Research Article

Examination of the Relationship Between Quality of Life and Leisure Satisfaction by Canonical Correlation Analysis

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ABSTRACT

Leisure activities are one of the determinants of quality of life, among others. In this context, this study focuses on all dimensions of satisfaction from leisure activities and quality of life. Canonical correlation analysis was used, and 300 university students were included in the study via convenience sampling method. Data collection tools of the research of "Satisfaction with Life Scale" and "Short-Form-36 Health Survey". According to the research findings, the shared variance between the quality of life and leisure satisfaction data sets was 31.955% for the first canonical function and 19.270% for the second canonical function. In the first canonical function, the physical function variable from the life quality data set and psychological, education, social, and physiologic variables from the leisure satisfaction data set had a relationship in the same direction. In the second canonical function, physical role and emotional functions from the quality of life and relaxation from leisure satisfaction data set had a relationship in the same direction. Leisure satisfaction could be expressed to increase the quality of life in university students. The results indicated that increasing the opportunities for university students to join leisure activities would give beneficial results.

INTRODUCTION

The concept of quality of life (QOL) has been subject to much research for decades, and the question of what consists of a good life is tried to be answered by academics (Diener, 2000). QOL is a concept that might be agreed upon by academicians coming from different fields as a vague term that is difficult to be defined (Henderson, 2007; Iwasaki, 2007). In their study, Diener and Suh (1997) mentioned three major philosophical approaches for defining QOL, referring to Brock (1993). These were: 1) Defining the characteristics of the good life dictated by normative ideals; 2) Defining a good life in terms of satisfaction of preferences; 3) Defining a good life based on the experience of individuals. To Diener and Suh (1997), the new approaches to define QOL were objective measurement based on social indicators and subjective measurement according to well-being based on an individual's internal judgment of well-being. Different measurement tools were developed for measuring QOL. One commonly used measurement tool is The Short-Form-36 Health Survey (SF-36), a generic measure that can be used in the general population and among various disease groups. As part of the "International Quality of Life Assessment (IQOLA)" Project, the scale and different versions were translated into more than 40 countries (Ware, 1999). SF-36 measures an individual's functional status and well-being. The eight health-related QOL domains are; "Physical functioning", "Social functioning", "Role limitation due to physical problems", "Role limitation due to emotional problems", "Mental health", "Energy and vitality", "Bodily pain", and "General perception of health" (Demiral et al., 2006). Another commonly used measurement tool of QOL is the "World Health Organization Quality of Life Scale" developed by the "World Health Organization" in 1998. The scale was developed based on an extensive pilot test in 15 centers around the World using 4500 participants. The sub-dimensions of this scale were: "Physical", "Psychological", "Level of independence", "Social relationships", "Environment", and "Spirituality" (Iwasaki, 2007).

Academicians from various fields focused more on defining and measuring factors affecting QOL (Lloyd & Auld, 2002). Among the factors affecting QOL, we can consider factors such as health, working life, friends, family, and leisure (Hagerty et al., 2001). As an essential life domain, leisure is necessary for individuals of different ages (Cheung et al., 2009). Research on leisure and QOL was a complex but remarkable study area by Phillips and Budruk (2011). Bedini et al. (2011) reported the existence of research finding positive relationships between leisure and greater QOL, improved health, and self-esteem and negative relationships between leisure and depression, stress, and risk of dementia. In a study by Gumus and Işık

(2018) conducted on teacher candidates, "leisure-time physical activity" showed a positive correlation with QOL. In a study applied to elderly people in South Korea, leisure activity predicted QOL (Lee et al., 2014). Wang (2022) studied the relationships between leisure involvement and quality of life among users of public sports centres aged 45 years and older. According to the results, leisure involvement provided significant positive quality-of-life outcomes, especially in the physical, psychological, and environmental domains.

