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Motives for engaging in physical activity and psycho-educational variables of university students

Motivos para realizar actividad física y variables psicoeducativas de estudiantes universitarios

Motivos para a prática de atividade física e variáveis psico-educacionais de estudantes universitários

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ABSTRACT

At present, despite the emphasis given to empirical studies on the benefits linked to the promotion of healthy lifestyle habits, there are shortcomings when it comes to relating levels of physical activity with the reasons for practicing, especially in the university context. The aim was to analyse the relationships between the motives for physical activity and the levels of sports practice of university students according to gender and areas of study. The sample consisted of 1.524 first-year university students from different degrees at the University of Extremadura (Spain). The instruments used were the Motives for *Physical Activity Measure-Revised* (MPAM-R) and the *International Physical Activity Questionnaire* (IPAQ). The most significant findings reveal significant differences in different variables according to gender in favour of men in the enjoyment dimension, in the social dimension, in competence, in the intensity of activity and in the self-determination index ($p < .001$). There are also significant differences in the branches of knowledge, related to enjoyment, health and in the self-determination index with $p < .001$, but also in competence ($p < .05$).

Keywords: motivation; physical activity; college students; health.

RESUMEN

El objetivo fue analizar las relaciones entre los motivos de práctica de actividad física y los niveles de práctica deportiva de los estudiantes universitarios en función del género y las áreas de estudio. La muestra estuvo formada por 1.524 estudiantes universitarios de primer curso de diferentes titulaciones de la Universidad de Extremadura (España). Los instrumentos utilizados fueron el *Motives for Physical Activity Measure-Revised* (MPAM-R) y el *International Physical Activity Questionnaire* (IPAQ). Los hallazgos más significativos revelan diferencias significativas en distintas variables en función del género a favor de los hombres en la dimensión disfrute, en la dimensión social, en la competencia, en la intensidad de realización de la actividad y en el índice de

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autodeterminación (p < .001). También existen diferencias significativas en las ramas de conocimiento, relacionadas con el disfrute, la salud y en el índice de autodeterminación con p < .001, pero también en la competencia (p < .05).

Palabras clave: motivación; actividad física; estudiantes universitarios; salud.

RESUMO

O objetivo foi analisar as relações entre os motivos para a prática de atividade física e os níveis de prática desportiva dos estudantes universitários em função do sexo e das áreas de estudo. A amostra foi constituída por 1.524 estudantes universitários do primeiro ano de diferentes cursos da Universidade da Extremadura (Espanha). Os instrumentos utilizados foram o *Motives for Physical Activity Measure-Revised* (MPAM-R) e o *International Physical Activity Questionnaire* (IPAQ). Os resultados mais significativos revelam diferenças significativas em diferentes variáveis de acordo com o género, a favor dos homens na dimensão do prazer, na dimensão social, na competência, na intensidade da atividade e no índice de autodeterminação (p < .001). Existem também diferenças significativas nos ramos do conhecimento, relacionadas com o prazer, a saúde e no índice de auto-determinação com p < .001, mas também na competência (p < .05).

Palavras chave: motivação; atividade física; estudantes universitários; saúde.

INTRODUCTION

Currently, one of the most frequently studied topics in the field of Physical Activity (PA) and Sport Science is the different motives that people have for engaging in PA. Despite the emphasis placed on empirical study of the benefits associated with the promotion of healthy lifestyle habits, shortcomings exist when it comes to relating PA levels with the motives for engaging in sports to provide positive and beneficial sporting experiences which at the same time mitigate some of the health issues faced by modern society. If we focus on the different contexts, the university environment is one of the most important, since it is a key age for the maintenance or abandonment of the regular practice of PA. In general, the literature points to the existence of a critical period for adherence to practice of PA-sports (Fernández et al., 2015; Luque-Casado et al., 2021; Sánchez-Beleña et al., 2017). University students are at the end of their teenage years, a period in which a series of biological, psychological, and social changes takes place in the individual (Güemes-Hidalgo et al., 2017). Moreover, it constitutes a significant phase in their development and growth (Brown et al., 2017) and in shaping healthy lifestyles (Kristo et al., 2020; Royo et al., 2023).

Continuous PA is an aspect that is directly linked to healthy habits and benefits, as it contributes to a lower risk of contracting chronic and non-communicable diseases (Chávez et al., 2018; Flores & Aceutino, 2021). One of the great challenges worldwide is to find ways to alleviate the development of chronic diseases. To this end, different studies suggest that some factors, such as low levels of physical activity, sedentary lifestyles and even the establishment of unhealthy lifestyles, could help to address the situation, and are related to factors that are closely related to several modifiable risk factors, in particular physical inactivity, sedentary lifestyles, and poor lifestyle habits (Anderson & Durstine, 2019; Ferrara et al., 2022; Kaur et al., 2022). In line with the above, other authors such as Troiano et al. (2008) found that a high percentage of young people and adolescents do not carry out the established recommendations of doing at least one hour of PA a day, encountering multiple difficulties to engage in sporting activities (De Craemer et al., 2013; Pulimeno et al., 2020; Stamatis et al., 2024).

The increase in research related to this research topic is associated with the role of PA levels as predictors of motivation and intention to be physically active. Based on this body of literature, different theories have emerged to explain the motivational processes of adolescents, especially in the school and sports context (Esmaeilzadeh et al., 2022; Lou et al., 2023;

Sánchez-Herrera et al., 2022; Zubizarreta-Cortadi et al., 2023). The Self-Determination Theory (SDT) (Deci & Ryan, 2000) stands out among these, as it approaches motivation from the viewpoint of physical exercise (Gil-Píriz et al., 2021; Gómez-Mazorra et al., 2021; Iglesias & Moral, 2021; Moreno & Martínez, 2006; Wang, 2017). This explanatory model allows us to understand the motivational process by which a person engages in a behaviour, so that motivation may vary depending on whether it comes from more internal or external reasons, and different forms of motivation can be established: intrinsic motivation, extrinsic motivation (integrated, identified, introjected and external regulation) and demotivation (Sicilia et al., 2014).

Research into PA and health has also increased in recent decades, with studies finding that regular and continuous PA has a direct relationship with improved health and increased life expectancy (Lavie et al., 2019; Rippe, 2019). Despite this scientific evidence, a sedentary lifestyle and high obesity rates constitute major problems worldwide (Bakola et al., 2022; Guthold et al., 2020; Kohl et al., 2012; Woessner et al., 2021), with studies pointing to the existence of low percentages of PA among university students (Chuliá et al., 2005; Durán-Vinagre et al., 2019; Martínez-Alvarado et al., 2022; Santillán et al., 2018; Zubiaur et al., 2020).

In Spain, different empirical studies have been carried out with adolescents in relation to the reasons that lead these people to do AP (Fernández-Ortega et al., 2022; Oja & Piksööt, 2022), and more specifically in a university context (Castañeda et al., 2018; Durán-Vinagre et al., 2021; Macarro et al., 2010; Miyawaki et al., 2017; Palau et al., 2005; Sevil et al., 2018). These studies show that the reasons that motivate these subjects are similar to those of the general population (Rodriguez-Romo et al., 2018), being related to the guidelines associated with PA and sedentary behaviours (Bull et al., 2020). As mentioned above, the university years are considered to be a crucial stage for maintaining PA levels and many studies have been conducted on the reasons for engaging in PA among this population group (Alonso & García, 2010; Castañeda & Campos, 2012; Castillo & Giménez, 2011). The most relevant findings indicate that improving health (Corbí et al., 2019), having fun (Durán-Vinagre et al., 2020) and staying in shape (Castañeda & Campos, 2012; Rodríguez & Sánchez, 2010) are among the most popular motives. Although there is a prevalence of enjoyable activities that include a certain degree of social involvement (Calestine et al., 2017; Durán-Vinagre et al., 2020; Granero-Gallegos et al., 2011), the results may vary depending on the profile and characteristics of each individual (Chacón et al., 2018). Other factors reported by university students are those that are associated with the dimension of competence and those variables associated with personal image and health (Diaz-Milanes et al., 2024; Kilpatrick et al., 2005; Rodriguez-Romo et al., 2018; Serpa dos Santos et al., 2017).

According to Cambronero et al. (2015), it is important to consider not only the reasons why university students engage in PA but also the reasons why they abandon it, such as lack of habit (Rodríguez & Sánchez, 2010) or lack of nearby sports facilities (Flores, 2009). It is also no less important to identify the reasons why this segment of the population has never engaged in any PA in their free time, which include lack of time (Castillo & Sáenz-López, 2008; Rodríguez & Sánchez, 2010; Santos-Villalba et al., 2023; Sanz, 2005) and lack of sporting ability (Flores, 2009; You et al., 2021).

