athlete" and “being positive towards the athlete".

Active. In this training management, coaches are active during training. They follow the practices of the athletes. They question why the athlete cannot perform certain movements within themselves and try to find solutions to the problems.

Applying scientific developments and innovations. In this training management, coaches try to use scientific developments and innovations in training.

Narrator, practitioner, and implementer. In this training management, the coaches explain the movement to the athlete in detail and sometimes make the athletes do it by demonstrating the movement himself.

Supportive. In this training management, coaches try to support their athletes in all areas. They carry out various supportive activities especially to support the development of their athletes and to get positive results from the competitions. These supportive activities are physical or non-physical supports to eliminate an existing problem or deficiency.

Informing the athlete. In this training management, coaches are informative towards their athletes. Coaches intervene as soon as possible in cases of the improper activity or incomplete learning. They perform this intervention by warning of errors, giving tips, and giving feedback.

Being positive towards the athlete. In this training management, coaches display positive behavior towards their athletes. They use the appropriate tone of voice towards their athletes and establish healthy communication with them. Since they care about athlete development, they always take care to be positive towards athletes.

2. Core Category: Situational Training Management

The entire current conditions in which anything is contained (Türk Dil Kurumu, 2014; Tercüman, 1985a; Devellioğlu & Kılıçkını, 1975) and the position of the individual identified by their relations in society is called the situation (Türk Dil Kurumu, 2014). Situational words related to the situation are called situational (Kılıçlıoğlu, 1976). Situational training management is a shift in training management as a result of adapting to different situations encountered.

The core category of situational training management consists of 3 subcategories: “different moods”, “different behaviors” and “variable training management”.

Different Moods. In this training management, coaches enter different moods during training for various reasons. Sometimes they may be affectionate in training and sometimes they may not. While this situation is carried out voluntarily by the coaches at times, it often happens involuntarily, causing the coaches to enter different moods as well.

Different Behaviors. In this training management, coaches sometimes voluntarily and sometimes involuntarily exhibit different behaviors during training. They make decisions about how they should behave based on their experience.

Variable training management. In this training management, coaches usually act within the available facilities. The reason for this situation is due to athletes (expectations, deficiencies, mental states, number, level, and category), time (training time and duration, competition date, conditions of day and present) and different situations (purpose and location of training, competition, and material status).

3. Core Category: Liberal Training Management

Tolerant individuals who are in favor of independence, freedom, and liberty are called liberals (Türk Dil Kurumu, 2014; Köktürk, 1986). Liberal training management is training management that is performed in a fair and gentle way to make the training atmosphere positive. As a result of the fact that coaches who practice this style of training management have colorful personality traits, athletes feel that their coach is one of both their relatives and family. At the same time, coaches also feel like they are close to their athletes. They show fair and gentle management in training. In addition, as a result of the fact that the coaches value their athletes and mostly practice the training that their athletes want, the athletes get satisfied with the training management of the coaches.

The core category of liberal training management consists of 5 sub-categories: "multiple personal traits", "family and relatives", "fair and gentle management", "valuing the athlete" and "happy athlete".

Multiple personal traits. In this training management, coaches exhibit a wide range of personal characteristics during training. These personal characteristics include: fair, forgiving, conscious, childish, devoted, listener, emotional, energetic, witty, altruistic, trustworthy, humanist, moderate, motivator, cheerful, relaxed, sincere, affectionate, loving, gracious, compassionate, tolerant, consistent, constructive and gentle.

Family and relatives. In this training management, coaches act as family members and/or relatives against their athletes in training. Athletes also perceive coaches as one of their families and relatives.

Fair and gentle management. In this training management, coaches strive to ensure that athletes can maintain training comfortably. Coaches who are democratic in training and maintain current balances also show fair management by trying to maintain training in combination. At the same time, they conduct gentle management by bending the rules, making the exercises light, playing games, and having enjoyable activities, freeing the athletes and making the training fun.

Valuing the athlete. In this training management, coaches value athletes by trying to get to know them, taking their opinions into account, paying attention to their psychology and health, and providing them with various opportunities to rest and relax.