The literature abovementioned shows evidence for the positive relationship between leisure and QOL. Besides this, leisure satisfaction exposes positive effects on QOL. In a study examining the relationship between leisure satisfaction (LS), life satisfaction, and QOL, the increase in leisure satisfaction in health professionals increased quality of life (Tokay Argan & Mersin, 2021). In a study, data was collected from 940 adults in China, and multiple regression was utilized to measure the relationship between LS, demographic variables, and QOL. The study's results showed that LS predicted all sub-dimensions of QOL and psychological satisfaction and aesthetical satisfaction had a relationship with all subscales of QOL (Zhou et al., 2021). Çakal and Esentaş Deveci (2022) examined the relationship between LS and QOL in Manisa Mental Hospital health professionals and detected a positive medium-level significant relationship. Leisure satisfaction (LS) is one of the frequently encountered concepts of leisure in the literature, which was defined by Beard and Ragheb (1980) as "the positive perceptions of feelings which individual forms, elicits or gains as a result of engaging leisure activities and choices." One of the studies proving the positive relationship between LS and QOL was conducted by Eifert et al. (2019) in a group of elderly women. In a study conducted on Chinese and British Canadians, overall LS significantly affected happiness, peacefulness, and all nine QOL domains (Spiers & Walker, 2009). In a study applied to Asian countries, among the South Korean population, a positive association was found between leisure satisfaction and QOL (Liang et al., 2013). The contribution of leisure time physical activity was also explored and a study in Taiwan showed that physical activity was positively related to QOL (Ou et al., 2017). In a study investigating the relationship between LS and QOL, all subscales of LS showed a positive correlation with subscales of subjective QOL (Ngai, 2005). In another study applied to residents of a tourism destination a positive correlation between QOL, and LS was detected (Liao et al., 2016). Choe et al. (2020) reported a strong association between LS, social connection/interaction, and QOL was found in the literature. University students were also inquired about the relationship between QOL and LS and the results showed no significant relationship between these two constructs (Yaşartürk et al., 2019).

Although there are studies conducted on university students, when we consider the number of university students in the country's population, more research is required for this group of society. Nowadays, university education is supported by public and private sectors in Turkey and there are 207 universities throughout the country. Currently, the number of university students is reported as 8.240,997 by the Council of Higher Education in Turkey. This number constitutes approximately 10% of Turkey's population, making university students an essential component of society. Besides, the life of young individuals at the university is important as this is a transition period to adulthood (Liu & You, 2015; Özbay, 1997). It is expected that positive physical and mental habits that students gain contribute constructively to the development of the adults of the future. The study is expected to fill the leisure and quality of life literature gap by focusing on university students. As university students are a considerable part of the population in society, gaining meaningful and healthy leisure habits will help them to benefit from leisure activities during their lifetime. Therefore, in the light of the abovementioned literature, the study aims to determine the relationship between QOL and LS in university students using canonical correlation analysis.

METHODS

Research Model

This study was designed with a survey model, and a relational survey model was used. In relational studies, the relationships between two or more variables are examined (Karasar, 1998). This study aims to reveal the relationship between LS and QOL by using canonical correlation analysis. Canonical correlation examines the relationship between two data sets having more than one variable (Tabachnick & Fidell, 2007).

Study Group

The population of the study of university students taking elective physical activity. The sample size was calculated by the formula n = t2pq/d2 (Sümbüloğlu & Sümbüloğlu, 1995). In the formula, t value for alpha = .05 was taken as 1.96 from the t table. The values of p (probability of occurrence) and q (probability of non-occurrence) were taken as .5 to give the highest sample size. d, the accepted level of deviation was taken as .05. By this formula sample size was calculated as n = 385. As a result, feedback from 300 students was reached with a rate of return = 77.9%. The study adhered to the research principles of the Declaration of Helsinki.

Data Collection Tools

In this study, two attitude scales were used as data collection tools.

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Leisure Satisfaction (LS) Scale

LS scale was developed by Beard and Ragheb in 1980 and adapted to Turkish by Karlı et al. (2008). The Turkish version of this scale of 39 questions and presents the satisfaction derived from the satisfied leisure needs of individuals. the six-sub dimensions are "Psychological", "Education", "Social", "Relaxation", "Physiologic" and "Aesthetic". In their study, Internal consistency coefficients changed between .79 and .84, and the overall coefficient of the scale was found as .92. In this study the internal consistency coefficient of the Leisure Satisfaction Scale was found to as .935.

Quality of Life (QOL) Scale

QOL was measured by The Short-Form-36 Health Survey (SF-36), which is a generic measure that can be used in both the general population and among various disease groups. SF-36 measures an individual's functional status and well-being. The eight-health related QOL domains are: "Physical functioning", "Social functioning", "Role limitation due to physical problems", "Role limitation due to emotional problems", "Mental health", "Energy and vitality", "Bodily pain", "General perception of health". Turkish adaptation of SF-36 scale was conducted by Koçyiğit et al. (1999). Further validity and reliability studies of this scale were tested in a sample of 1279 adults (Demiral et al., 2006). High points obtained from the subscales show a better perception of QOL. In this study, the internal consistency coefficient of the Quality-of-Life Scale was found to as .849.