In light of the above, the main objective of this study is to analyze the relationships between the reasons for engaging in PA and the levels of PA among university students according to gender and fields of study, with the aim of detecting the main reasons students engage in PA.

MATERIAL AND METHODS

Study desing

The methodological design consisted of a non-experimental empirical study using a comparative strategy with a cross-sectional cohort (Ato et al., 2013). The study considers different motivational variables and the motives for PA depending on the gender of the participants and the different university degrees categorized by field of study.

Participants

The study was carried out with 1.524 first-year university students from different undergraduate degrees at the University of Extremadura (Spain), who were selected using non-probabilistic, non-random, convenience sampling. Of the participants, 580 were men (38.1%) and 944 were women

(61.9%), with an average age of 20 years (M=19.61±3.658). The sample was divided by fields of studies. This differentiation was made based on the International Standard Classification of Education (ISCED) developed by the UNESCO Institute for Statistics (UNESCO, 2012). The distribution was 118 (7.7%) in Arts and Humanities, of 132 (8.7%) in Sciences, of 351 (23%) in Health Sciences, of 196 (12.9%) in Engineering and Architecture and of 727 (47.7%) in Social and Legal Sciences.

Materials/Instruments

The Self-Determined Motivation Index (SDI) was used to assess self-determined motivation. It is based on the Exercise Behaviour Regulation Questionnaire (BREQ-3), the Spanish version developed by González-Cutre et al. (2010), which assesses, in the context of PA, those types of motivation and their regulations established by the SDT. It was calculated using the following formula established by Vallerand & Rousseau (2001): (3*Intrinsic) + (2*Integrated) + (1*Identified) - (1*Introjected) - (2*External) - (3*Demotivation).

The study used different questionnaires as measurement instruments. The first of these was the Motives for Physical Activity Measure-Revised (MPAM-R) by Ryan et al. (1997) in a version validated in Spanish (Moreno-Murcia et al., 2007). This instrument consists of five factors made up of 30 items on a Likert-type scale, with scores ranging from 1 (strongly disagree) to 7 (strongly agree). The reliability of the dimensions, expressed by the internal consistency value using Cronbach's alpha, were as follows: Fitness (α = .86), Appearance (α = .88), Enjoyment (α = .92), Social (α = 0.86) and Competence (α = 0.91). The reliability of the instrument was optimal (α > .85) (Nunnally & Bernstein, 1994).

In addition, the International Physical Activity Questionnaire (IPAQ) designed by Craig et al. (2003) was administered, which consists of seven questions regarding the frequency, duration, and intensity of PA (moderate and vigorous) in the preceding seven days, along with walking and sitting time during a 24-hour period. The questionnaire may be administered by direct interview, telephone or self-administered survey and it is designed for use with adults aged 18-65 years. The version used consisted of seven items that provide information on the time the person spends performing activities at different levels. The weekly activity is recorded in Mets (Metabolic Equivalent of Task) per minute per week (walking: 3.3 Mets; moderate physical activity: 4 Mets; vigorous physical activity: 8 Mets).

Procedure

Throughout the research process, the principles established in the Declaration of Helsinki (World Medical Association, 2013) were respected, and the ethical standards in sport and exercise science research (Harriss et al., 2019). In addition, approval was obtained from the Bioethics and Biosafety Committee of the University of Extremadura.

Subsequently, permission was requested from the teaching staff responsible for each group and from the participants who finally completed the questionnaire. In all meetings, it was specified that participation was completely voluntary and anonymous, and that it was adjusted in accordance with Organic Law 3/2018, of 5 December, on the Protection of Personal Data and the guarantee of digital rights. In addition, the purpose of the survey was informed, and it was clarified that the duration to complete it would not be more than 15 minutes. The questionnaire was carried out in person, with the main researcher present at the time of data collection. It should be noted that no participant reported difficulties when completing the instrument.

Statistical analysis

Initially, the psychometric properties of the MPAM-R scale were analyzed by means of a confirmatory factor analysis and internal consistency values expressed by Cronbach's alpha. Several indices were considered to evaluate the adequacy of fit of the BREQ-3 and MPAM-R questionnaires used (Hu & Benthler, 1999): the global goodness-of-fit index (GFI), the adjusted goodness-of-fit index (AGFI), the normalized fit index (NFI), the relative fit index (RFI), the root mean square residual (RMR) and the standardized root mean square residual (SRMR). The values of the GFI, AGRFI, NFI and RFI range from 0 to 1, where 0 indicates no fit and 1 indicates optimal fit. Values of 0.95 or above are considered excellent and values above 0.90 suggest an acceptable fit of the model to the data. Since the Root Mean Square Residual (RMR) is affected by the scale on which the variable is measured, it was decided to use the

standardised RMR (SRMR). The optimal values of the fit for RMR and SRMR should be ≤ .50 and appropriate values should be ≤ .09 (Byrne, 2013; Hu & Benthler, 1995; Kline, 2010).

The internal consistency of the data was assessed using McDonald's Omega coefficient (ω), Cronbach's alpha and Composite Reliability (CR). Convergent validity was assessed through the average variance extracted (AVE), this being a demanding criterion, with an AVE value > .40 being considered acceptable (Aldás, 2013). Discriminant validity was assessed and accepted if the square root of the AVE is greater than the correlation coefficient between the factors (Henseler et al., 2015).

A descriptive analysis of the variables under study was carried out to establish the nature of the data. Subsequently, the Mann-Whitney U test was used to obtain the gender differences for the variables studied and the Kruskal-Wallis H test was used for the fields of study. The significance level was set at $p < .05$ (Newell et al., 2014). Finally, the effect size was calculated using Cohen's d, classified as low effect (0-0.2), small effect (0.2-0.6), medium effect (0.6-1.2), large effect (1.2-2.0) and very large effect (>2.0) (Hopkins et al., 2009). The software used was the SPSS 25 (Statistical Package for the Social Sciences, IBM Corp, published in 2012. IBM SPSS Statistics for Windows, Version 25, IBM Corp, Armonk, NY, USA).

RESULTS

The unweighted least squares (ULS) estimation method was used to perform the confirmatory factor analysis (CFA), given that items were found following analysis of the Likert-type scale with a kurtosis and skewness that recommended its application, and in addition the assumption of univariate and multivariate normality was not met (Guàrdia, 2016; Morata-Ramírez et al., 2015). The CFA of the MPAM-R scale had a satisfactory fit across several indicators (Kline, 2010). After studying the modification of indices, it was decided to delete items 23 and 26. The values of the RMR = .169 and *SRMR* = .06 were adequate, while the values of the *GFI* = .98, *AGFI* = .98, *NFI* = .98 and *RFI* = .97 were adequate, with values greater than .95 (Uriel & Aldas, 2005). The motivation scale has an adequate reliability, while the rest of the scales have a reliability slightly below .70 (Field, 2013). The average variance extracted (*AVE*) was higher than 0.5 in all variables, Enjoyment (AVE = .630), Fitness (*AVE* = .555), Competence (*AVE* = .621), Appearance (*AVE* = .565) and Social (*AVE* = .616). In terms of discriminant validity, it was considered adequate as the square root of AVE was higher than the correlations between the constructs, except for the correlation between the factors Enjoyment - Competence, which was lower than the *AVE*, although the value of *AVE* was higher than .62 (Table 1).

Table 1

Descriptive data, reliability and validity analyses, and factor weights of the Unweighted Least Squares model.

Variables	**Items**	M	Median	SD	IQR	Estimate	**α**	**ω**	CR	AVE
I. Enjoyment	MP2	5.15	5.00	1.59	2.00	.807	0.922	0.925	0.91	0.630
	MP7	5.46	6.00	1.62	3.00	.788				
	MP11	5.15	5.00	1.70	3.00	.821				
	MP18	4.97	5.00	1.58	2.00	.784				
	MP22	5.29	6.00	1.70	3.00	.829				
	MP26	5.13	5.00	1.62	2.00	.812				
	MP29	3.89	4.00	1.77	2.00	.723				
II. Appearance	MP5	5.22	6.00	1.69	3.00	.720	0.879	0.886	0.88	0.565
	MP10	4.63	5.00	1.86	3.00	.854				
	MP17	5.25	6.00	1.61	3.00	.835				
	MP20	4.22	4.00	1.86	3.00	.677				
	MP24	5.55	6.00	1.51	2.00	.849				
	MP27	3.57	4.00	1.93	3.00	.514				
III. Social	MP6	4.67	5.00	1.75	2.00	.660	0.862	0.864	0.86	0.616
	MP15	4.49	5.00	1.79	3.00	.912				
	MP21	4.25	4.00	1.71	3.00	.724				
	MP30	4.49	5.00	1.84	2.25	.821				
IV. Fitness	MP1	5.98	6.00	1.27	1.00	.656	0.860	0.861	0.86	0.555
	MP13	5.45	6.00	1.44	2.00	.750				
	MP16	5.23	5.00	1.51	2.00	.693				
	MP19	5.76	6.00	1.36	2.00	.772				
	MP25	5.43	6.00	1.45	2.00	.839				
V. Competence	MP3	4.42	4.00	1.78	3.00	.818	0.877	0.881	0.91	0.621
	MP4	4.89	5.00	1.56	2.00	.756				
	MP8	5.13	5.00	1.59	2.00	.791				
	MP9	4.51	5.00	1.79	2.00	.805				
	MP12	5.05	5.00	1.63	2.00	.705				
	MP14	4.41	4.00	1.78	3.00	.847				

Note: IQR = Interquartile Range; α = Cronbach's internal consistency index; ω = McDonald's Omega coefficient; CR = Composite Reliability; AVE = Average Variance Extracted

The results of the descriptive analysis of the variables related to the MPAM-R, IPAQ and SDI expressed in Table 2 show that the factors most highly valued by the participants were fitness (5.68 ± 1.10) and enjoyment (5.00 ± 1.36), considering that the maximum value of the MPAM-R scale is seven points. In contrast, the social dimension had the lowest mean score of the rest (4.47 ± 1.19).

