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Sport motivation, adherence to the mediterranean diet and digital leisure. An explanatory model for gender in education students

Motivación deportiva, adherencia a la dieta mediterránea y ocio digital. Un modelo explicativo en estudiantes de educación en función del sexo

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Abstract

The motivation developed towards sport plays a key role in the adherence to a healthy dietary pattern, however, it also plays an important role towards digital entertainment. Taking this into account, the present study aims to develop an explanatory model of the incidence of sport motivation on adherence to a healthy dietary pattern and adherence to video games and to contrast the structural model by means of a multi-group analysis according to gender. To this end, a cross-sectional descriptive comparative study was carried out with 1112 participants (25.09±6.22). The instruments used were a sociodemographic questionnaire, the Predimed questionnaire, the Perceived Motivational Climate in Sport Questionnaire (PMCSQ-2) and the Video Game Related Experiences Questionnaire (CERV). Finally, the results reveal that the female sex obtains a negative relationship between sport motivation and digital leisure, while the male sex reflects a negative relationship between task climate and adherence to the Mediterranean diet.

Keywords

Sport motivation, mediterranean diet adherence, digital entertainment, gender

Resumen

La motivación desarrollada hacia el deporte juega un papel clave en la adherencia a un patrón dietético saludable, sin embargo, también juega un papel importante hacia el ocio digital. El presente estudio pretende desarrollar un modelo explicativo de la incidencia de la motivación hacia el deporte en la adherencia a un patrón dietético saludable y la adicción a los videojuegos y contrastar el modelo estructural mediante un análisis multigrupo en función del sexo de los participantes. Para ello se realizó un estudio descriptivo comparativo transversal con 1112 participantes (25,09±6,22). Los instrumentos utilizados fueron un cuestionario sociodemográfico, el cuestionario Predimed, el Cuestionario de Clima Motivacional Percibido en el Deporte (PMCSQ-2) y el Cuestionario de Experiencias Relacionadas con los Videojuegos (CERV). Finalmente, los resultados revelan que el sexo femenino obtiene una relación negativa entre la motivación deportiva y el ocio digital, mientras que el sexo masculino refleja una relación negativa entre el clima de tarea y la adherencia a la dieta mediterránea.

Palabras clave

Motivación deportiva; adherencia a la dieta mediterránea; ocio digital; sexo

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Introduction

Motivation is currently one of the most studied factors in sport psychology (Castro-Sánchez et al., 2018), which can be defined as a mechanism that controls the intensity and direction of effort due to its great potential to explain different human behaviours (Claver et al., 2020; Conde-Pipó et al., 2021). In psychology, the theory of achievement goals (Nicholls, 1989) proposes the concept of perception originating from the motivational climate defined as the set of indicators that different subjects perceive of their environment through which success or failure in the performance of a given activity is defined (Wang et al., 2018), so that the creation of a certain motivational climate will depend on the motivations towards which the subject orients the performance of a given activity (Groenewal and Putrino, 2021). Focusing on the Sport domain, when physical practice is oriented towards mastery, values such as fun or personal satisfaction (task climate) become important (Mabuta and Leaptswe, 2016). When extrinsic values are emphasised, competition (ego-climate) is encouraged (Mabuta and Leapetswe, 2016), leading to increased levels of frustration and anxiety when goals are not achieved (Li et al, 2019). Continuous exposure to high levels of anxiety can lead to a process of overfeeding (Melguizo-Ibáñez et al., 2020).

The university stage is characterised by the abandonment of a healthy dietary pattern and uncontrolled food intake (López-Moreno et al., 2021). Research (Angelis et al., 2021; Romanidou et al., 2020) extols the role of the Mediterranean diet in following a healthy lifestyle, highlighting the benefits that this dietary pattern brings to the health of its consumers (Melero et al., 2020). These include an increase in life expectancy, a decrease in the risk of suffering from cardiovascular diseases, diabetes and cancer (Martini, 2019). Likewise, the Mediterranean diet is characterised by the moderate consumption of foods typical of the Mediterranean area, especially olive oil, cereals, fruit, milk derivatives and a higher consumption of fish to the detriment of red meat (Muros et al., 2017). Furthermore, adherence to this dietary pattern may be affected by excessive consumption of digital leisure, as sedentary lifestyles are favoured over active lifestyles, which help to improve the health of young people (Thompson et al., 2015).