Data Collection Procedure

For the data collection process, the permissions of the lecturers were taken in order to reach students in sports fields. Students taking elective physical education lessons were explained the purpose of the study and after their approval, questionnaires with informed consent were distributed to students. Participants were given 20 minutes for filling out the questionnaires right after a brief explanation that their information will be kept confidential.

Data Analysis

For data analysis, Canonical correlation method was used which is an appropriate multivariate statistical technique when the relationship between two variable sets is aimed to be examined (Sherry & Henson, 2005). Before application, the basic assumptions of the canonical correlation were controlled. In this context, normality, linearity of the data, and multicollinearity was tested. Scatter diagrams for multivariate normality and linearity were examined, and every distribution showed a nearly elliptical shape. In order to test univariate normality, skewness, and kurtosis coefficients were checked. As these coefficients changed

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between ±2 interval, it could be concluded that the normality assumption was fulfilled (Kunnan, 1998). The details of skewness and kurtosis values are presented in Table 1.

The other assumption of canonical correlation is the non-existence of the multicollinearity problem. In order to check this assumption, VIF and CI values were examined; VIF value was <1.0000 and CI value was <18.225. According to Belsley (1991), when VIF value <10 and CI value is <30 the multicollinearity problem does not exist.

Table 1
Descriptive Statistics of Data Sets

Variable	mean	SD	skewness	Kurtosis	Variable	Mean	SD	skewness	Kurtosis
"X1"	3.9813	.513	-.547	.091	X1	88.03	15.778	-1.324	.685
"X2"	4.0341	.617	-1.229	2.371	X2	76.91	27.326	-1.081	.342
"X3"	4.0379	.509	-.679	.482	X3	71.55	30.452	-.772	-.374
"X4"	4.1333	.626	-.788	1.070	X4	55.46	10.583	.280	1.470
"X5"	4.0511	.606	-1.103	1.772	X5	55.60	9.762	.382	.029
"X6"	4.0992	.670	-.706	-.098	X6	57.41	14.78	.685	.637
					X7	69.60	21.274	-.908	.588
					X8	61.55	13.439	.088	.258

RESULTS

The significance of the canonical model was checked by Pillais, Hotellings, Wilks and Roys tests. As the theoretical bases of these tests were different, the F values were also different. In general, Wilks λ was used commonly (Sherry & Henson, 2005).

The results in Table 2 proved the significance of the model. Wilks λ = .48022, F (48, 141130) = 4.72672, p <.001. This result was evidence of the relationship between QOL and LS. As the significance of the model could be impacted by the sample size, the effect size was also suggested to be evaluated (Sherry & Henson, 2005). So, in this study, the Wilks λ was used as inverse effects. This value represented the variance which was not explained by canonical variables.

Table 2
Multivariate Significance Tests

Test	value	Approximate F.	Hypothesis DF.	Error DF.	Significance of F.
"Pillais test"	.4366	4.37113	48.00	1746.00	.000
"Hotellings test"	.84592	5.01088	48.00	1706.00	.000
"Wilks test"	.48022	4.72672	48.00	1411.30	.000
"Roys test"	.31955				

The value "1- λ" showed the common variance shared by canonical variables and could be interpreted as R 2 in regression analysis. In this table "1- λ" value was .51978. So, we could conclude that the shared variance between QOL and LS was 51.978% (Figure 1).

Figure 1
Shared variance between LS and QOL

51,978%

Canonical correlation examined if the canonical model and each canonical function are significant. According to the results, 6 canonical functions were presented (Table 3).

Table 3
Eigenvalues and Canonical Correlations

root no.	Eigen value	Percentage (%)	Cumulative Percentage (%)	Canonical Correlation	Squared Canonical Correlation
one	.46962	55.51565	55.51565	.56529	.31955
2	.23870	28.21780	83.73345	.43898	.19270
3	.06447	7.62130	91.35475	.24610	.06057
4	.03910	4.62236	95.97711	.19398	.03763
5	.02836	3.35246	99.32958	.16606	.02758
6	.00567	.67042	100.000000	.07509	.00564

Table 3 revealed that the canonical correlation value was .56529. According to this, QOL and LS data sets had a shared variance of 31.955% in the first function. The correlation value in the second canonical function was .43898, and the shared variance between QOL and LS was 19.270%. In the third canonical function, the canonical correlation value was found to be .24610 after excluding the shared variance between QOL and LS data sets in the first two canonical functions. According to this the shared variance between QOL and LS data sets was 6.057. The canonical correlation values and shared variances between two data sets were .19398 and 3.763% for the fourth canonical function, .16606 and 2.758% for the fifth canonical function, .07509 and .0564% for the sixth canonical function, respectively.