Positive and statistically significant correlations were found between the motives for PA, the intensity of activity in the last seven days and the SDI ($p < .01$), with the correlations between enjoyment and the social dimension (*Rho*=.658; $p < .01$), competence (*Rho* = .773; $p < .01$) and the SDI (*Rho* = .784; $p < .01$) standing out. Other statistically significant correlations were found between fitness and the social dimension (*Rho* = .635; $p < .01$), and finally competence and the SDI (*Rho* = .670; $p < .01$).

Table 2

Descriptive variables of the MPAM-R, IPAQ and SDI.

Variables	M -SD	Variance	Skewness (Desv. Err=0.06)	Kurtosis (Desv. Error=0.12)	K-S	II	III	IV	V	VI	VII
I. Enjoyment	5.00±1.36	1.87	-0.80	0.31	0.079*	.224**	.658**	.576**	.773**	.299**	.784**
II. Appearance	4.74±1.38	1.38	-0.54	-0.08	0.080*	-	.197**	.464**	.299**	.128**	.183**
III. Social	4.47±1.19	1.49	-0.40	-0.41	0.062*		-	.374**	.561**	.132**	.464**
IV. Fitness	5.68±1.10	1.10	-1.47	3.10	0.069*			-	.635**	.199**	.570**
V. Competence	4.73±1.39	1.39	-0.49	-0.14	0.126*				-	.306**	.670**
VI. IPAQ	2464.20±2446.18	5983806.54	2.68	14.65	0.056*					-	.326**
VII. SDI	7.61±4.62	21.40	-0.69	-0.06	0.157*						-

* $p < .05$; ** $p < .01$

Table 3 shows significant differences in the different variables according to gender. Men scored more favorably than women in enjoyment (U = 200913.50; $p < .001$), the social dimension (U = 228001.50; $p < .001$), competence (U = 204721.00; $p < .001$), intensity of activity (U = 211133.50; $p < .001$) and the SDI (U = 224543.50; $p < .001$). The effect size, applying Cohen's d, showed a medium effect on enjoyment (d = 0.459), competence (d = 0.434) and intensity of PA with the IPAQ (d = 0.392).

Table 3

Inferential results of the motives for PA, the intensity of the activity performed and the SDI for men and women.

Variables	Gender	M-SD	W [1]	p	U	p	d
Enjoyment	Men Women	5.364±.053 4.784±.044	0.952	< .001	200913.50	.000***	.459
Appearance	Men Women	4.750±.055 4.731±.045	0.970	< .001	274645.50	.915	.005
Social	Men Women	4.737±.060 4.315±.048	0.977	< .001	228001.50	.000***	.284
Fitness	Men Women	5.750±.042 5.649±.037	0.888	< .001	264238.50	.252	.059
Competence	Men Women	5.102±.052 4.510±.045	0.978	< .001	204721.00	.000***	.434
IPAQ	Men Women	2963.586 ±106.462 2154.050±75.660	0.806	< .001	211133.50	.000***	.392
SDI	Men Women	8.471 ±.181 7.097±.153	0.956	< .001	224543.50	.000***	.306

*** $p < .001$. [1]Normality test, Shapiro-Wilk.

Table 4 shows the descriptive data for the variables analysed according to the branch of knowledge they studied, showing that the assumption of normality is not met ($p > .05$).

Table 4

Descriptive analysis according to fields of study and normality test.

Variables	Fields of study	n	M	Median	SD	W^1	*p*
Enjoyment	Arts and Humanities	118	4.83	5.00	1.401	0.939	< .001
	Science	132	5.15	5.29	1.246	0.920	< .001
	Health Sciences	351	5.06	5.29	1.304	0.943	< .001
	Engineering and Architecture	196	5.41	5.57	1.171	0.941	< .001
	Social and Legal Sciences	727	4.87	5.14	1.438	0.953	< .001
Appearance	Arts and Humanities	118	4.70	4.75	1.492	0.966	.004
	Science	132	4.85	4.92	1.251	0.977	.023
	Health Sciences	351	4.66	4.83	1.448	0.958	< .001
	Engineering and Architecture	196	4.60	4.75	1.284	0.977	.002
	Social and Legal Sciences	727	4.81	5.00	1.374	0.968	< .001
Social	Arts and Humanities	118	4.31	4.50	1.514	0.970	.009
	Science	132	4.40	4.50	1.437	0.975	.014
	Health Sciences	351	4.46	4.50	1.537	0.969	< .001
	Engineering and Architecture	196	4.81	5.00	1.387	0.970	< .001
	Social and Legal Sciences	727	4.43	4.50	1.493	0.972	< .001
Fitness	Arts and Humanities	118	5.69	6.00	1.137	0.880	< .001
	Science	132	5.85	6.00	0.855	0.918	< .001
	Health Sciences	351	5.82	6.20	1.119	0.828	< .001
	Engineering and Architecture	196	5.81	6.00	1.021	0.891	< .001
	Social and Legal Sciences	727	5.56	5.80	1.140	0.900	< .001
Competence	Arts and Humanities	118	4.54	4.67	1.359	0.977	.037
	Science	132	4.77	4.83	1.288	0.969	.004
	Health Sciences	351	4.79	4.83	1.397	0.968	< .001
	Engineering and Architecture	196	5.01	5.00	1.313	0.958	< .001
	Social and Legal Sciences	727	4.66	4.67	1.428	0.973	< .001
IPAQ (Mets)	Arts and Humanities	118	2405.25	2043.00	2007.932	0.928	< .001
	Science	132	2060.79	1809.00	1722.060	0.920	< .001
	Health Sciences	351	2277.82	1588.50	2258.027	0.796	< .001
	Engineering and Architecture	196	2651.30	2119.50	2033.170	0.919	< .001
	Social and Legal Sciences	727	2586.56	1980.00	2779.966	0.761	< .001
SDI	Arts and Humanities	117	6.78	7.21	4.581	0.971	.013
	Science	132	7.96	8.73	4.262	0.921	< .001
	Health Sciences	351	8.48	9.38	4.352	0.936	< .001
	Engineering and Architecture	196	8.39	9.48	4.216	0.933	< .001
	Social and Legal Sciences	725	7.07	7.63	4.835	0.959	< .001

[1]Normality test, Shapiro-Wilk.

The variables under study were also analyzed according to fields of study (Table 5). The results show statistically significant differences in the dimensions of enjoyment (H = 26.570; $p < .001$), fitness (H = 24.566; $p < .001$) and competence (H = 13.324; $p < .05$) and in the SDI (H = 31.635; $p < .001$). There were no statistically significant differences ($p > .05$) for appearance, the social factor and the IPAQ.

Table 5

Inferential results of the motives for PA, the intensity of the activity performed and the SDI as a function of the field of study.

Variables	*H*	*p*	*d*	Interpretation
Enjoyment	26.570	.000***	.246	EA > SLC
Appearance	5.680	.224	.067	-
Social	11.256	.024	.139	EA > SLC
Fitness	24.566	.000***	.234	HS > SLC
Competence	13.324	.015*	.157	EA > SLC
IPAQ	9.114	.058	.116	-
SDI	31.635	.000***	.272	HSS > SLC

* $p < .05$; ** $p < .01$; *** $p < .001$; AH = Arts and Humanities; S = Science; HS = Health Sciences; EA = Engineering and Architecture; SLS = Social and Legal Sciences.