Happy athlete. Athletes are happy in this training management. The reasons for this situation include the training done by the coach according to a purpose, the pleasure of the feeling of winning achieved as a result of the competition with the coaches, the approach of the coaches

to their athletes as a friend, the training period not being kept long, the training being enjoyable, and the athletes being given free time during the training.

4. Core Category: Authoritarian Training Management

Individuals who can never resist being objected to, who love to command others and get work done, and who desire other people's obedience are referred to as authoritarian person (Türk Dil Kurumu, 2014; Tercüman, 1985a). Authoritarian training management is the training management that contains negativity and is aimed at success as a result. Coaches display voluntary and/or involuntary negative behavior when performing training management. In the face of this negative situation, athletes have negative feelings towards both the coach and the way the coach manages the training. The reason why coaches manage their training with this training management style is that their goals are a definite success. For this reason, they expect athletes in full to fulfill what they want.

The core category of authoritarian training management consists of 3 subcategories: "negativities", "athlete obedience" and "definite success".

Negativities. Certain negativities are encountered in this training management. These negativities arise both in the behavior and training method of the coach and in the emotions of the athletes. Negativities in the coach's behavior occur with him being "unfair, aggressive, howler, unequal, brutal, reckless, harsh, angry, uncompromising and inconsistent". Coaches who exhibit these behaviors do not act with complete awareness in training management and force athletes, impose punishment, and persecution on them. This creates distrust and timidity towards coaches in athletes. Athletes get unhappy because of the negative training atmosphere caused by these reasons.

Athlete Obedience. In this training management, coaches expect athletes to do what is desired in the training, to bear with the training tempo, to work hard, not to ask questions unrelated to the training, to come and do the training under all circumstances, and to comprehend all the tasks given.

Definite success. In this training management, the goal of the coaches is to achieve definite success. Coaches never compromise or deviate from their goals and objectives.

5. Core Category: Planned Training Management

Operations carried out, organized, and performed according to a certain plan are called planned (Devellioğlu & Kılıçkını, 1975; Tercüman, 1985b). Planned training management is a training management performed in order and discipline by taking measures. In this training management, coaches aim to keep everything going regularly while planning training sessions and want to benefit from everything opportunity. They believe that the way to success can be achieved in order within a plan and program. This order provides discipline. They strive to keep everything under control so that the training continues as planned. They also take precautions against any adverse situations. They want their athlete to be alert and conscious in order to get efficiency from the training. In this way, they believe that they can control the training management more easily and get a high level of quality from the training. In addition, the fact that they can be distant towards the athletes and have high expectations may cause the athletes to face negative situations.

The core category of planned training management consists of 7 subcategories: "order", "discipline", "control process", "taking precautions", "formal", "conscious athlete", and "athlete negativity".

Order. In this training management, coaches perform the training in a pattern. This order is achieved by setting rules for training management, by preparing training in a planned and scheduled manner, and by performing training management in a systematic order. It is believed that success and development will occur with regular work.

Discipline. In this training management, coaches believe that training should be conducted in discipline under all circumstances. Discipline is not compromised, especially in terms of the purpose and timely execution of the training.

Control process. In this training management, coaches aim to keep the entire process under control so that everything proceeds in a planned way before, during and after the training. The control process is followed one-on-one to avoid any disruptions.

Taking precautions. In this training management, coaches are sensitive to the problems that occur and/or might occur in training. They make the necessary arrangements by taking the necessary measures against these problems before training.

Formal. In this training management, coaches are distanced from their athletes. Coaches believe that this approach is professional in training management and they act formally in order for the movement they want to be carried out successfully by the athletes. In this formality, the professional identities of coaches are revealed and they do not treat athletes like a parent.

Conscious athlete. In this training management, coaches expect athletes to be aware of the movements and why training should be done. This consciousness is gained by being ready for training, setting goals for the future, and respecting their work.

Athlete negativities. In this training management, negative situations are observed in athletes from time to time. A variety of physical and/or mental disorders are observed in athletes with strict execution of the training. These disorders occur in the form of athletes being exhausted, bored, complainant, persistent, and anxious.