Dimension reduction analysis was used to show how canonical functions explained much shared variance. In dimension reduction analysis, canonical functions were ranked hierarchically according to the value of correlation (İlhan et al., 2013). By examining the first line of the dimension reduction table, it could be decided if the canonical model was statistically significant. Also, the shared variance was presented in the first line of the table. The second line of this table showed if the canonical model was statistically significant. Also,

in the second line of the table, the shared variance was presented after the first function was excluded. The dimension reduction analysis results for QOL and LS data sets were presented in Table 4.

Table 4
Dimension Reduction Analysis

root	Wilks λ	F	Hypothesis DF	Error DF	Significance of F
"1 to 6"	.48022	4.72672	48.00	1411.30	.000
"2 to 6"	.70574	2.98554	35.00	1209.73	.000
"3 to 6"	.87419	1.64691	24.00	1005.92	.026
"4 to 6"	.93055	1.40568	15.00	798.20	.137
"5 to 6"	.96694	1.22901	8.00	580.00	.279
"6 to 6"	.99436	.55011	3.00	291.00	.648

The results in Table 4 proved the significance of the canonical model obtained from cumulative values of 6 canonical functions (function 1 to 6). Here (Wilks's λ = .48022, F (48, 1411.30) = 4.72672, p<.001). According to Wilks λ value, which belonged to the relationship formed by cumulative values of 1st and 6th canonical functions, the shared variance between QOL and LS data sets was 51.978% [1-λ = .51978]. The remaining two canonical functions (function 2 to 6) after the deduction of the first canonical correlation, which had the highest correlation between canonical variables, showed a significant correlation between QOL and LS (Wilks's λ = .70574, F (35, 1209.73) = 2.98554, p<.05). According to Wilks λ value which belonged to the relationship formed by cumulative values of 1st and 6th canonical functions, the shared variance between QOL and LS was 29.426% [1-λ = .29426]. The third canonical function (function 3 to 6) exhibited a statistically significant relationship between canonical variables (Wilks's λ = .87419, F (24, 1005.92) = 1.64691, p<.05) after the first two canonical functions were excluded. In this function, the shared variance between QOL and LS was 12.581% [1-λ = .12581]. The relationship was formed by cumulative values of fourth and sixth canonical functions (4 to 6). The remaining ones showed insignificant relationships (p>.05). The explained variances were 6.945%, 3.309%, and .564% for (4 to 6), (5 to 6) and (6 to 6) respectively. When significance levels and shared variances were considered, the 1st and 2nd canonical functions guaranteed the significance. That is why the 1st and 2nd canonical functions that made the highest contribution to variance between two variable sets were decided to be interpreted.

Another important aspect of canonical correlation was the quantity of the contribution of variables in data sets to the relationship between canonical variables. Standardized coefficients of canonical functions and structural coefficients were utilized to analyze this contribution. In this study, to identify the amount of contribution of the variables in the QOL

data set ("Physical function", "Physical role", "Pain score", "General health score", "Vitality score", "Social function score", "Emotional function score", "Mental health score") and the variables in LS data set ("Psychologic", "Education", "Social", "Relaxation", "Physiologic" and "Aesthetic"), standardized and structural coefficients of first and second canonical functions were examined. The findings were presented in Table 5. By the summation of shared variance values in the first and second canonical functions of variables in data sets of QOL and LS, the amount of shared variance with their data set in the canonical model could be known. To decide the significance of shared variance in the data set of the variables, .45 values were taken as criteria. This value was represented as "h2". According to Sherry and Henson (2005), the r s and h 2 values ≥ .45 significantly contributed to the variables' data set.