A significant correlation was found between gender, field of study and categories of PA ($X^2 = 24.689$; $gl = 8$; $p = .002$; $Vc = 0.123$; $p = .003$). As can be seen in Fig 1, the corrected typified residuals (CTR) indicate that men studying Engineering and Architecture degrees showed moderate values of PA (CTR = 2.4). However, men from Health Sciences showed a greater preference for high intensity activities (CTR = 2.1). Meanwhile, women studying Engineering and Architecture degrees were more inclined towards high intensity PA (CTR = 2.7). This was also the case for women studying Health Sciences (CTR = 2.5). Finally, the total values for degrees in the fields of Engineering and Architecture (CTR = 2.5) and Health Sciences (CTR = 1.7) showed higher values for high intensity activities.

Figure 1

Significant results of the contingency table for fields of study and categories of PA as a function of gender (men).

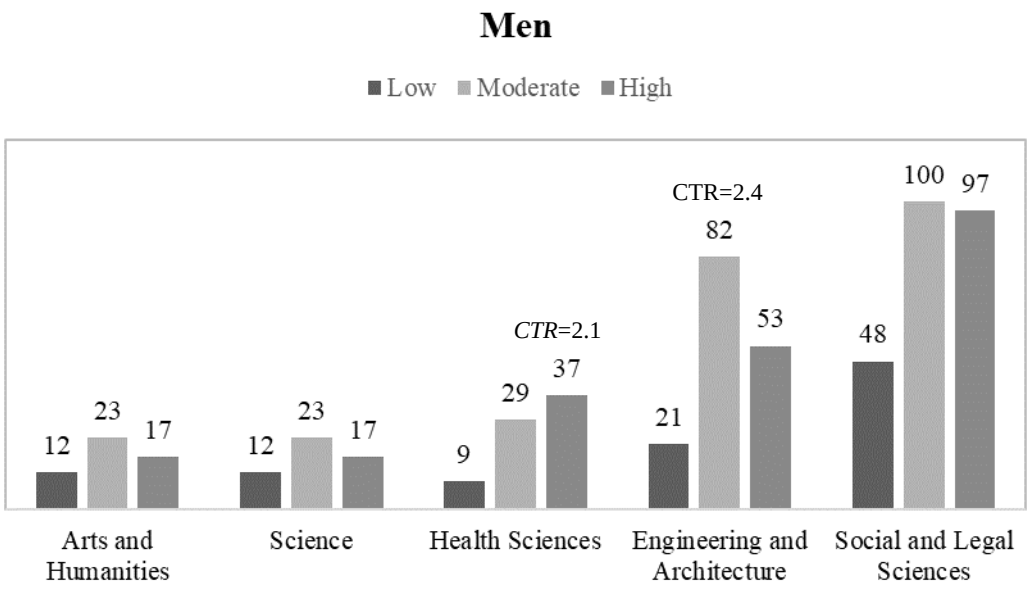
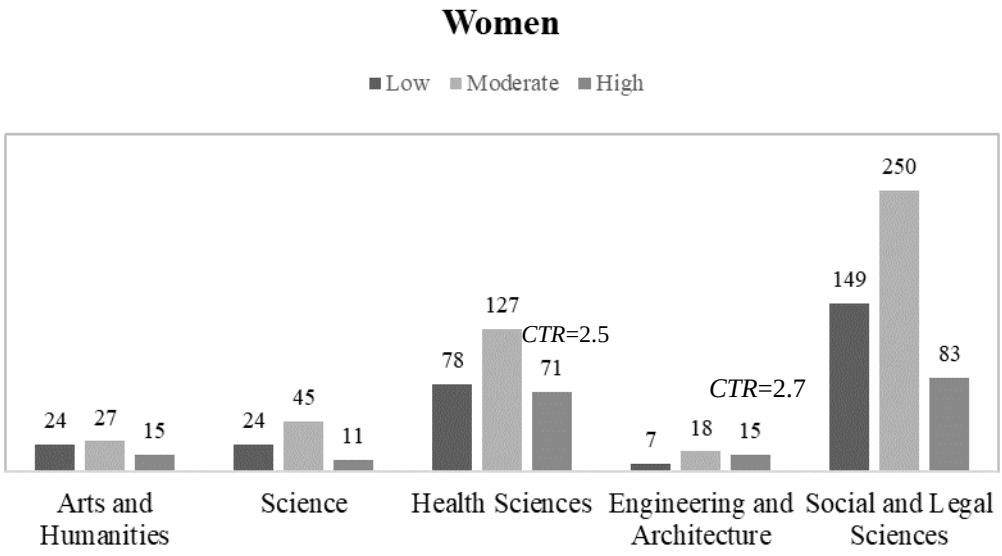


Figure 2
Significant results of the contingency table for fields of study and categories of PA as a function of gender (women).



DISCUSIÓN

The main objective of this work was to examine the relationships between the different factors associated with the practice of PA and the levels of PA among university students according to gender and fields of study. In our case, as absolute fit indices, we have found appropriate values for GFI, AGRFI and SRMR. Likewise, the NFI and RFI as measures of incremental fit present correct indices. The reliability indices also presented very adequate values, so that the structure of the instrument and its reliability is similar to the structure and validation of the Spanish MPAM-R scale (Moreno-Murcia et al., 2007). Based on the results, we can conclude that the main reasons the students engage in PA are fitness and enjoyment. These findings are in line with other studies carried out in the USA (Egli et al., 2011), the United Kingdom (Roberts et al., 2015) and Spain (Cambronero et al., 2015; Durán-Vinagre et al., 2021; Rodriguez-Romo et al., 2018). However, in the study by Pavón & Moreno (2008) the motives for engaging in PA among university students were related to competition and the social factor, relating to their need for self-improvement and a desire to relate to their peer group.

Regarding the relationships between the variables analyzed, the results indicate positive and significant correlations between all the subscales of the MPAM-R, the IPAQ and the SDI, with the highest values between enjoyment and the social factor, enjoyment and competence and enjoyment and the SDI. These differences are consistent with the results of several studies (O'Loughlin et al., 2022; Ugwueze et al., 2021) showing that PA is related to more self-determined types of motivation. The significant relationships between the different motives for PA are also in line with other empirical studies that obtained similar values (Durán-Vinagre et al., 2020; Granero-Jiménez et al., 2022; Gutiérrez et al., 2020). In the study by González-Hernández et al. (2019), the subjects indicated they engaged in PA both because they felt motivated by some internal factor such as the pleasure of performing the activity itself, taking one's mind off things or the sensation of feeling competent, and also external factors such as relating with other people and being able to have fun at the same time. However, while these elements are necessary, intrinsic motivation is of key importance for maintenance of PA as it is more closely related with high levels of PA (Concha-Viera et al., 2017; Cheng & Chen, 2018; Tao et al., 2019; Teixeira et al., 2012). Therefore, developing self-determined behavior favors adherence to PA and, in turn, leads to greater satisfaction with PA (Granero-Jiménez et al., 2022). Despite this, external pressure to behave in a

certain way also seems to play an indispensable role in relation to PA (Tao et al., 2019). Also noteworthy is the existence of statistically significant differences in the results of this study when relating fitness with the social factor and competence with the SDI, in line with other studies such as Durán-Vinagre et al. (2020) and Fernández-Ozcorta et al. (2015). In contrast, other studies argue that the social factor was not the most relevant factor for the participants (Rodriguez-Romo et al., 2018).

With regard to gender, the findings reveal statistically significant differences between the motives of enjoyment, the social factor and competence, with the mean scores being higher for men than women. The same applies in the case of the intensity of PA and the SDI. The data are consistent with different studies showing a similar motivational trend (Cambronero et al., 2015; Egli et al., 2011; Meyer & Bevan-Dye, 2014). More specifically, the study by Fernández et al. (2015) of 422 students at the University of Huelva found the same differences, with the average being higher for men than for women. Various studies show that appearance is a factor associated with women (Fernández-Ozcorta et al., 2015; Guedes et al., 2013; Mahony et al., 2019). However, despite attributing motives relating to skill development to men and appearance and image to women, such affirmations are inconsistent with the data obtained in the present research since both men and women had similar mean values for appearance, in line with the results obtained by other studies (Corbí et al., 2019; García-Puello et al., 2015; Gutiérrez et al., 2020). In fact, in the current study the highest appearance scores were for males, possibly due to the influence of current aesthetic canons (Moreno-Murcia et al., 2016). In line with the above, appearance is one of the most valued motifs today, especially among young people, and is diminishing with age (Rodriguez-Romo et al., 2018).

