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Factors that Influence Academic Performance in Physical Education

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Abstract

The objective of this study was to determine the predictive function that different variables (physical self-concept, task orientation, engaging in extracurricular physical activity and reasons for engaging in this type of activity) have on academic performance in the physical education class. The participants were 568 primary and compulsory secondary students between the ages of 11 and 16 from eight public primary schools, one public secondary school and two primary and secondary schools in the Region of Valencia who responded to the Physical Activity Questionnaire for Adolescents, the Task and Ego Orientation in Sport Questionnaire, the Physical Self-concept Questionnaire and the Motives for Physical Activity Measure-Revised (MPAM-R) in Spanish. Descriptive, correlational and multiple linear regression analyses were performed and an explanatory predictive model of academic performance in the physical education class was proposed, based on the results. The results of the path analysis indicated that the proposed model showed adequate goodness of fit indices. Thus, the reasons for practicing physical activity and goal orientation towards the task determine the physical activity index and the general physical self-concept, which, in turn, affect academic performance in physical education.

Keywords: physical self-concept, goal orientation, extracurricular physical activity

Introduction

Engaging in extracurricular physical activity is positively related to a person's self-concept (Navas & Soriano, 2016) as well as to physical self-concept (Reigal & Videra, 2011). On the one hand, self-concept is crucial to a person's self-esteem and psychological health and is particularly important in adolescence (Ibarra & Jacobo, 2017). On the other hand, physical self-concept, one of the dimensions of self-concept, presents a strong relationship with the latter, and its influence can be transferred to other spheres of life, such as school, sports or social life (Reigal et al., 2013). Furthermore, physical self-concept correlates with task orientation (Hellín, 2007). It therefore follows that acquiring athletic habits in the integral development of children and adolescents is important.

Another important factor, which is a cause of concern in Spain, is how habits related to academic performance exert a heavy influence on goal orientation (Debicki et al., 2016). Goal orientation in learning, which task orientation is, has been empirically related to improved academic performance (Ruiz & Pieron, 2013). In physical education (PE) classes, task orientation is related to the belief that success depends on effort (Moreno et al., 2008).

Task orientation correlates positively with doing extracurricular sports, and task-oriented people have been found to have more fun when they do sports, while conversely, ego-orientation is correlated with boredom (Cechinni et al., 2008). Many studies that conclude that engaging in sports or extracurricular physical activity regularly is closely related to good academic performance as those of Chaddock et al. (2011), Kamijo et al. (2011) o Pontifex et al. (2011), although few studies examine academic performance in the PE class. One of these studies is by Luis de Cos et al. (2010), which concludes that the more often and the longer that one engages in physical activity and sports, the higher the mark in PE will be.

One important aspect in adolescence in relation to engaging in extracurricular physical activity are the reasons why people do it. According to *García-Ferrando* and *Llopis*-Goig (*2010*), the most oft-cited reason for engaging in sports in the general population is "to do physical exercise", while "to have fun and spend time" comes in second, and the third reason refers to "improving and maintaining health". Another study by Cambronero et al. (2015) in university students found that the main reasons why they engaged in physical activity were first "to be fit", secondly "to release energy" and third "to improve my health". Focusing exclusively on adolescents, the reasons for engaging in extracurricular physical activity found by Fraile and De Diego (2006) are first to improve health and secondly to be with friends.

The objective of this study was to determine the predictive function of different variables (physical self-concept, task goal orientation, engaging in extracurricular physical activity and the reasons for engaging in extracurricular physical activity) in academic performance in the PE class and the intensity with which these predictions occurred.

Methodology

Participants

A total of 568 students participated in this study, 331 males (58.27%) and 237 females (41.73%), who stated that they engaged in extracurricular physical activity. Of the total, 386 students were in the 5th and 6th grades of primary school (68%) and 182 were in the 1st to 3rd years of secondary school (32%). They studied at eight public primary schools, one public secondary school and two publicly subsidised private primary and secondary schools in the Region of Valencia. These schools were preschool/primary, secondary and primary/secondary. Therefore, no school had unique education, special education or specialised programmes. Student age range was from 9 to 18 ($M = 11.89$; $SD = 1.72$). These grades were chosen because the students were in compulsory education and it was thought that students younger than 5th grade might have difficulties reflecting on the topic of this study. Non-probabilistic incidental sampling was used.

Instruments

1) The Physical Activity Questionnaire for Adolescents (PAQ-A) in the version by Martínez-Gómez et al. (2009). It is comprised of 9 questions that assess the adolescent's physical activity during their free time in the last 7 days. The final score was the arithmetic mean of the scores obtained on the first 8 questions. Question 9 revealed whether the adolescent had been sick or whether there were some circumstances that prevented them from engaging in physical activity that week. It yielded a Cronbach's internal consistency coefficient of between .77 and .84, a level of statistical significance of $p < .05$ (Janz et al., 2008) and an ICC test-retest reliability of .71 (Martínez-Gómez et al., 2009).