Mainly, research highlights that video games are supposed to be one of the elements with which young people spend their free time (Bienvenido and Bruna, 2019). These devices

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can be understood as interactive applications that simulate different experiences offering to the player high levels of entertainment and satisfaction (Johnson et al., 2021). Addiction to video games occurs in adolescence and may extend beyond this stage of development, with the main reasons for initiation being relaxation and abstraction (Gao et al., 2021). Despite being used as a form of relaxation, many young people suffer from pathological states and despair when they are not playing video games, which can lead to a process of dependence on them (Gao et al., 2021).

Therefore, in the light of the above, the following research hypotheses are proposed:

H.1. It is expected that the male sex obtains a better relationship between ego-climate and video game use than the male sex.

H.2. Female sex is expected to have a better relationship between task climate and adherence to the Mediterranean diet than males.

Finally, the research objective presented here is to study the relationships between motivational climate, adherence to the Mediterranean diet and the use of video games in university students.

Materials and methods

Design and Participants

The present research reflects a non-experimental (ex post facto), descriptive and cross-sectional design. The sample consisted of a total of 1112 Spanish participants, aged between 18 and 31 years. In terms of gender, 834 (75%) were female and 278 (25%) were male. In this case, all participants belong to the Faculty of Education Sciences of the University of Granada. All students were invited to collaborate and gave their informed consent to participate in the study. They were also informed that the data would be anonymised and processed exclusively for scientific purposes.

Instruments

Sociodemographic questionnaire which was destinated to pick up sociodemographic variables such as sex and age of the participants.

Predimed questionnaire developed by Schöder et al. (2011), but for the present study the version by Álvarez-Álvarez et al. (2019) was used. This instrument is composed of 14

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items, where once answered, a final score is obtained that categorises participants' responses into three levels: low adherence (≤7), medium adherence (8-10) and high adherence (≤10). For this research, Cronbach's Alpha obtained a score of α=0.815.

Perceived Motivational Climate in Sport Questionnaire (PMCSQ-2) designed by Newton et al. (2000), but the Spanish version adapted to Spanish by González-Cutre et al. (2008) was used in the present research. This questionnaire consists of 33 items rated on a five-level Likert scale (1 = strongly disagree and 5 = strongly agree), and assesses motivation within two dimensions: task climate (consisting of three sub-dimensions: effort, improvement and cooperative learning), and ego climate (consisting of three sub-levels: unequal recognition, punishment for mistakes and rivalry between members). The internal reliability of the task climate was 0.925, while that of the ego climate was 0.912.

Video Game Related Experiences Questionnaire (VREQ) developed and validated by Chamarro et al. (2014). This instrument is composed of a total of 17 items of negative connotation, which are answered through a Likert scale of four options (1=Almost never, 2=Sometimes, 3=Sometimes, 4=Almost always), The reliability for the present research was 0.869.

Procedure

The first step was to carry out a search of current bibliography in order to find out about the problems addressed. Subsequently, from the Department of Didactics of Musical, Plastic and Corporal Expression of the University of Granada, a Google Form was created with the instruments described above, establishing the objectives of the study and the informed consent of the participants. Several media were used to send the questionnaires, but due to the current health situation, the virtual medium was used for the most part. In addition, two questionnaires were duplicated to ensure that the questionnaires were not filled in randomly, but 22 questionnaires had to be deleted because they were incorrectly filled in. In terms of ethical aspects, the principles set out in the 1975 Declaration of Helsinki were followed at all times, guaranteeing the anonymity and rights of the participants. Finally, an ethics committee of the University of Granada approved the present research (1230/CEIH/2020).