Table 5
Canonical Analysis of Canonical Functions 1 and 2 for the Relationship Between QOL and LS Data Sets

Variable	1st Canonical Function			2nd Canonical Function			
	Standardized Coefficients	Structural Coefficients (r_s)	Square of Structural Coefficients (r^2_s)	Standardized Coefficients	Structural Coefficients (r_s)	Square of Structural Coefficients (r^2_s)	Communality Coefficient (h^2)
"Physical function"	.37350	.49178*	.24185	.33450	-.22638	.051239	.293086
"Physical role"	.37078	.37758	.14277	.37078	-.69856*	.487986	.630757*
"Pain"	-.17178	.23253	.05407	-.82078	-.15073	.02272	.07679
"General health"	.06993	.06279	.00394	-.04426	-.06812	.00464	.008583
"Vitality"	.54946	.25202	.06351	.18785	-.02849	.000812	.064326
"Social functions"	-.78591	-.59628*	.35555	-.20076	-.35723	.127613	.483163*
"Emotional role"	.11222	.26866	.07218	.32894	-.77696*	.603667	.675845*
"Mental Health"	-.35340	-.21118	.04460	.01595	-.37714	.142235	.186832
Rc ²			**.31955**			**.19270**	
"Psychological"	.49270	.85096*	.72413	-.77850	-.43428	.188599	.912732*
"Education"	.03679	.65941*	.43482	.34691	.04603	.211876	.646698*
"Social"	.31444	.73723*	.54351	-.06183	-.26339	.069374	.612882*
"Relaxation"	-.23268	.41318	.17072	-.64799	-.48258*	.232883	.403601
"Physiologic"	.47510	.82111*	.67422	.79263	.36760	.13513	.809351*
"Aesthetic"	.05184	.59200*	.35046	.16249	.15741	.024778	.375242

*Structure coefficients (r_s) > .45*

According to Table 5, in the first canonical function, the contribution of the "Physical function" and "Social function" variables to the life quality data set was over .45. These variables showed a higher contribution than other variables. Additionally, in the first canonical function, "Psychological", "Education", "Social", "Physiologic", and "Aesthetic" variables contributed to LS more than .45. They contributed more significantly to the LS data set than the "Relaxation" variable. The signs of variables contributing to their own data set (especially the variables with structural coefficients ≥.45) help us detect the relationship's direction. In the first canonical function, where the structural coefficients of "Physical

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function" and "Social function" were significant, the sign of the "Social function" variable was negative. This finding indicated that the two variables had a negative relationship. When variables included in LS data set were examined, it was detected that "Psychological", "Education", "Social", "Physiologic," and "Aesthetic" variables showed positive signs, which denoted that these variables had a positive relationship. When the relationship was examined according to "Social function" variable, it could be expressed that "Psychological", "Education", "Social", "Physiologic" and "Aesthetic" variables in LS data set decreased with the increase in "Social function" variable.

The structural coefficients and the canonical correlation coefficient between QOL and LS data sets regarding to the first canonical function were presented in Figure 2. According to Table 5, for the first canonical function, the value of R_c^2 was calculated as .31955. This value indicated that the shared variance between the two data sets was 31.955%.

Figure 2
Structural Coefficients and Canonical Correlation Coefficients Between QOL and LS Data Sets Regarding the First Canonical Function
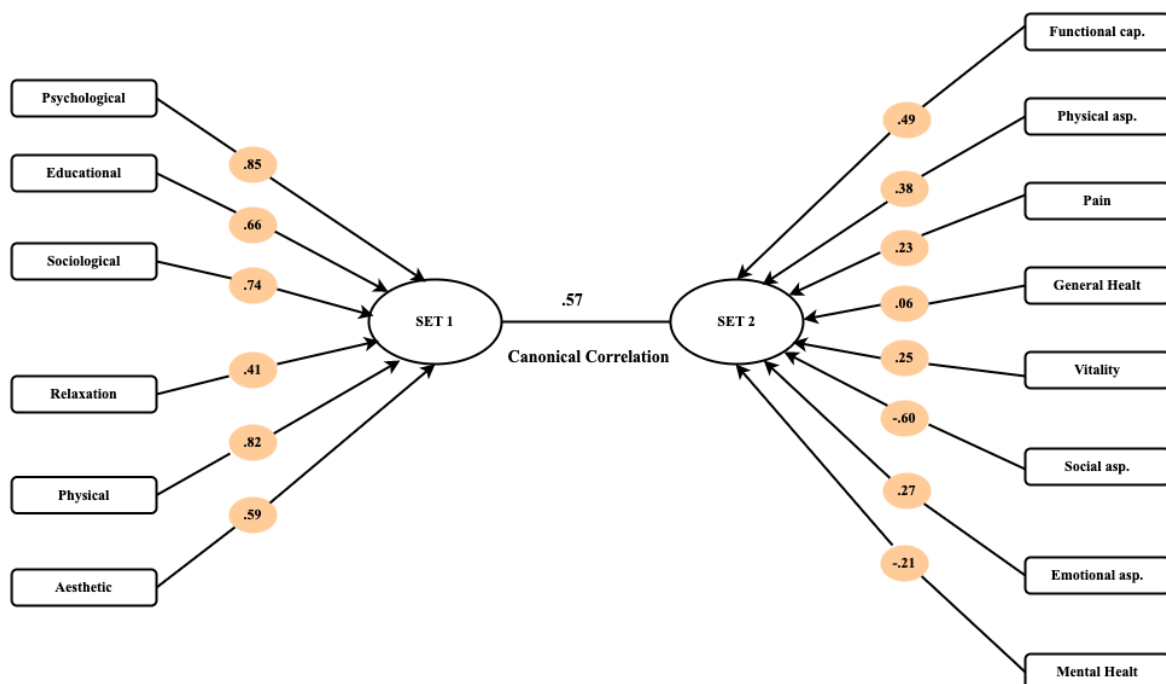