Discussion and Conclusion

Due to their management characteristics, the literature review and discussion of the study were aimed to contribute to the research by examining the aspects of leadership, teaching methods, teaching, classroom management, management, coaching, and coaching styles.

1. Core Category: Contemporary Training Management

There are certain behaviors that are expected to be seen in a contemporary sports executive. These are effective communication power, the use of technological tools, being sensitive to athletes' problems, and mastering the branch **(**Sunay, 2017). Coaches who manage their training with contemporary training management styles do not have any problems communicating with their athletes. Because they strive to dominate their branches and have an investigative spirit, they closely follow the scientific developments and innovations and apply them to their athletes. They also benefit from their technological tools to contribute to the development of athletes. They engage in supportive activities against the problems observed in athletes. The behavior of the coaches who manage their training with the contemporary training management style and the behavior of the contemporary sports manager has shown similarities.

Among the contemporary learning - teaching approaches; teaching approaches through presentation and invention; there are brainstorming and problem solving methods (Güngör, 2014). The movement that will be performed in contemporary training management is first

explained to the athletes, then shown, and then implemented. Athletes are taught to discover and find what is being questioned. The use of these learning and teaching approaches and learning methods has shown similarities in the training carried out with contemporary learning–teaching approaches and training managed with contemporary training management style.

Active. In contemporary training management, coaches are voluntarily or involuntarily active in the moment of curiosity, experiencing the moment of competition, pretending to be in competition, becoming role models, questioning, and producing solutions. The activeness of coaches in contemporary training management was found similar to participative leaders providing and contributing information that will help to make decisions by actively taking part in the field (Kıranlı, 2010, as cited in Yukl), and transformational leaders easily solving problems due to having active and creative ideas (Buluç, 2009).

Applying scientific developments and innovations. In contemporary training management, coaches follow scientific developments and innovations in terms of changing science, being sensitive to scientific developments, applying scientific developments, not using classical methods, avoiding routine behavior, training with data, and applying innovations. The application of scientific developments and innovations in contemporary training management was found similar to the visionary leaders making the necessary changes by keeping up with the changes (Buluç, 2009, as cited in Nanus), and the post-modern coaches utilizing the technological and scientific methods for their purposes (Konter, 2004).

Narrator, practitioner, and implementer. In contemporary training management, coaches are narrators, practitioners, and implementers in the subjects of making an active observation, describing the training, using the analogies, role-playing, being educational, practicing different trainings, making visual work, showing and implementing the movement, making the athletes watch the matches, making a passive observation, ensuring the athlete's follow-up, transferring experience, practicing, implementing and directing. The fact that coaches are narrators, practitioners, and implementers in contemporary training management was found similar to transformational leaders, easily explaining the goals to their team and making them understand (Doruk, 2007, as cited in Shamir), and teachers who teach through a presentation, trying to ensure active participation in the lesson by showing the students the activities (Güngör, 2014, as cited in Senemoğlu).

Supportive. In contemporary training management, coaches are supportive of athletes in materials, motivation, autonomy, performance improvement, spiritual development, athletic ability, making training efficient, addressing deficiencies, observing physical development, interviewing, preparing, pacifying anxiety, making the athlete professional, video creation and measurement methods. (Aslan, 2013) The supportive activities carried out to increase the performance of athletes in contemporary training management was found similar to the mentor leaders' way of supporting their team members (Aslan, 2013) and the leaders who adopt the way of caring about individuals from Bass's executive behavior, which includes identifying the shortcomings of their athletes and supporting them (Kıranlı, 2010, as cited in Avalio et al.).

Informing the athlete. In contemporary training management, coaches inform athletes in terms of completing deficiencies, giving feedback, warning of errors, and giving tips. In contemporary training management, coaches' completion and correction of their athletes' mistakes were found similar to the interactive leaders tracking the performances of their subordinations and informing them to correct their mistakes (Buluç, 2009, as cited in Bass),

and coaches with education and training leadership behavior characteristics informing athletes about skill, technique, and tactics (Chelladurai & Saleh, 1980).