On the other hand, the study by Castañeda et al. (2018) analyzing the motives for PA of students at the University of Seville concluded that the main motives of the participants were health and aesthetics, followed by enjoyment and social relationships. These findings are in line with our data, since when examining the different fields of study significant differences were found in terms of enjoyment, health, social relations, competence, and the SDI. Interestingly, we found there is a lack of studies allowing comparison of our results with other scientific evidence on the variables analyzed relating to fields of study. However, and in relation to the above, numerous authors have pointed out that the reasons for engaging in PA among university students stand out due to their intrinsic nature: the prevailing elements include fun, improvement of health and physical fitness, motivations and aspects that are distanced from other more extrinsic factors (Alonso & García, 2010; Castañeda et al., 2018; Elijah & Eric, 2012; Gómez-López et al., 2009). In this sense, different studies have found that intrinsic and more self-determined motives are related to better states of physical fitness and health (Sibley et al., 2013), generating various benefits and the possibility of adhering to sports practice and making it sustainable over time (Gómez-López et al., 2009).

The study by Durán-Vinagre et al. (2023) obtained different results when analyzing different fields of study. Engineering and Architecture students had more significant results compared to Arts and Humanities, Social and Legal Sciences and Health Sciences. In our case, the differences observed were between students from Health Sciences and those from Social and Legal Sciences.

Finally, the data showed that there was a significant correlation according to gender, fields of study and the categories established in the IPAQ. More specifically, both men and women showed greater propensity towards high intensity or vigorous activity. This is consistent with the results of other studies, which highlight how those who have a higher level of activity have higher intrinsic motivation, while those who engage in low intensity activity have more extrinsic motivations (Granero-Jiménez et al., 2022; Sevil et al., 2018; Stamatis et al., 2024). This leads us to conclude that people can engage in high intensity PA simply for reasons of self-satisfaction, relegating more extrinsic aspects which consider PA as a means to achieve something and not an end in itself (Sevil et al., 2018; Tao et al., 2019). However, some authors report that extrinsic motivation may be present, although to a lesser extent, in the case of high intensity activities, granting importance to factors such as appearance (O'Loughlin et al., 2022; Ugwueze et al., 2021).

CONCLUSIONS

The data reveal the existence of significant differences between men and women when comparing the variables of the motives for practicing sports, with men being favored in the dimension of enjoyment, the social factor, and competition. There are also relevant findings in the self-determination index and the intensity with which they engage in physical activity. On the other hand, the statistics applied to the variables under study with the areas of knowledge, finding the existence of differences linked to enjoyment, fitness, competence and the index of self-determination and the intensity of physical activity (low, moderate, and high).

To sum up, our findings contribute to knowledge regarding the motives for engaging in PA and the levels of PA among university students. The results of this study indicate the baseline of PA in educational institutions, facilitating establishment of preventive intervention strategies to promote health and favor healthier environments that considering account their diversity.

Some limitations of this study correspond to the data collection as it is based on self-reported questionnaires, which may introduce bias and lack of precision in the answers and the sample size, since the study was conducted with a specific sample of university students, limiting the generalisation of the results to other population groups or university contexts, considering, therefore, that the results may vary depending on the demographic and socio-cultural characteristics of other educational institutions at national or international level.

As future lines of research, a longitudinal study could be designed to evaluate the real impacts of sports programmes in the university community, exploring the effectiveness of intervention programmes aimed at promoting motivation and motives for sports practice, with the aim of increasing their commitment and adherence to regular PA, also analysing the causes of dropout during the university stage.

PRACTICAL APPLICATIONS

Bearing in mind the findings obtained in this research, more work should be done to propose activities according to the needs of everyone so that they can enjoy more pleasurable and positive experiences. In this sense, personalised interventions should be designed to address the specific needs of everyone, thus encouraging healthy habits and promoting physical activity. Along these lines, health promotion programmes should also be developed in university settings as they can include strategies to motivate students to engage in PA, considering their motives and psycho-educational variables. In addition, actions can be implemented to improve self-determination and intensity of physical activity, promoting a healthy lifestyle in the university community.

Another practical implication of this work should be aimed at raising awareness and educating about the importance of PA by carrying out educational campaigns that highlight the benefits of physical activity in preventing diseases and improving quality of life, thus promoting an active and healthy culture in the university environment. In this sense, university sports services play a fundamental role, as they must promote a suitable environment and an offer of physical-sports activities that contribute to mitigating the consequences of physical inactivity.

On the other hand, it should be noted that sport is important for young university students not only for the benefits it brings to their physical health, but also for its positive influence on a psychological level associated with mental health, in the development of social skills, in the construction of interpersonal relationships or even in the improvement of academic performance. Therefore, the practice of sport is a valuable tool to enhance teamwork, leadership, communication, empathy, awareness and socialisation, fundamental aspects in the comprehensive training of university students and in their preparation for their personal and professional life.

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REFERENCIAS

1. Aldás, J. (2013). La invarianza del instrumento de medida. In F. Sarabia (Ed.), *Metodología para la investigación en marketing y dirección de empresas* (pp. 386–410). Pirámide.
2. Alonso, D., García, J. L. (2010). Motivación hacia la práctica físico-deportiva de universitarios gallegos. *Revista de Investigación en Educación*, *8*, 128-138.
3. Anderson, E., Durstine, J. L. (2019). Physical activity, exercise, and chronic diseases: A brief review. *Sports Med Health Sci*, *1*(1), 3-10. https://doi.org/10.1016/j.smhs.2019.08.006
4. Ato, M., López, J. J., Benavente, A. (2013). Un sistema de clasificación de los diseños de investigación en psicología. *Anales de Psicología*, *29*(3), 1038-1059. https://doi.org/10.6018/analesps.29.3.178511
5. Bakola, M., Manthopoulou, T., Bonotis, K., Peritogiannis, V. (2022). Dietary habits and obesity in patients with psychotic disorders in rural areas in northwestern Greece. *Psych*, *4*(1), 1-9. https://doi.org/10.3390/psic4010001
6. Brown, K. A., Patel, D. R., Darmawan, D. (2017). Participation in sports in relation to adolescent growth and development. *Transl Pediatr*, *6*(3), 150-159. https://doi.org/10.21037/tp.2017.04.03
7. Bull, F. C., Al-Ansari, S. S., Biddle, S., Borodulin, K., Buman, M. P., Cardon, G., … Willumsen, J. F. (2020). World Health Organization 2020 guidelines on physical activity and sedentary behaviour. *British Journal of Sports Medicine*, *54*(24), 1451–1462. https://doi.org/10.1136/bjsports-2020-102955
8. Byrne, B. M. (2013). *Structural equation modeling with AMOS: Basic concepts, applications, and programming*. Routledge. https://doi.org/10.4324/9781410600219
9. Calestine, J., Bopp, M., Bopp, C. M., Papalia, Z. (2017). College student work habits are related to physical activity and fitness. *International Journal of Exercise Science*, *10*(7), 1009-1017.
10. Cambronero, M., Blasco, J. E., Chiner, E., Lucas-Cuevas, A. G. (2015). Motivos de participación de los estudiantes universitarios en actividades físico-deportivas. *Revista Iberoamericana de Psicología del Ejercicio y el Deporte*, *10*(2), 179-189.
11. Castañeda, C., Campos, M. C. (2012). Motivación de los estudiantes de la Facultad de Ciencias de la Educación (Universidad de Sevilla) hacia la práctica de actividad físico-deportiva. *Retos. Nuevas tendencias en Educación Física, Deporte y Recreación*, *22*, 57-61.
12. Castañeda, C., Zagalaz, M. L., Arufe, V., Campos-Mesa, M. C. (2018). Motivos hacia la práctica de actividad física de los estudiantes universitarios sevillanos. *Revista Iberoamericana de Psicología del Ejercicio y el Deporte*, *13*(1), 79-89.
13. Castillo, E., Giménez, F. J. (2011). Hábitos de práctica de actividad física del alumnado de la Universidad de Huelva. *Revista Internacional de Medicina y Ciencias de la Actividad Física y el Deporte*, *10*(41), 127-144.
14. Castillo, E., Sáenz-López, P. (2008). Práctica de actividad física y estilo de vida del alumnado de la Universidad de Huelva. (Tesis Doctoral). Universidad de Huelva, Huelva.
15. Chacón, R., Chacón, F., Zurita, F., Chacón, J., Zagalaz, M. L., Chinchilla, J. J. (2018). Characterization of motivation and type of physical sport practice in adults through COMPASS profiles. *Journal of Human Sport and Exercise*, *13*(1), 161-173. https://doi.org/10.14198/jhse.2018.131.16
16. Chávez, M. E., Salazar, C. M., Hoyos, G., Bautista, A., González, D., Ogarrio, C. E. (2018). Physical activity and chronic non-transmissible diseases in Mexican students by gender. *Retos. Nuevas tendencias en Educación Física, Deporte y Recreación*, *33*, 169-174. https://doi.org/10.47197/retos.v0i33.55354
17. Cheng, C. H., Chen, C. H. (2018). Developing a Mobile APP-Supported Learning System for Evaluating Health-Related Physical Fitness Achievements of Students. *Mobile Information Systems*, *2018*, 8960968. https://doi.org/10.1155/2018/8960968
18. Chuliá, M., Ferrer, E., Lizama, N., Martin, S., Monrabal, C. (2005). El sedentarismo en los jóvenes universitarios. *Educare21*, *17*, 125-129.
19. Concha-Viera, A. M., Cuevas, R., Campos, P., González-Hernández, J. (2017). Recursos motivacionales para la autorregulación en la actividad física en edad universitaria. *Cuadernos de Psicología del Deporte*, *17*(2), 27-34.