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Data Analysis

For the descriptive analysis of the results, the statistical programme IBM SPSS Statics 25.0 (IBM Corp, Armonk, NY, USA) was used, where an analysis of frequencies was carried out, using Cronbach's Alpha to determine the internal consistency of the instruments, determining the reliability index at 95%.

For the elaboration of the structural equation models, the IBM SPSS Amos 26.0 software (IBM Corp., Armonk, NY, USA) was used to establish the relationships between the variables that make up the theoretical model (Figure 1). For the present research, two structural equation models were developed according to the sex of the participants. In this case, each of these is composed of eight endogenous variables (CL, EI, IR, MR, UR, PM, MDA, DE) and two exogenous variables (TC, EC). In the case of the latter, a causal explanation has been carried out taking into account the observed associations between the indicators and the reliability of the measurement, so the measurement error of the observed variables has been included in the model. At the same time, the unidirectional arrows represent lines of influences between the latent variables, which are interpreted from the regression weights. A significance level of 0.05 has been established using the Chi-Square test.

In this case, it is observed how sport motivation (TC and EC) affect adherence to the Mediterranean Diet and digital leisure.

Finally, the model fit was assessed after estimating the model parameters. According to the established criteria (McDonald and Marsh, 1990; Bentler, 1990), the goodness of fit must be assessed on the Chi-square, whose values associated with p and non-significant denote a good fit of the proposed model. In this case, the comparative fit index (CFI; values above 0.95 indicate a good model fit), the goodness-of-fit index (GFI; values above 0.90 indicate an acceptable fit), the incremental reliability index (IFI; values above 0.90 indicate an acceptable fit) and the root mean square approximation (RMSEA; values below 0.1 indicate an acceptable model fit).

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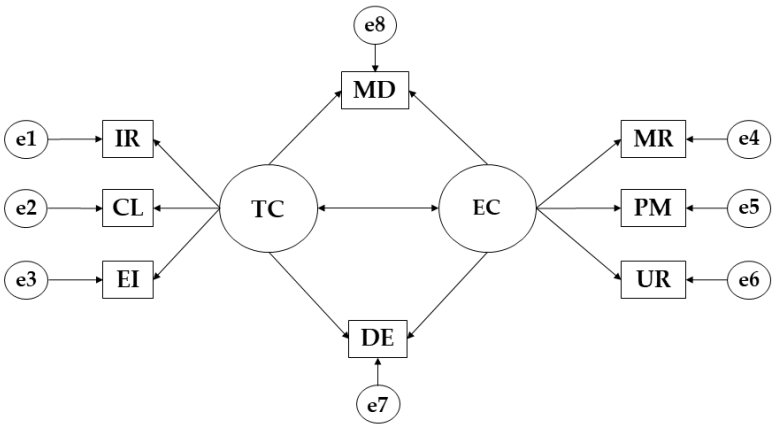

Figure 1: Theoretical model proposed. **Note:** Task-oriented Climate (TC); Cooperative Learning (CL); Effort/Improvement (EI); Important Role (IR); Ego-oriented Climate (EC); Punishment for Mistakes (PM); Unequal Recognition (UR); Member Rivalry (MR); Mediterranean Diet Adherence (MD); Digital Entertainment

Results

The proposed model, developed through the variables evaluated in a sample of male university students, showed a good fit for all its component indices. Chi-Square analysis showed a non-significant *p*-value (X^2 = 23,581; df=17; pl=0,131), so other standardised fit indices have been used. In this case, the comparative fit index (CFI) analysis obtained a value of 0.985, which represents an excellent score. The normalised fit index (NFI) analysis obtained a value of 0.950, the incremental fit index (IFI) was 0.986 and the Tucker-Lewis index (TLI) obtained a value of 0.976, all of which were excellent. In addition, the root mean square error of approximation analysis (RMSEA) also obtained a value of 0.043.