The second canonical function was examined, and the variables that contributed significantly to the second canonical function in the QOL data set showed negative signs. Among them, "Physical role" and "Emotional role" contributed to the QOL data set over .45. Meanwhile, in the LS data set, "Psychological", "Social" and "Relaxation" variables had the same direction, and "Relaxation" variables contributed more than .45 to LS data set. In other words, with their improved "Physical role" and "Emotional role", individuals might get more

LS resulting from the increasing "Relaxation" obtained from leisure activities. Table 5 shows the R c 2 value for the second canonical correlation was .19270. This value indicated that the shared variance between QOL and LS data sets was 19.270%. The structural coefficients and the canonical correlation coefficient between QOL and LS data sets regarding the second canonical function were presented in Figure 3.

Figure 3

Structural Coefficients and Canonical Correlation Coefficients Between QOL and LS Data Sets Regarding to the Second Canonical Function
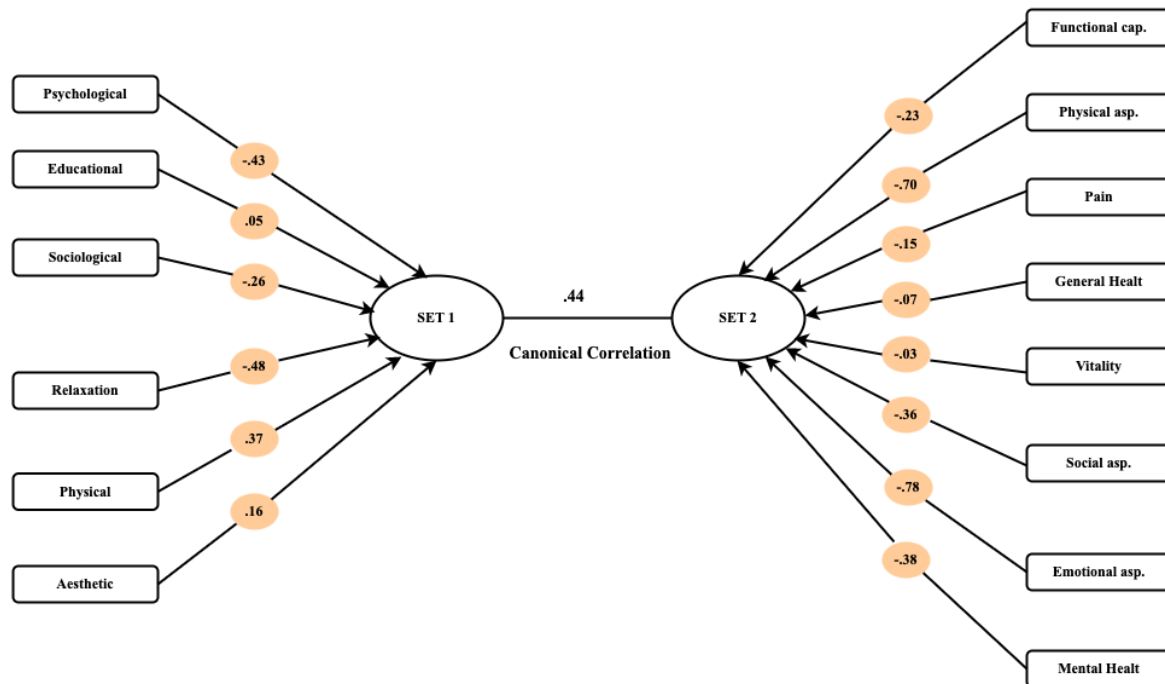
DISCUSSION

This study examined the relationship between LS and QOL by canonical correlation analysis. The analysis brought out two significant canonical functions between LS and QOL. In the first canonical function, the canonical correlation coefficient was found to as .57, and the shared variance as 31.955%. Meanwhile, the second canonical function put forward a correlation coefficient of .44 and a shared variance of 19.270%. The canonical model consisting of cumulative values obtained by correlation analysis showed that the shared variance between these two data sets was 51.978%.