2) Task and Ego Orientation in Sport Questionnaire (TEOSQ) in the version by Balaguer et al. (1996). This evaluates people's tendency towards task and ego orientation in sports through 13 items. Seven of them reflect a task orientation (TO) (items 2, 5, 7, 8, 10, 12 and 13). The other 6 items reveal an ego orientation (EO) (items 1, 3, 4, 6, 9 and 11). The participants have to respond on a 5-point Likert scale (in which 1 means "strongly disagree" and 5 means "strongly agree"). The questionnaire's factor structure was tested by means of a confirmatory factor analysis using the unweighted least squares method, resulting in adequate goodness of fit indices ($\chi^2 = 129.78$; $df = 64$; $p = .00$; $RMSEA = .04$; $GFI = .98$ and $AGFI = .97$).

3) *Physical Self-concept Questionnaire* (CAF) by Goñi et al. (2006). It has 36 items divided into 6 scales (sports skill or SS, physical condition or PC, strength or S, physical attractiveness or PA, general physical self-concept or GPS, and general self-concept or GS). After each statement, the person completing the questionnaire is asked which of the following options best fits their case: 1 "strongly disagree", 2 "disagree", 3 "indifferent", 4 "agree" and 5 "strongly agree". When the questionnaire is corrected, 20 items are scored from 1 to 5 while 16 are scored from 5 to 1, since they are written indirectly. The reliability coefficient of the questionnaire is .93 (Goñi, 2008), and it was concluded that the model fits the data according to the goodness of fit indices obtained ($\chi^2 = 2307.58$; $df = 579$; $p = .00$; $RMSEA = .06$; $GFI = .97$ and $AGFI = .97$).

4) *Motives for Physical Activity Measure-Revised (MPAM-R)* validated in Spanish by Moreno et. al., 2007. This measures the reasons for engaging in physical activity by means of 30 items divided into five factors (enjoyment or E, appearance or A, socialisation or S, fitness or F and competence or CMP), to which the participants responded on a 7-point Likert scale. The enjoyment factor yielded α Cronbach's reliability coefficient of .84. The appearance factor had a reliability coefficient of .87. The third factor refers to engaging in physical activity as a way of establishing, improving or maintaining social relationships, and its reliability was $\alpha = .81$. The fitness factor, pertaining to engaging in physical activities as a way of maintaining or improving health, yielded an α reliability coefficient of .80. The last factor is competence, which yielded α Cronbach's alpha coefficient of .85. The MPAM-R scale is a valid, reliable instrument (Moreno et al., 2007).

For the marks in PE, we used a copy of the final class evaluations which showed the marks assigned to the students by the different teachers specialising in this subject.

Procedure

The respondents were invited to participate in the study after the management of all the primary and secondary schools in the Region of Valencia had been contacted. Eleven (11) schools ultimately participated. After the school management's authorisation had been secured, the students' parents' authorisation was sought through an informed consent form.

The questionnaires were completed in the classroom. Three of them (PAQ-A, TEOSQ and CAF) were completed by all students, leading to an initial sample of 812 students. After they had finished completing it, they were asked verbally whether or not they were participating in extracurricular sports activities at that time. The students who were participating in extracurricular sports activities were given the Motives for Physical Activity Measure-Revised (MPAM-R); thus, 568 students ultimately took part in this study.

The students from two classes were ruled out, the first one because they did not have their marks and the second because they did not respond to one of the questionnaires. Similarly, to avoid potential contamination of the results, students with significant curricular adaptations were ruled out after the different academic marks they were given had been compared, depending on the reference school.

The procedure was approved by the Ethics Committee of the University of Alicante with reference number UA-2019-03-03.

Design

This study has a basic correlational design, given that there was no random selection of participants or intentional manipulation of the variables by the researcher, and the data were collected using self-reporting techniques.

Data Analysis

Different types of analyses were performed. Descriptive analysis was used to control for possible errors in the data entry phase or for the presence of missing values, in addition to obtaining information about the form of the data, both the possible distribution of likelihood with the centralisation parameters, such as mean, median and mode and the dispersion parameters, such as variance, standard deviation, etc. The symmetry and kurtosis values are important, since they enable us to determine whether or not the directly observed variables fit a normal distribution. Correlation analyses (Pearson's *r*) and multiple linear regression were also performed. Both