Table 1: The structural model for male gender

Associations between variables	R.W.				S.R.W.
	Stimations	S.E.	C.R.	*P*	Stimations
CL ←TC	1,000				,865
EI ←TC	,918	,070	13,091	***	,868
IR ←TC	1,051	,077	13,718	***	,903
MR ←EC	1,000				,506
UR ←EC	1,720	,300	5,736	***	,844
PM ←EC	1,426	,250	5,710	***	,867
MDA ←TC	-,010	,0	-	,	-,059

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		17	,581	561	
MDA ←EC	,018	,028	,625	,532	,066
DE ←TC	-,039	,066	-,587	,557	-,058
DE ←EC	,196	,112	1,747	,081	,186
EC ←→TC	-,121	,035	-3,471	**	-,622

Note 1: Regression Weights (R.W); Standardized Regression Weights (S.R.W); Estimation Error (S.E); Critical Ratio (C.R). **Note 2:** Task-oriented Climate (TC); Cooperative Learning (CL); Effort/Improvement (EI); Important Role (IR); Ego-oriented Climate (EC); Punishment for Mistakes (PM); Unequal Recognition (UR); Member Rivalry (MR); Digital Entertainment (DE); Mediterranean Diet Adherence (MD). **Note 3:** *** p < 0,001

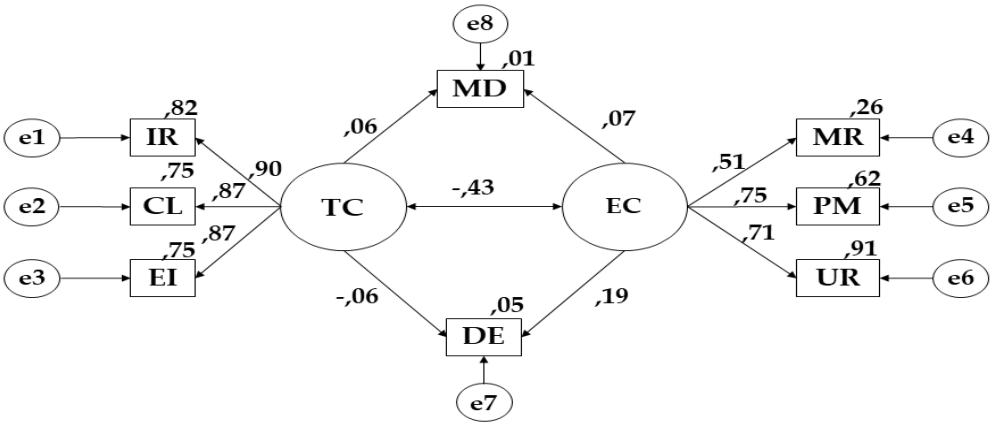

Figure 2: Theoretical model proposed for male gender. **Note:** Task-oriented Climate (TC); Cooperative Learning (CL); Effort/Improvement (EI); Important Role (IR); Ego-oriented Climate (EC); Punishment for Mistakes (PM); Unequal Recognition (UR); Member Rivalry (MR); Mediterranean Diet Adherence (MD); Digital Entertainment (DE).

Figure 2 and table 1 show the regression weights of the theoretical model, with statistically significant relationships at p<0.001. In this case, it is observed that there is a negative relationship between task climate (TC) and adherence to the Mediterranean diet (MD) (r=-.059), while the opposite is observed for ego climate (EC) and adherence to a healthy dietary pattern (MD) (r=.066). Positive relationships were also observed between task climate (TC) and cooperative learning (CL) (r=.865), effort/improvement (EI) (p<0.001; r=.868) and important role (IR) (p<0.001; r=.903). Continuing with the existing relationships with ego climate (EC), positive relationships are observed with rivalry between group

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members (RM) (r=.506), unequal recognition (UR) (p<0.001; r=.844) and punishment for errors (PM) (p<0.001; r=.867), however, a negative relationship is evident with task climate (TC) (p<0.001; r=-.433). Finally, observing the relationships between sport motivation and digital leisure (DE), a negative relationship is shown towards task climate (TC) (p<0.001; r=-.058) and a positive relationship towards ego climate (EC) (p<0.001; r=.186).