Being positive towards the athlete. In contemporary training management, coaches are positive towards athletes in terms of resting, being reliable, good communication, combat pleasure, tone of voice, athlete development, appreciation, and receiving information from the athlete. In contemporary training management, coaches' positive behaviors and communication towards athletes were found similar to the positive communication of modern managers (Kıranlı, 2010, as cited in Açıkalın) and supporter managers with their subordinations (Kıranlı, 2010, as cited in Başaran).

2. Core Category: Situational Training Management

In the contingency approach, the focus is on the 'situations or circumstances' of the current position in management. There is no fixed management style in this style of approach. The most appropriate management practice is carried out according to the current situation (Sunay, 2017, as cited in Şahin). According to the contingency model of Victor V. Vroom and P. W. Yetton, there is not only one good management style that can be seen as valid in every environment and situation. The best management style is one that fits with the current situation (Bektaş, 2014, as cited in Çetin). Leaders who encounter different situations in Fiedler's contingency model react and make changes in their leadership styles (Bektaş, 2014, as cited in Torlak) The changes in the training management of the coaches who manage their training in the situational training management style were found similar to the contingency approach and the reaction of situational leaders to the situations in the contingency model.

Different moods. In this training management, coaches voluntarily or involuntarily enter different moods in terms of being emotional, going through different moods, experiencing anger, reflecting the mood, being tough, being affected by the mood, and being soft.

Different behaviors. In this training management, coaches display different behaviors, positively or negatively, in terms of flexibility, motivation, attitude and behavior, diligence, moderation, use of positive language, and experience against the different situations that occur in training. In situational training management, coaches' use of their experience against the situations encountered was found similar to situational leaders benefiting from their experience in deciding how to act against the situations they faced (Doruk, 2007, as cited in Arvonen & Ekvall).

Variable training management. In situational training management, coaches make changes in training management according to athletes (special training, athlete expectations, athlete deficiencies, mental status, number of athletes, training planning, practicing, management style, athlete level, and athlete category), different situations (purpose of training, method, training place, competition status, schedule, method, technique, material, situationality, training management, and training plan) and time issues (training time, training duration, conditions of the day and moment, and competition date).

According to the athlete. In situational training management, the management of the training according to the athletes was found similar to delegative leaders directing the work according to the capacities of their employees and their willingness to take responsibility (Kıranlı, 2010, as cited in Hersey & Blanchard; Schermerhorn et al), and the focused coaches forming their styles according to the performance levels of the students (Parsloe, 1997).

According to different situations. Managing the training according to different situations in situational training management was found similar to the teachers in the holistic classroom

management model performing classroom management by taking students and different situations into account (Başar, 2013)

According to the time. In situational training management, the training management of the coaches by taking the time into account was found similar to the coaches who have leadership characteristics that evaluate the environment and manage the training by taking the time into account (İnce, 2006, as cited in Zhang, Jensen, and Mann).

3. Core Category: Liberal Training Management

The release of athletes in training by coaches who practiced in a liberal training management style was found similar to the employees of liberal leaders (Doruk, 2007, as cited in Karaküçük & Yetim) and the students of teachers in the liberal approach (Aydın, 2010, as cited in Dembo).

Individualism is the basis of classical liberalism (Aktuğ, 2019). In the principle of individualism, there is essentially an idea of equality (Aktuğ, 2019, as cited in Heywood). The fact that coaches who practice their training with a liberal training management style treat athletes democratically and equally in all circumstances was found similar to the idea of equality of the principle of individualism of liberalism.

In liberal training management, athletes' way of viewing their coaches as members of their family and/or relatives was found similar in modern liberalism to the fact that the individual is connected to society through tight ties such as family, kinship, and friendship (Aktuğ, 2019).

Multiple personal traits. Coaches in liberal training management are fair, forgiving, conscious, childish, devoted, listener, emotional, energetic, witty, altruistic, trustworthy, humanist, moderate, motivator, cheerful, relaxed, sincere, affectionate, loving, gracious, compassionate, tolerant, consistent, constructive and gentle. The personal characteristics of the coaches in liberal training management were found similar to the democratic teachers being fair, energetic, altruistic, reliable, motivating, compassionate, dear, comfortable, sincere, tolerant and gentle towards students (Balay, 2003, as cited in İpek; Smith & Laslett), and to good-natured coaches being affectionate and gentle (Sevim, 2010).