The relationship between the two data sets revealed that LS aspects had a determining role in the aspects of QOL. As a result, it could be observed from the study's findings that a significant relationship existed between LS and QOL. In a study by Zhou et al. (2021), LS predicted all domains of QOL among 940 urban Chinese individuals. Meanwhile, research conducted in Asian countries showed a significant positive relationship among South Korean

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participants (Liang et al., 2013). Another study relating LS and QOL with tourism development found that a positive relationship existed between "LS" and "QOL" (Liao et al., 2016). Health professionals were inquired about their LS, life satisfaction, and QOL, and positive significant relationships were obtained between these two variables (Tokay Argan & Mersin, 2021).

While interpreting the results, it should be considered that the QOL scale shows better health results when the scores increase for each subscale. The satisfaction derived from leisure activities showed a positive relationship with "Physical functioning", "Physical role," and "Emotional role" aspects of QOL. In leisure literature, many presented the positive effects of studies participating in leisure activities on physical health (Mielke et al., 2020; Tian et al., 2016), psychological health (Chun et al., 2012; Goodman et al., 2016; Kim et al., 2018; Lin et al., 2014; McKay, 2012) and cognitive health (Verghese et al., 2003; Wang et al., 2002; Wang et al., 2006; Yates et al., 2016) socialization levels of individuals (Kim et al., 2015b; Schwarzenegger et al., 2005; Zerengok et al., 2018).

One important finding in this study highlighted that satisfaction from leisure activities in terms of "Psychological", "Education", "Social", "Physiologic," and "Aesthetic" was related in the same direction as "Physical functions" and "Physical role" levels of young individuals. In some studies, it was detected that physical activity had a considerable impact on inactivity situations which was an important determinant of mortality, and participating in physical activity improved the physical health condition and life quality of participants (Anokye et al., 2012; DiPietro et al., 2018; O'Dwyer et al., 2017; Villalobos et al., 2019). Meta-analysis studies and systematic reviews handling the effect of physical activity on health expressed that the results of the examined studies showed similar results. According to these results, physical activity had a positive impact on the factors that caused mortality, such as weight or body composition, blood pressure, lipids, glycaemic control, metabolic syndrome, and diabetes. Additionally, it was stated that physical activity protected bone health, and decreased overweight and adiposity risks. The results of the study that Haible et al. (2020) performed on adolescents presented support as it showed that participating in physical activity improved the cardiovascular and muscular fitness levels of the sample. Another considerable result came from a study conducted on disabled individuals. In this study, it was observed that disabled individuals who participated in social activities acquired a high perception of health and life satisfaction, and their level of accepting their disabilities increased (Kim et al., 2015a).

The impact of psychological satisfaction obtained from physical activities that young individuals joined on physical function and physical role restrictions was found to be

considerable. The achieved result highlighted the importance of psychological satisfaction gained in physical activity participation. There were studies presenting evidence of a positive relationship between leisure participation and LS (Huang & Carleton, 2003; Yerlisu Lapa et al., 2012). In other words, some studies revealed that leisure participation increased LS (Ragheb & Griffith, 1982; Ragheb & Tate, 1993); LS leisure increased participation (Sirgy et al., 2010). Therefore, in order to increase leisure participation or the frequency of participation, individuals should acquire a high level of satisfaction from these activities (Beard & Ragheb, 1980). Hence it did not seem likely that an individual repeatedly participating in an activity that he/she did not get psychological satisfaction. According to this result, psychological satisfaction could be important for the continuation of physical activity, and consequently, regular physical activity participation was expected to affect physical functions in a positive way (Vuillemin et al., 2005). A similar situation might be valid for aesthetic satisfaction. Aesthetic satisfaction represented the feelings and views about the fields or places that young individuals used during leisure participation. They could make evaluations of the design, quaintness, and usefulness of these places, and they could change their preferences according to these evaluations.