Continuing with the model developed for the female sex, it also showed good scores for each of the different indices. The Chi-Square showed a non-significant p-value ($X^2 = 64{,}045$; df=17; pl=0,000). The comparative fit index (CFI) analysis obtained a value of 0.967, which represents an excellent score. The normalised fit index (NFI) analysis obtained a value of 0.956, the incremental fit index (IFI) was 0.968 and the Tucker-Lewis index (TLI) obtained a value of 0.930, all of which were excellent. In addition, the root mean square error of approximation analysis (RMSEA) also obtained a value of 0.061.

Table 2: The structural model for female gender

Associations between variables	R.W.				S.R.W.
	Stimations	S.E.	C.R.	*P*	Stimations
PM ←EC	1,000				,819
UR ←EC	1,445	,086	16,740	***	,918
MR ←EC	,788	,066	11,975	***	,577
CL ←TC	1,000				,862
IR ←TC	1,009	,04.	23,429	***	,909
EI ←TC	,779	,036	21,354	***	,839
ADM ←TC	-,010	,011	-,892	,372	-,056
ADM ←EC	-,011	,009	-1,183	,237	-,073
DE ←TC	,034	,030	1,134	,257	,070
DE ←EC	-,012	,026	-,458	,647	-,028
EC ←→TC	-,267	,034	-7,793	***	-,508

Note 1: Regression Weights (R.W); Standardized Regression Weights (S.R.W); Estimation Error (S.E); Critical Ratio (C.R). **Note 2:** Task-oriented Climate (TC); Cooperative Learning (CL); Effort/Improvement (EI); Important Role (IR); Ego-oriented Climate (EC); Punishment for Mistakes (PM); Unequal Recognition (UR); Member Rivalry (MR); Digital Entertainment (DE); Mediterranean Diet Adherence (MD). **Note 3:** *** p < 0,001

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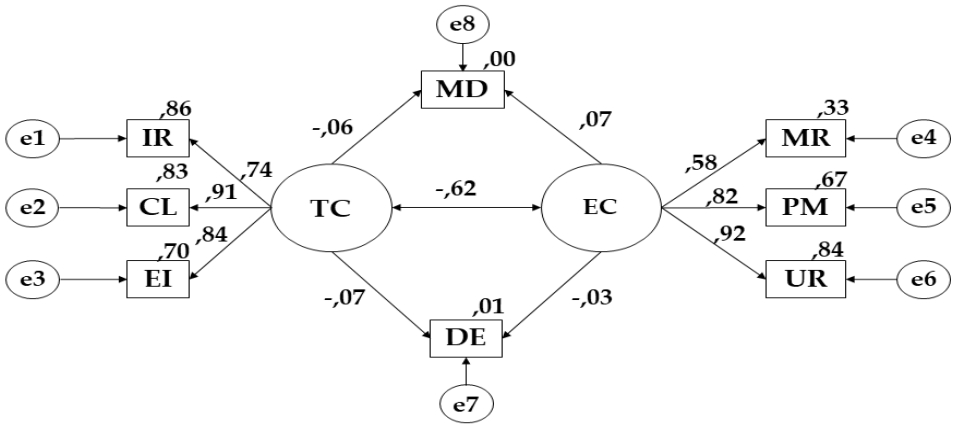

Figure 3: Theoretical model proposed for female gender. **Note:** Task-oriented Climate (TC); Cooperative Learning (CL); Effort/Improvement (EI); Important Role (IR); Ego-oriented Climate (EC); Punishment for Mistakes (PM); Unequal Recognition (UR); Member Rivalry (MR); Mediterranean Diet Adherence (MD); Digital Entertainment (DE).