Family and relatives. In liberal training management, coaches treat their athletes as a big brother, sister, family member, mother, father, parent, sibling, relative, uncle, aunt, and they are perceived as such by their athletes. In liberal training management, coaches treating their athletes as if they were family members and athletes perceiving their coaches as members of family were found similar to humanist leaders being fatherly to subordinates (Aslan, 2013, as cited in Savuncuoğlu & Tüz), and paternalist managers treating subordinates as a parent (Bektaş, 2014, as cited in Börekçi).

Fair and gentle management. In liberal training management, coaches perform fair (democratic, balanced, combination) and gentle management (flexible, light, cheerful, plays, relaxing activities, liberalist).

Fair management. Coaches who practice liberal training management approaching their athletes fairly and gently was found similar to democratic teachers forming their classroom rules with students in a democratic way (Pala, 2005), and democratic coaches making decisions together with their athletes. (Konter, 2004; Chelladurai & Saleh, 1980; Sunay, 2017).

Gentle management. In the liberal training management, coaches providing their athletes with free time and relaxing activities while at the same time playing games and continuing the training with joy were found similar to liberal leaders releasing their employees to achieve

their business goals (Doruk, 2007), delegate leaders releasing their employees to improve themselves (Kıranlı, 2010, as cited in Başaran), and liberal coaches being too gentle on rule-making and not intervening if there are no difficulties in training (Konter, 2004).

Valuing the athlete. In liberal training management, coaches value their athletes in terms of athlete ideas, athlete psychology, athlete health, taking care of the athletes, offering opportunities, and knowing the athlete. In liberal training management, coaches trying to get to know their athletes and to make them benefit from existing opportunities and valuing their ideas, health, and psychology, were found similar to relational leaders strengthening the motivation of the team members based on their emotional needs (Aslan, 2013, as cited in Goleman, Boyatzis & Mckee), and democratic coaches caring about the health and physical and psychological developments of the athletes (Konter, 2004).

Happy athlete. In Liberal training management, coaches ensure that athletes are happy with purposeful training, making them defeat the coach, being friendly, doing little training, fun training, desired training, free training, and popular training practices. In liberal training management, ensuring that athletes can continue to train happily was found similar to democratic teachers being friendly to students (Balay, 2003, as cited in Ertekin), and docile coaches making their athletes happy because they get along with their teams (Koludar, 2017).

4. Core Category: Authoritarian Training Management

In authoritarian training management, coaches' negative behavior towards their athletes, such as being unfair, unequal, and aggressive was found similar to autocratic teachers making fun of students' intent on asking questions (Yıldırım, 2012, as cited in Pala), and excessively disciplined and authoritarian coaches asking to be obeyed, being punishing, intolerant, merciless, narrow-minded and prejudicial (Sevim, 2010).

The development of negative emotions such as insecurity, timidity, and unhappiness in the athletes due to the practices of the coaches in authoritarian training management was found similar to autocratic leaders negatively influencing the team's stability, effectiveness, group atmosphere, feelings of contentment and happiness (Doruk, 2007, as cited in Cremer), and authoritarian coaches doing wrong practices and causing athletes to feel fear and not like such coaches (Sevim, 2010).

The reason for training to be carried out with authoritative training management being the desire to achieve the definite access was found similar to autocratic leaders wanting to achieve success by leading in this style (Doruk, 2007) as cited in Cremer, and authoritarian teachers believing that the way to achieve success is to make students follow the rules (Yıldırım, 2012, as cited in Yapıcı).

Negativities. In authoritarian training management, negativity is observed in coach behavior (unfair, aggressive, howler, unequal, brutal, impatient, harsh, angry, uncompromising, inconsistent), athlete's feelings (disliking practice, timid, insecurity, unhappy), and method (unconscious, punishment, persecution, authoritarian, coercion).

Coach behavior. In authoritarian training management, coaches' negative behavior towards athletes was found similar to traditional coaches being dominant (Konter, 2004), over disciplinary authoritarian coaches wanting to be obeyed, being intolerant and tough-looking, and being strict with athletes (Sevim, 2010), and authoritarian coaches being aggressive and tough towards athletes (Konter, 2004).