20. Corbí, M., Palmero-Cámara, C., Jiménez-Palmero, A. (2019). Diferencias en los motivos hacia la actividad física de los universitarios según nivel de actividad y su relación con la satisfacción del servicio deportivo universitario. *Retos. Nuevas Tendencias en Educación Física, Deporte y Recreación*, *35*, 191-195. https://doi.org/10.47197/retos.v0i35.62284
21. Craig, C. L., Marshall, A. L., Sjöström, M., Bauman, A. E., Booth, M. L., Ainsworth, B. E., . . . Oja, P. (2003). International physical activity questionnaire: 12-country reliability and validity. *Medicine & Science in Sports & Exercise*, *35*(8), 1381-1395. https://doi.org/10.1249/01.MSS.0000078924.61453.FB
22. De Craemer, M., De Decker, E., De Bourdeaudhuij, I., Deforche, B., Vereecken, C., Duvinage, K., . . . Cardon, G. (2013). Physical activity and beverage consumption in preschoolers: focus groups with parents and teachers. *BMC Public Health*, *13*, 278. https://doi.org/10.1186/1471-2458-13-278
23. Deci, E. L., Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behaviour. *Psychological Inquiry*, *11*, 227-268. https://doi.org/10.1207/S15327965PLI1104_01
24. Diaz-Milanes, D., Santin, C., Andrés-Villas, M., Segura-Barriga, A., Pérez-Moreno, P. J. (2024). Evidence of validity, invariance, and reliability of te body image dimension in the body investment scale: a study in spanish university students. *Psych*, *6*(1), 345-355. https://doi.org/10.3390/psych6010020
25. Durán-Vinagre, M. Á, Ibáñez, S. J., Feu, S., Sánchez-Herrera, S. (2023). Analysis of the motivational processes involved in university physical activity. *Frontiers in Psychology*, *13*, 1080162. https://doi.org/10.3389/fpsyg.2022.1080162
26. Durán-Vinagre, M. Á., Feu, S., Sánchez-Herrera, S., Cubero, J. (2020). Motives of Future Elementary School Teachers to Be Physically Active. *International Journal of Environmental Research and Public Health*, *17*(12), 4393. https://doi.org/10.3390/ijerph17124393
27. Durán-Vinagre, M. Á., Sánchez, S., Feu, S. (2019). Influencia de la actividad físico-deportiva y la intención de ser físicamente activos en universitarios de la facultad de educación de la UEx. *International Journal of Developmental and Educational Psychology*, *1*(Monográfico 4), 83-96. https://doi.org/10.17060/ijodaep.2019.n1.v5.1563
28. Durán-Vinagre, M. Á., Sánchez, S., Feu, S. (2021). La motivación de los estudiantes universitarios para realizar actividad física. *International Journal of Developmental and Educational Psychology*, *1*(2), 147-156. https://doi.org/10.17060/ijodaep.2021.n1.v2.2126
29. Egli, T., Bland, H. W., Melton, B. F., Czech, D. R. (2011). Influence of age, sex, and race on college students´ exercise motivation of physical activity. *Journal of American College Health*, *59*(5), 399-406. https://doi.org/10.1080/07448481.2010.513074
30. Elijah, G. R., Eric, D. K. N. (2012). Motivational gender differences in sport and exercise participation among univeristy sport science students. *Journal of Physical Educational and Sport*, *12*(2), 180-187.
31. Esmaeilzadeh, S., Rodriquez-Negro, J., Pesola, A. J. (2022). A Greater Intrinsic, but Not External, Motivation Toward Physical Activity Is Associated With a Lower Sitting Time. *Frontiers in Psychology*, *13*, 888758. https://doi.org/10.3389/fpsyg.2022.888758
32. Fernández, E. J., Sáenz-López, P., Almagro, B. J., Conde, C. (2015). Motivos de práctica de actividad física en universitarios activos. *EmásF. Revista Digital de Educación Física*, *6*(34), 52-60.
33. Fernández-Ortega, C., González-Bernal, J., Gonzalez-Bernal, S., Trigueros, R., Aguilar-Parra, J. M., Minguez-Minguez, L. A., ... De La Fuente Anuncibay, R. (2022). The Perception of Teaching, Learning Styles and Commitment to Learning and Their Influence on the Practice of Physical Activity and Eating Habits Related to the Mediterranean Diet in Physical Education Students. *Frontiers in Psychology*, *13*, 927667. https://doi.org/10.3389/fpsyg.2022.927667
34. Fernández-Ozcorta, E. J., Almagro, B. J., Sáenz-López, P. (2015). Predicción de la intención de seguir siendo físicamente activos en estudiantes universitarios. *Cuadernos de Psicología del Deporte*, *15*(1), 275-284. https://doi.org/10.4321/S1578-84232015000100026

35. Ferrara, M., Langiano, E., Falese, L., Diotaiuti, P., Cortis, C., De Vito, E. (2022). Changes in Physical Activity Levels and Eating Behaviours during the COVID-19 Pandemic: Sociodemographic Analysis in University Students. *International Journal of Environmental Research and Public Health*, *19*(9). https://doi.org/10.3390/ijerph19095550
36. Field, A. P. (2013). *Discovering statistics using SPSS* (4ª ed.). Londres, Inglaterra: SAGE.
37. Flores, B., Aceutino, J. (2021). Planes de prevención de enfermedades crónicas no transmisibles en niños y adolescentes. *Revista Pediatría Atención Primaria*, *23*(90), 143-153.
38. Flores, G. (2009). Actividad físico-deportiva del alumnado de la Universidad de Guadalajara (México). Correlatos biológicos y cognitivos asociados. (Tesis Doctoral). Universidad de San Javier, Murcia.
39. García-Puello, F., Herazo-Beltrán, Y., Tuesca-Molina, R. (2015). Levels of physical activity among colombian university students. *Rev Med Chil*, *143*(11), 1411-1418. https://doi.org/10.4067/S0034-98872015001100006
40. Gil-Píriz, D., Leyton-Román, M., Mesquita, S., Jiménez-Castuera, R. (2021). Barriers to the practice of sport and physical activity from the perspective of Self-Determination Theory. *Sustainability*, *13*(14), 7665. https://doi.org/10.3390/su13147665
41. Gómez-López, M., Ruiz-Juan, F., García-Montes, M. E., Granero, A., Piéron, M. (2009). Motivaciones aludidas por los universitarios que practican actividades físico-deportivas. *Revista Latinoamericana de Psicología*, *41*(3), 519-532.
42. Gómez-Mazorra, M., Sánchez-Oliva, D., Labisa, A. (2021). Motivational processes towards physical activity in the school context in Colombian university students: a study from the self-determination theory. *Educación Física y Deporte*, *40*(1). https://doi.org/10.17533/udea.efyd.v40n1a05
43. González-Cutre, D., Sicilia, A., Fernández, A. (2010). Hacia una mayor comprensión de la motivación en el ejercicio físico: medición de la regulación integrada en el contexto español. *Psicothema*, *22*(4), 841-847.
44. González-Hernández, J., Gómez-López, M., Pérez-Turpin, J. A., Muñoz-Villena, A. J., Andreu-Cabrera, E. (2019). Perfectly Active Teenagers. When Does Physical Exercise Help Psychological Well-Being in Adolescents? *International Journal of Environmental Research and Public Health*, *16*(22). https://doi.org/10.3390/ijerph16224525
45. Granero-Gallegos, A., Gómez-López, M., Abraldes, J. A., Rodríguez-Suárez, N. (2011). Motives of practice in the field of non-competitive physical activity. *Espiral. Cuadernos del profesorado*, *4*(7), 15-22. https://doi.org/10.25115/ecp.v4i7.915
46. Granero-Jiménez, J., López-Rodríguez, M. M., Dobarrio-Sanz, I., Cortés-Rodríguez, A. E. (2022). Influence of Physical Exercise on Psychological Well-Being of Young Adults: A Quantitative Study. *International Journal of Environmental Research and Public Health*, *19*(7), 4282. https://doi.org/10.3390/ijerph19074282
47. Guàrdia, J. (2016). Esquema y recomendaciones para el uso de los Modelos de Ecuaciones Estructurales. *Revista de Estudios e Investigación en Psicología y Educación*, *3*(2), 75-80. https://doi.org/10.17979/reipe.2016.3.2.1847
48. Guedes, D. P., Legnani, R. F., Legnani, E. (2013). Exervise motives in a sample of Brazilian university students. *Motriz, Río Claro*, *19*(3), 590-596. https://doi.org/10.1590/S1980-65742013000300009
49. Güemes-Hidalgo, M., Ceñal, M. J., Hidalgo, M. I. (2017). Pubertad y adolescencia. *Revista de Formación Continuada de la Sociedad Española de Medicina de la Adolescencia*, *5*(5), 7-22.
50. Guthold, R., Stevens, G. A., Riley, L. M., Bull, F. C. (2020). Global trends in insufficient physical activity among adolescents: a pooled analysis of 298 population-based surveys with 1·6 million participants. *Lancet Child Adolesc Health*, *4*(1), 23-35. https://doi.org/10.1016/S2352-4642(19)30323-2
51. Gutiérrez, J. M., Feu, S., Blázquez, A. (2020). Motivos de práctica deportiva y participación en actividades físico-deportivas en maestros españoles. *RICYDE: Revista Internacional de Ciencias del Deporte*, *60*(16), 116-132. https://doi.org/10.5232/ricyde2020.06002
52. Harriss, D. J., MacSween, A., Atkinson, G. (2019). Ethical standards in sport and exercise science research: 2020 update. *International*