Figure 3 and table 2 show the regression weights of the theoretical model, with statistically significant relationships at p<0.001. In this case ego climate (EC) shows positive relationships with punishment for errors (PM) (r=.819), unequal recognition (UR) (p<0.001; r=.918) and rivalry between group members (MR) (*p*<0.001; r=.577). Likewise, task climate (TC) shows positive relationships with cooperative learning (CL) (r=.862), important role (*p*<0.001; r=.909) and effort/improvement (*p*<0.001; r=.839). Focusing attention on adherence to the Mediterranean diet (ADM) shows negative relationships with task climate (TC) (r=-.056) and ego climate (EC) (r=-.073). At the same time, digital leisure (DE) shows a positive relationship with task climate (TC) (r=-.070), but a negative relationship with ego climate (EC) (r=-.028). Finally, the relationship between task climate (TC) and ego climate (EC) shows a negative relationship for both (*p*<0.001; r=-,508).

Discussion

This study shows the relationship between sport motivation and its impact on adherence to a healthy dietary pattern and digital leisure. Likewise, the results obtained respond to the proposed objectives and therefore the aim of this research is to compare the results obtained with those of another research already carried out.

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Considering the existing relationships between sport motivation and adherence to the Mediterranean diet for the male sex, a positive relationship is observed for both the task climate and the ego climate; however, for the female sex, a negative relationship is observed between the task climate and adherence to the Mediterranean diet. Very similar results were obtained by Álvarez-Fernández et al. (2020) where it is stated that the male sex tends to show better dietary care regardless of the motivation developed towards sport. Likewise, the results obtained in the present research differ from those concluded by Raparelli et al. (2020) where it is stated that the female sex also cares for positive adherence towards a healthy dietary pattern, where in addition Zurita-Ortega et al. (2018) argue that positive adherence towards the Mediterranean diet has a positive impact on the physical self-concept and body image that young people have of themselves.

Continuing with the relationship between sport motivation and digital leisure, a negative relationship is observed between task climate and digital leisure for males, but a negative relationship between digital leisure and ego climate and task climate for females. The study by González et al. (2016) argues that when sports practice is oriented towards competition, video games play a detrimental role, as they do not favour healthy lifestyles; however, the study carried out by Ufholz et al. (2019) states that the use of active video games favours healthy lifestyles, thus improving the fitness and health of their users. Likewise, the research carried out by Rodríguez-Larrad et al. (2021) states that during adolescence, the female sex, compared to the male sex, abandons various activities such as sports, where Galdino and Silva (2018) point out that the use of video games is another of the activities that this sex abandons.

Conclusions

In general, acceptable values have been obtained for each of the different parameters that make up the different models presented. This research shows the impact of sport motivation on adherence to a healthy dietary pattern and on digital leisure.

Focusing attention on the model developed for the male sex, a positive relationship is observed between sport motivation and adherence to the Mediterranean diet; however, a negative relationship is evident between task climate and digital leisure. Continuing with the

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model developed for the female sex, a positive relationship is obtained between ego climate and adherence to a healthy dietary pattern; however, a negative relationship is observed between task climate and adherence to a healthy dietary pattern. In addition, a negative relationship is also observed between sport motivation and digital leisure.

The present research also reflects a number of limitations. For example, the nature of the study is supposed to be one of them. As this is a descriptive, cross-sectional study, only one measurement has been carried out, so it is not possible to establish the cause-effect relationships of the variables over a longitudinal period, but only at that point in time. In addition, the students who participated belonged to a very specific geographical area, so that generalisations cannot be made across a wider area of the territory.

Finally, with a view to future perspectives, the aim is to develop an intervention programme where, through the use of technology during physical activity, students can be trained in the field of nutrition. In this way, the aim is to use the practice of physical activity from a cross-cutting approach, ensuring that students have an active and healthy lifestyle.

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