Athlete's feelings. The negativities in athletes' feelings due to the negativities seen in the training in authoritarian training management was found similar to subordinations being

unhappy and dissatisfied and not liking their leaders as a result due to the management of autocratic leaders (Doruk, 2007, as cited in Cremer) and students not liking autocratic teachers (Pala, 2005).

Method. Negativities seen in authoritarian training management were found similar to autocratic leaders imposing punishments against subordinations (Kıranlı, 2010, as cited in Koontz et al.), teachers imposing penalties against undesirable situations in the reactive classroom management model (Başar, 2013), authoritarian teachers imposing restrictions and limitations to ensure class control (Aydın, 2010, as cited in Cohen), intervening coaches managing inexperienced students with instructions (Parsloe, 1997), and traditional coaches being authoritarian and resorting to force, intimidation and punishment to maintain control over the athlete in training (Konter, 2004).

Athlete Obedience. In authoritarian training management, coaches expect obedience from their athletes in terms of withstanding the training tempo, training itself, coming to training, not being angry with the coach, working hard, not being asked unnecessary questions, doing what is desired, and taking what is given. In authoritarian training management, coaches expecting obedience from athletes was found similar to autocratic leaders wanting their decisions to be accepted by team employees without question (Aslan, 2013, as cited in Çetin & Beceren), coaches with commanding (dictative) style asking their athletes to do the orders given (Martens, 1998), authoritarian coaches expecting athletes to do what is desired and expecting obedience (Konter, 2004).

Definite success. In authoritarian training management, coaches do not deviate from the goal and care about target issues because their sole purpose is to achieve success. The reason of coaches carrying out training with authoritarian training management being a definite success was found similar to (Northouse, 2014) success-oriented leaders aiming at the highest level of success in their work, and task-motivated leaders wanting to achieve the goal directly.

5. Core Category: Planned Training Management

In training carried out with a planned training management style, coaches ensuring that the training progresses within the framework of the plan they have determined was found similar to teachers taking care to comply with the plans and programs they prepared beforehand for classroom management (Başar, 2013).

Coaches who carry out their training with a planned training management style, applying their work according to a certain order during the training was found similar to teachers applying the education plans they prepared in a certain order in classroom environments (Başar, 2013).

Order. In planned training management, coaches have an order in respecting their work, rules, periods, plans, schedules, lines, and systems. The implementation of the training in regular order in planned training management was found similar to claims that are arguing that each problem can be solved by previously determined rules and procedures in the cookbook teacher managerial approach (Aydın, 2010, as cited in Dembo), and teachers implementing the programmatic approach to teach gradually in a certain order (Güngör, 2014, as cited in Sönmez; Sünbül).

Discipline. In planned training management, coaches take care not to compromise on discipline in terms of purpose, training, being a full staff, and timing. In planned training management, coaches trying to provide discipline in training by giving necessary instructions to the athletes about the training was found similar to guiding leaders giving directions to subordinates about when to complete tasks (Northouse, 2014).

Control process. In the planned training management, the coaches evaluate the subjects such as control disruption, taking control, controlling, materials, hall, researching the problem, the number of athletes, and direction within the control process. The control processes performed by the coaches in the planned training management were found similar to the controlling characteristics of the guiding leaders (Kıranlı, 2010, as cited in Shermerhorn), and the strategic leaders controlling the action processes (Doruk, 2007).

Taking precautions. In planned training management, coaches use punishment, paying attention, making extra training and exercises, and fighting activities for preventive purposes for situations that may be encountered during training management. The precautions taken in order to prevent unwanted situations in planned training management were found similar to preventative classroom management teachers trying to create a system to prevent wrong behaviors in the classroom (Başar, 2013).

Formal. In planned training management, coaches are formal in terms of not acting like a big brother, training heavily, claiming a coaching identity, not acting like a father, training seriously, hard, ensuring that athlete performances are equal, not allowing athletes to laugh, being distant with the athlete, not concession and using a high tone of voice. Coaches being formal towards their athletes in the planned training management was found similar to the rising managers being formal towards their employees.