Journal of Sports Medicine, *40*(13), 813-817. https://doi.org/10.1055/a-1015-3123
53. Henseler, J., Ringle, C. M., Sarstedt, M. A. (2015). New criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, *43*, 115–135. https://doi.org/10.1007/s11747-014-0403-8
54. Hopkins, W. G., Marshall, S. W., Batterham, A. M., Hanin, J. (2009). Progressive statistics for studies in sports medicine and exercise science. *Med Sci Sports Exerc*, *41*(1), 3-13. https://doi.org/10.1249/MSS.0b013e31818cb278
55. Hu, L., Benthler, P. M. (1995). Evaluating model fit. In R. H. Hoyle (Ed.), *Structural equation modeling: Concepts, issues, and applications* (pp. 76-99). Sage Publications, Inc.
56. Hu, L., Benthler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *6*(1), 1-55. https://doi.org/10.1080/10705519909540118
57. Iglesias, C., Moral, M. V. (2021). Rendimiento deportivo en atletas federados y su relación con autoestima, motivación e inteligencia emocional. *Revista de Psicología Aplicada al Deporte y al Ejercicio Físico*, *6*(e14), 1-13. https://doi.org/10.5093/rpadef2021a15
58. Kaur, S., Kaur, M., Kumar, R. (2022). Health promotion intervention to prevent risk factors of chronic diseases: Protocol for a cluster randomized controlled trial among adolescents in school settings of Chandigarh (India). *PLoS One*, *17*(2), e0263584. https://doi.org/10.1371/journal.pone.0263584
59. Kilpatrick, M., Hebert, E., Bartholomew, J. (2005). College students' motivation for physical activity: differentiating men's and women's motives for sport participation and exercise. *J Am Coll Health*, *54*(2), 87-94. https://doi.org/10.3200/JACH.54.2.87-94
60. Kline, R. B. (2010). *Principles and Practice of Structural Equation Modeling (3rd ed.)*. Guilford Press, New York.
61. Kohl, H. W., Craig, C. L., Lambert, E. V., Inoue, S., Ramadan, J., Leetongin, G., Kahlmeir, S. (2012). The pandemic of psychical inactivity: Global action for public health. *Lancet*, *380*(9839), 294-305. https://doi.org/10.1016/S0140-6736(12)60898-8
62. Kristo, A. S., Gültekin, B., Öztağ, M., Sikalidis, A. K. (2020). The Effect of Eating Habits' Quality on Scholastic Performance in Turkish Adolescents. *Behav Sci (Basel)*, *10*(1). https://doi.org/10.3390/bs10010031
63. Lavie, C. J., Ozemek, C., Carbone, S., Katzmarzyk, P. T., Blair, S. N. (2019). Sedentary behavior, exercise, and cardiovascular health. *Circulation Research*, *124*(5), 799-815. https://doi.org/10.1161/CIRCRESAHA.118.312669
64. Lou, H., Chen, J., Liu, P. (2023). The impact of adolescents' health motivation on the relationship among mental stress, physical exercise, and stress symptoms during COVID-19: A dual moderation model. *Front Public Health*, *11*, 1164184. https://doi.org/10.3389/fpubh.2023.1164184
65. Luque-Casado, A., Mayo, X., Lavín-Pérez, A. M., Jiménez, A., Del Villar, F. (2021). Understanding behavioral regulation towards physical activity participation: do we need a paradigm shift to close the gender gap? *Sustainability*, *13*, 1683. https://doi.org/10.3390/su13041683
66. Macarro, J., Romero, C., Torres, J. (2010). Motivos de abandono de la práctica de actividad físico-deportiva en los estudiantes de bachillerato de la provincia de Granada. *Revista de Educación*, *353*, 495-519.
67. Mahony, R., Blake, C., Matthews, J., Donnoghue, G. O., Cunningham, C. (2019). Physical activity levels and self-determined motivation among future healthcare professionals: Utility of the Behavioral Regulation in Exercise Questionnaire (BREQ-2). *Physiother Theory Pract*, *35*(9), 884-890. https://doi.org/10.1080/09593985.2018.1457112
68. Martínez-Alvarado, J. R., Guillén, F., Aguiar, L. H., Magallanes, A. G., Campuzano, A. (2022). Predictores del bienestar psicológico en estudiantes universitarios mexicanos físicamente activos. *Cuadernos de Psicología del Deporte*, *22*(3), 227-237. https://doi.org/10.6018/cpd.355641
69. Meyer, N., Bevan-Dye, A. L. (2014). Gender differences in South African Generation Y students' motives for engaging in physical activity. *Mediterranean Journal of Social*

Sciences, *5*(21), 195-202. https://doi.org/10.5901/mjss.2014.v5n21p195

70. Miyawaki, C. E., Bouldin, E. D., Kumar, G. S., McGuire, L. C. (2017). Associations between Physical Activity and Cognitive Functioning among Middle-Aged and Older Adults. *J Nutr Health Aging*, *21*(6), 637-647. https://doi.org/10.1007/s12603-016-0835-6
71. Morata-Ramírez, M. A., Holgado-Tello, F. P., Barbero-García, I., Méndez, G. (2015). Análisis factorial confirmatorio. Recomendaciones sobre mínimos cuadrados no ponderados en función del error tipo I de Chi-Cuadrado y RMSEA. *Acción Psicológica*, *12*(1), 79-90. https://doi.org/10.5944/ap.12.1.14362
72. Moreno, J. A., Martínez, A. (2006). Importancia de la Teoría de la Autodeterminación en la práctica físico-deportiva: Fundamentos e implicaciones prácticas. *Cuadernos de Psicología del Deporte*, *6*(2), 39-54.
73. Moreno-Murcia, J. A., Cervelló, E., Martínez, A. (2007). Validación de la Escala de Medida de los Motivos para la Actividad Física-Revisada en españoles: diferencias por motivos de participación. *Anales de psicología*, *23*(1), 167-176.
74. Moreno-Murcia, J. A., Marcos-Pardo, P. J., Huéscar, E. (2016). Motivos de práctica físico-deportiva en mujeres: diferencias entre practicantes y no practicantes. *Revista de Psicología del Deporte*, *25*(1), 35-41.
75. Newell, J., Aitchison, T., Grant, S. (2014). *Statistics for sports and exercise science: A practical approach*. Routledge. https://doi.org/10.4324/9781315847542
76. Nunnally, J. C., Bernstein, I. H. (1994). *Psychometric theory*. McGraw-Hill.
77. Oja, L., Piksööt, J. (2022). Physical Activity and Sports Participation among Adolescents: Associations with Sports-Related Knowledge and Attitudes. *International Journal of Environmental Research and Public Health*, *19*(10), 6235. https://doi.org/10.3390/ijerph19106235
78. O'Loughlin, E. K., Sabiston, C. M., DeJonge, M. L., Lucibello, K. M., O'Loughlin, J. L. (2022). Associations among physical activity tracking, physical activity motivation and level of physical activity in young adults. *Journal of Health Psychology*, *27*(8), 1833-1845. https://doi.org/10.1177/13591053211008209
79. Palau, P., Ponseti, X., Gili, M., Borrsa, P. A., Vidal, J. (2005). Motivos para el inicio, mantenimiento y abandono de la práctica deportiva de los preadolescentes de la isla de Mallorca. *Apunts. Educación Física y Deportes*, *81*, 5-11.
80. Pavón, A., Moreno, J. A. (2008). Actitud de los universitarios ante la práctica físico-deportiva: diferencias por género. *Revista de Psicología del Deporte*, *17*(1), 7-23.
81. Pulimeno, M., Piscitelli, P., Colazzo, S., Colao, A., Miani, A. (2020). School as ideal setting to promote health and wellbeing among young people. *Health Promot Perspect*, *10*(4), 316-324. https://doi.org/10.34172/hpp.2020.50
82. Rippe, J. M. (2019). Lifestyle Medicine 2019: Deeper, Broader, and More Precise. *American Journal Lifestyle Medicine*, *13*(5), 436-439. https://doi.org/10.1177/1559827619845342
83. Roberts, S., Reeves, M., Ryrie, A. (2015). The influence of physical activity, sport, and exercise motives among UK-based university students. *Journal of Further and Higher Education*, *39*(4), 598-607. https://doi.org/10.1080/0309877x.2014.938265
84. Rodríguez, A., Sánchez, E. (2010). *Los universitarios y el deporte*. Wanceulen. Sevilla.
85. Rodriguez-Romo, G., Macias-Pla, R., Garrido-Muñoz, M., Tejero-Gonzalez, C. M., López-Adan, E. (2018). Motivos para la práctica de actividad física durante el tiempo libre y su relación con el cumplimiento de las recomendaciones. *Cuadernos de Psicología del Deporte*, *18*(1), 183-194.
86. Royo, E., Latorre-Peña, J., Denoni, M., Orejudo, S. (2023). The mediating role played by perceived motor competence in the relationship between motor competence and physical activity in spanish adolescents. *Sustainability*, *15*(23), 16327. https://doi.org/10.3390/su152316327
87. Ryan, R.M., Frederick, C.M., Lepes, D., Rubio, N., Sheldon, K.M. (1997). Intrinsic motivation and exercise adherence. *Int J Sports Psychol*, *28*(4), 335–354.
88. Sánchez-Beleña, F., García-Naveira, A. (2017). Sobreentrenamiento y deporte desde una perspectiva psicológica: estado de la cuestión. *Revista Aplicada al Deporte y al Ejercicio*