Another interesting finding in this study was that physical function, which was an important indicator of QOL, changed in the same direction as education and social satisfaction levels. This result might arise from the possibility that regular physical activity participants could gain experiences in time and information on the activities from the informed individuals (such as coaches, instructors, and friends) in their social environment. The increase in awareness and information on physical activity might help maintain and develop physical function levels for young people. Additionally, when the competence in physical activity increased, the motivation to participate in physical activity was expected to increase. The trans-theoretical model explaining why people participate in physical activity highlighted the concept of self-efficacy. According to this model, when individuals participated in physical activity, their self-efficacy increased. Individuals with higher levels of self-efficacy continued to participate in physical activity because self-efficacy was an important source of motivation (Fallon et al., 2005). Individuals with higher levels of motivation participated more in physical activity, which increased QOL and life satisfaction (Chen et al., 2013; Wang, 2008). A grounded theory study on prisoners focused on the benefits of physical activity (Köse, 2021). Prisoners said they achieved physical, psychological, and social benefits and relaxed via physical activities. The relationships between themes obtained supported the findings of the study; the physical benefits achieved by physical activity directly affected the physical health of

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prisoners. Additionally, through socialization and education, prisoners gained awareness of their physical health, which indirectly improved them.

Besides the abovementioned positive effects, the impact of physical activity participation on emotional functions, which were important indicators of LS and life quality, was also remarkable. Various studies revealed a decrease in a negative emotional state such as depression (Ma et al., 2020), anxiety (Bélair et al., 2018) and an increase in a positive emotional states such as psychological well-being and motivation (Meira Jr. et al., 2020; Schmiedeberg & Schröder, 2016; Yang et al., 2012) for regular physical activity participants. Herrera et al. (2011) clarified the situation: By productive leisure activities such as handicrafts, computer usage, arts, music, and physical activity, it was possible to contribute to emotional or cognitive health by changing one of the risk factors or a combination of them such as social isolation, emotional or physical function loss which affected QOL negatively. Köse (2021) reported similar findings stating that individuals had psychological relaxation and improved their psychological health through structured leisure activities. The results showed that psychological relaxation might be key to protecting against psychological problems such as depression, anxiety, and anger. It is possible to mention that there is a positive relationship between physical activity participation and QOL, which attracted researchers' attention. Studies are reporting that participating in physical activity increased the life quality of individuals (Anokye et al., 2012; Gu et al., 2016; Marquez et al., 2020). In other words, some studies showed evidence that physically inactive individuals had lower life quality (Blom et al., 2019). LS was helpful for young individuals to participate in leisure activities and increase their life quality. The relationships between leisure participation, LS, and life satisfaction are worthy of attention (Ragheb & Griffith, 1982; Sato et al., 2016).

Additionally, studies show direct relationships between LS and QOL (Chick et al., 2015; Tokay Argan & Mersin, 2021; Zhou et al., 2021). Ngai (2005) found a positive relationship between LS and QOL; and explained that LS could be related to all subjective areas of QOL. Liang et al. (2013) stated that in Asian culture, positive emotions and self-esteem could be developed, social and cultural harmony could be increased, and values such as human development and flexibility could be gained through leisure. As a result, it could be observed that satisfaction derived from leisure could be effective on QOL of young individuals in terms of an emotional situation, physical health, social and cultural adaptation, and mental condition.

CONCLUSION

QOL represents a kind of contentment of individuals as well as it is a general state of well-being. This study aimed to present a perspective on the role of satisfaction obtained from leisure activities on QOL, which is a complete state of well-being having physical, emotional, and social aspects. Results revealed that different sources of satisfaction obtained from leisure activities had a determining role in increasing the QOL. LS could increase QOL directly. Also, the satisfaction derived from leisure activities could increase life quality indirectly by increasing leisure participation. For future studies, are researchers recommended to inquire about mediating variables between LS and QOL (such as participation, perceived freedom, and motivation…) for presenting a more detailed perspective.

This study is limited to university students participating in elective physical education courses. It is impossible to generalize the results to all university students due to the difficulties in randomization. Another limitation was the lack of conditions that could affect the life quality of students, such as chronic diseases, and psychiatric disorders. For future research, other leisure concepts, such as perceived freedom in leisure, leisure negotiation, and leisure benefit, could be studied in relation to university students' quality of life. Also, these concepts could be studied in different populations such as elderly people, disabled people, or immigrants.

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Authors' contributions

The first author contributed to the study design; the first and second authors analyzed the data; the third author helped with review and editing. All authors revised the manuscript and contributed to the interpretation of the results. All authors have read and approved the final version of the manuscript. A consensus was reached on the order of authors.

Declaration of conflict interest

The authors declare that there is no conflict of interests.

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