Conscious athlete. In planned training management, coaches expect their athletes to be conscious about understanding, being conscious, being ready, goal, willing, being respectful to their job, establishing concentration, getting to know the rival, and knowing the psychology of athletes. The coaches' expectations from athletes to be conscious during the training carried out in planned training management were found similar to transformational leaders increasing the willingness, consciousness, and awareness of the audience (Keçecioğlu, 1998).

Athlete negativities. In planned training management, negative situations are observed in athletes due to unconsciousness, exhaustion, anxiety, lack of performance, boredom, ongoing stress, and complaint issues. The occurrence of some negativities in the athletes in the planned training management was found similar to subordinates being bored with the leadership of leaders who follow the authority-compliance management style (Northouse, 2014), and nervous and active coaches making excessive demands resulting in the exhaustion of the athletes (Koludar, 2017).

In the study which was carried out with the participation of 11 male coaches from 9 different branches (Athletics, Boxing, Gymnastics, Shooting, Football, Physically Handicapped Table Tennis, Fitness, Taekwondo, and Judo) with at least 10 years of coaching experience, the theoretical structure of training management styles consisting of "Contemporary, Situational, Liberal, Authoritarian and Planned" training management core categories has been revealed.

With this research, new measurement tools can be introduced to the field and the study can be spread. With these measurement tools, it can be determined which training management benefits which branch more. Then, more efficiency can be obtained from the coaches by training branch coaches related to the training management style, which is found to be beneficial.

This article is derived for the first and last time from the doctoral thesis titled "A study on training management styles in physical education and sports" in Gazi University Physical Education and Sports Teaching Department in 2020 by the corresponding author.

REFERENCES

Aktuğ, S. (2019). The concept of individual, society and state in three different types of liberalism. Master Thesis, Karadeniz Teknik University, Trabzon.

Aslan, Ş. (2013). Geçmişten günümüze liderlik kuramları (Sağlık yönetimi bakış açısıyla). Konya: Eğitim.

Aydın, A. (2010). Sınıf yönetimi. (12. Baskı). Ankara: Pegem.

Balay, R. (2003). 2000'li yıllarda sınıf yönetimi. (1. Baskı). Ankara: Sandal.

Başar, H. (2013). Sınıf yönetimi. (18. Baskı). Ankara: Anı.

Bektaş, M. (2014). The impact of management styles on informal communication channels: A sample of Burdur public institutions. PhD Thesis, Süleyman Demirel University, Isparta.

Buluç, B. (2009). The Relationship between Bureaucratic School Structure and Leadership Styles of School Principals in Primary Schools. Education and Science, 34(152), 71-86.

Charmaz, K. (2015). Gömülü (grounded) teori yapılandırması: nitel analiz uygulama rehberi. (2. Baskı). R. Hoş (Çev. Ed.), Kurumsal (teorik) örnekleme, veri doyumu ve sınıflandırma (T. Şeker, Çev.) içinde (273-315). Ankara: Seçkin.

Chelladurai, P., Saleh, S. D. (1980). Dimensions of leader behavior in sports: development of a leadership scale. Journal of Sport Psychology, 2(1), 34-45. doi:https://doi.org/10.1123/jsp.2.1.34

Creswell, J. W. (2016). Nitel araştırma yöntemleri beş yaklaşımına göre nitel araştırma ve araştırma deseni. (3. Baskıdan Çeviri). M. Bütün & S. Beşir D. (Çev. Ed.), Beş nitel araştırma yaklaşımı (M. Aydın, Çev.) içinde (69-110). Ankara: Siyasal.

Çelik, H. & Ekşi, H. (2015). Nitel desenler: Gömülü kuram. İstanbul: EDAM.

Devellioğlu, F. & Kılıçkını, N. (1975). En yeni büyük Türkçe sözlük. İstanbul: Rafet Zaimler.

Doruk, B. (2007). Liderlik ve spor. İstanbul: Ötüken.

Frew, D. R. (1977). Leadership and Followership. Personel Journal. 56(2), 90-97.