Físico, *2*(2), 1-12. https://doi.org/10.5093/rpadef2017a8

89. Sánchez-Herrera, S., Cubero, J., Feu, S., Durán-Vinagre, M. (2022). Motivation Regarding Physical Exercise among Health Science University Students. *International Journal of Environmental Research and Public Health*, *19*(11), 6524. https://doi.org/10.3390/ijerph19116524
90. Santillán, R. R., Asqui, J. E., Casanova, T. A., Santillán, H. R., Obregón, G. A., Vásquez, M. G. (2018). Niveles de actividad física en estudiantes de administración de empresa y medicina de la ESPOCH. *Revista Cubana de Investigaciones Biomédicas*, *37*(4), 1-12.
91. Santos-Villalba, M. J., Alcalá del Olmo, M. J., Montenegro, M., Fernández, J. (2023). Incident factors in Andalusian university dropout: A qualitative approach from the perspective of higher education students. *Frontiers in Education*, *7*, 1083773. https://doi.org/10.3389/feduc.2022.1083773
92. Sanz, E. (2005). La práctica físico-deportiva de tiempo libre en universitario. Análisis y propuesta de mejora. (Tesis Doctoral). Universidad de La Rioja, Logroño.
93. Serpa dos Santos, J. C., Castillo, E., Gama de Araujo, A. P., Giménez, F. J. (2017). Relación entre actividad física, composición corporal e imagen corporal en estudiantes universitarios. *SPORT TK-Revista EuroAmericana de Ciencias del Deporte*, *6*(2), 39-48. https://doi.org/10.6018/300381
94. Sevil, J., Sánchez-Miguel, P. A., Pulido, J. J., Práxedes, A. (2018). Motivation and physical activity: Differences between high school and university students in Spain. *Perceptual and Motor Skills*, *125*(5), 894-907. https://doi.org/10.1177/0031512518788743
95. Sibley, B. A., Hancock, L., Bergman, S. M. (2013). University students exercise behavioral regulation, motives, and physical fitness. *Percept Mot Skills*, *116*(1), 322-339. https://doi.org/10.2466/06.10.PMS.116.1.322-339
96. Sicilia, A., Ferriz, R., González-Cutre, D. (2014). Relación entre la satisfacción de las necesidades psicológicas básicas durante la educación física recibida en la educación secundaria obligatoria y las conductas saludables al inicio del bachillerato. *Revista Brasileira de Ciencias do Esporte*, *35*(2), S59-S74.
97. Stamatis, A., Morgan, G. B., Boolani, A., Papadakis, Z. (2024). The positive association between grit and mental toughness, enhanced by a minimum of 75 minutes of moderate-to-vigorous physical activity, among US students. *Psych*, *6*(1), 221-235. https://doi.org/10.3390/psych6010014
98. Tao, K., Liu, W., Xiong, S., Ken, L., Zeng, N., Peng, Q., Gao, Z. (2019). Associations between self-determined motivation, accelerometer-determined physical activity, and quality of life in Chinese college students. *International Journal of Environmental Research and Public Health*, *16*(16), 2941. https://doi.org/10.3390/ijerph16162941
99. Teixeira, P. J., Carraca, E. V., Markland, D., Silva, M. N., Ryan, R. M. (2012). Exercise, physical activity, and self-determination theory: a systematic review. *International Journal of Behavioral Nutrition and Physical Activity*, *9*(1), 1-30. https://doi.org/10.1186/1479-5868-9-78
100. Troiano, R. P., Berrigan, D., Dodd, K. W., Mâsse, L. C., Tilert, T., McDowell, M. (2008). Physical activity in the United States measured by accelerometer. *Med Sci Sports Exerc*, *40*(1), 181-188. https://doi.org/10.1249/mss.0b013e31815a51b3
101. Ugwueze, F. C., Agbaje, O. S., Umoke, P. C. I., Ozoemena, E. L. (2021). Relationship Between Physical Activity Levels and Psychological Well-Being Among Male University Students in South East, Nigeria: A Cross-Sectional Study. *Am J Mens Health*, *15*(2), 15579883211008337. https://doi.org/10.1177/15579883211008337
102. UNESCO. (2012). *International Standard Classification of Education ISCED 2011*. UNESCO Institute for Statistics.
103. Uriel, E., Aldas, J. (2005). *Análisis Multivariante Aplicado*. Thomson Editorial. Madrid.
104. Vallerand, R. J., Rousseau, F. L. (2001). Intrinsic and extrinsic motivation in sport and exercise: A review using the hierarchical model of intrinsic and extrinsic motivation. In R. N. Singer, H. A. Hausenblas, & C. M. Janelle (Eds.), *Handbook of sport psychology* (2nd

ed.)(pp. 389-416). New York: John Wiley & Sons.

105. Wang, W. (2017). Using rubrics in student self-assessment: student perceptions in the English as a foreign writing context. *Assessment & Evaluation in Higher Education*, *42*(8), 1280-1290. https://doi.org/10.1080/02602938.2016.1261993

106. Woessner, M. N., Tacey, A., Levinger-Limor, A., Parker, A. G., Levinger, P., Levinger, I. (2021). The Evolution of Technology and Physical Inactivity: The Good, the Bad, and the Way Forward. *Frontiers in Public Health*, *9*, 655491. https://doi.org/10.3389/fpubh.2021.655491

107. World Medical Association. (2013). World Medical Association Declaration of Helsinki: ethical principles for medical research involving human subjects. *JAMA*, *310*(20), 2191-2194. https://doi.org/10.1001/jama.2013.281053

108. You, J., Woosuk, K., Lee, H., Know, M. (2021). Best content standards in sports career education for adolescents: a Delphi survey of Korean professional views. *Sustainability*, *13*(12), 6566. https://doi.org/10.3390/su13126566

109. Zubiaur, M., Zitouni, A., Del Horno, S. (2020). Comparison of Sports Habits and Attitudes in University Students of Physical and Sports Education of Mostaganem (Algeria) and Physical Activity and Sport Sciences of León (Spain). *Frontiers in Psychology*, *11*, 593322. https://doi.org/10.3389/fpsyg.2020.593322

110. Zubizarreta-Cortadi, A., Arribas-Galarraga, S., Luis de Cos, I. (2023). Perfil del deportista resiliente en función de la orientación motivacional y la diversión en la práctica deportiva federada. *Cuadernos de Psicología del Deporte*, *23*(1), 158-174. https://doi.org/10.6018/cpd.512041