Glaser, B. G. & Holton, J. (2004). Remodeling Grounded Theory. In Forum Qualitative Sozialforschung/Forum: Qualitative Social Research, 5(2), doi:http://dx.doi.org/10.17169/fqs-5.2.607

Glaser, B. G. & Strauss, A. L. (1967). The discovery of Grounded Theory: strategies for qualitative research. New Jersey: Aldine.

Glaser, B. G. & Strauss, A. L. (2006). The discovery of Grounded Theory: strategies for qualitative research. New Jersey: Aldine.

Güngör, S. (2014). Sınıf Yönetimi. (2. Baskı). İ. Çınar (Ed.), Sınıf içi öğretim etkinliklerinin yönetimi içinde (209-241). Ankara: Eğiten Kitap.

İnce, P. (2006). Antrenör davranışları ve sporcu doyumu: ölçek geliştirme ve uyarlama çalışması. Master Thesis, Celal Bayar University, Manisa.

Jones, M. & Alony, I. (2011). Guiding the use of Grounded Theory in doctoral studies – an example from the Australian Film Industry. International Journal of Doctoral Studies, Volume 6, 95-114. doi:10.28945/1429

Keçecioğlu, T. (1998). Liderlik ve liderler. İstanbul: Kalder Yayınları.

Kılıçlıoğlu, S. (1976). Durumsal. Meydan-Larousse büyük lûgat ve ansiklopedi içinde (Ek cilt, p. 243). İstanbul: Meydan.

Kıranlı, S. (2010). Public and private high schools principals administrator behaviour forms in Eskişehir city center. PhD thesis, Ankara University, Ankara.

Koludar, S. (2017). Başarılı antrenörlüğün temel ilkeleri (öğrenmek ve öğretmek). İzmir: Meta.

Konter, E. (1996). Bir lider olarak antrenör. (1. Baskı). İstanbul: Alfa.

Konter, E. (2004). Antrenörlük ve takım psikolojisi. Ankara: Palme.

Köktürk, K. (1986). Türkçe sözlük A-Z. İstanbul: Kipaş.

Martens, R. (1998). Başarılı antrenörlük (T. Büyükanat, Çev.). İstanbul: Beyaz.

Mil, B. (2007). Nitel araştırma: Neden, nasıl, niçin? A. Yüksel, B. Mil & Y. Bilim (Ed.), Araştırmalarda Gömülü Teori oluşturma içinde (45-58). Ankara: Detay.

Northouse, P. G. (2014). Liderlik: Kuram ve Uygulamaları. (6. Baskıdan çeviri). C. Şimşek (Çev. Ed.), M. Kaleli (Çev.). İzmir: Sürat.

Pala, A. (2005). Sınıfta istenmeyen öğrenci davranışlarını önlemeye dönük disiplin modelleri. Manas Üniversitesi Sosyal Bilimler Dergisi, 7(13), 171-179.

Parsloe, E. (1997). Koç ve kılavuz olarak yönetici. (1. Baskı). S. Kaynak (Ed.), (A. Bora & O. Cankoçak, Çev.). Ankara: İlkkaynak.

Tercüman. (1985a). Temel Türkçe Sözlük 1 (A-F). (1. Baskı). İstanbul: Tercüman.

Tercüman. (1985b). Temel Türkçe Sözlük 3 (M-Z). (1. Baskı). İstanbul: Tercüman.

Türk Dil Kurumu. (2014). İlköğretim okulları için Türkçe sözlük. (5. Baskı). Ankara: TDK.

Sevim, Y. (2010). Antrenör eğitim ilkeleri. (2. Basım). Ankara: Fil.

Sunay, H. (2017). Spor Yönetimi. (3. Baskı). Ankara: Gazi.

Yıldırım, C. (2012). Class Management Models and Behaviors Demonstrated by Class Teachers in Classes. Master Thesis, Mehmet Akif Ersoy University, Burdur.

Yıldırım, A., & Şimşek, H. (2016). Sosyal bilimlerde nitel araştırma yöntemleri. (10. Baskı). Ankara: Seçkin.

Zhang, J. J., Jensen, B. E., & Mann, B. L. (1997). Modification and revision of the Leadership Scale for Sport. Journal of Sport Behavior, 20(1), 105-122.