Table 1
Descriptive statistics

Variables	*M*	*ETM*	*SD*	Asymmetry	Kurtosis
SS	23.03	.17	4.10	–0.61	0.90
PC	22.61	.20	4.74	–0.45	–0.23
PA	23.14	.19	4.44	–0.64	0.36
ST	20.38	.20	4.88	–0.04	–0.36
GPS	24.65	.18	4.25	–0.88	0.63
GS	25.72	.15	3.56	–1.02	1.02
TO	30.65	.15	3.68	–1.41	3.76
EO	15.27	.24	5.61	0.36	–0.58
MPAQ	2.32	.02	0.54	0.58	0.49
E	41.74	.27	6.43	–1.31	2.46
A	28.25	.36	8.61	–.36	–0.60
S	22.40	.21	5.08	–1.06	0.76
F	29.05	.21	5.10	–1.34	2.57
CMP	33.30	.30	7.01	–0.85	0.47
PEP	7.63	.06	1.53	–0.41	–0.11

Note. SS: Sports skill; PC:Physical condition; PA: Physical attractiveness; ST: Strength; GPS: General physical self-concept; GS: General self-concept; TO: Task orientation; EO: Ego orientation; MPAQ: Index of extracurricular physical activity; E: Enjoyment; A: Appearance; S: Socialisation; F: Fitness; CMP: Competence; PEP: PE performance.

of them enable us to estimate the relations between the key variables in the study. With the correlational analyses, which were performed with latent variables resulting from the previous confirmatory factor analyses, the correlation coefficient matrix (Pearson's *r*) was found in order to obtain a grid of associations among the variables considered, while the regression analyses yielded the equations resulting from the regression. Finally, path analyses were conducted to ascertain the predictive capacity of the variables considered in the study in relation to academic performance in PE. The statistical packages used for the data analysis were SPSS version 20 and LISREL 8.7.

Results

The descriptive statistics of the variables are presented in Table 1.

The variables reasonably fit a normal distribution according to the asymmetry and kurtosis values.

Table 2 shows the correlation matrix among the variables considered in the study. The appearance variable did not correlate with the physical attractiveness, general physical self-concept and PE performance variables, while it did correlate with the ego orientation variable, the one that presented the fewest correlations. Ego orientation showed no correlation with the general physical self-concept, task orientation, engaging in extracurricular physical activity, PE performance, enjoyment, socialisation, fitness and competence variables.

Table 3 shows the results of the multiple linear regression analysis in which the criterion value was PE performance, with the remaining variables being the predictive variables, of which only the sports skill,

Table 2
Bivariate correlations matrix

	SS	PC	PA	ST	GPS	GS	TO	EO	MPAQ	PEP	E	A	S	F	CMP
SS	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
PC	**.69****	–	–	–	–	–	–	–	–	–	–	–	–	–	–
PA	**.49****	**.54****	–	–	–	–	–	–	–	–	–	–	–	–	–
ST	**.42****	**.41****	**.29****	–	–	–	–	–	–	–	–	–	–	–	–
GPS	**.55****	**.63****	**.73****	**.34****	–	–	–	–	–	–	–	–	–	–	–
GS	**.45****	**.43****	**.57****	**.24****	**.67****	–	–	–	–	–	–	–	–	–	–
TO	**.30****	**.34****	**.22****	**.28****	**.27****	**.27****	–	–	–	–	–	–	–	–	–
EO	**.20****	**.14****	**.09***	**.15****	.06	–.02	.02	–	–	–	–	–	–	–	–
MPAQ	**.32****	**.34****	**.28****	**.29****	**.25****	**.18****	**.19****	–.05	–	–	–	–	–	–	–
PEP	**.33****	**.30****	**.22****	**.16****	**.28****	**.24****	**.18****	.05	**.17****	–	–	–	–	–	–
E	**.36****	**.39****	**.31****	**.31****	**.39****	**.33****	**.40****	.02	**.28****	**.19****	–	–	–	–	–
A	**.10***	**.10***	.06	**.19****	–.04	**–.15****	**.10***	**.19****	**.10***	–.04	**.24***	–	–	–	–
S	**.20****	**.21****	**.26****	**.21****	**.27****	**.23****	**.26****	–.00	**.19****	**.18****	**.64****	**.25****	–	–	–
F	**.21****	**.26****	**.25****	**.28****	**.22****	**.10***	**.34****	.07	**.21****	**.09****	**.51****	**.65****	**.47****	–	–
CMP	**.38***	**.41****	**.28****	**.42****	**.30****	**.21****	**.39****	**.09***	**.29****	**.18****	**.67***	**.42****	**.50****	.66**	–

Note. SS: Sports skill; PC: Physical condition; PA: Physical attractiveness; ST: Strength; GPS: General physical self-concept; GS: General self-concept; TO: Task orientation; EO: Ego orientation; MPAQ: Index of extracurricular physical activity; PEP: PE performance; E: Enjoyment; A: Appearance; S: Socialisation; F: Fitness; CMP: Competence.
* $p = .05$; ** $p = .01$.

Table 3
Multiple regression analysis to establish predictive models of the marks or performance in PE

Criterion	Predictors	*t*	*p*	β
	SS	3.30	.00	.19
	PC	1.30	.20	.80
PE performance (PEP)	PA	–0.42	.68	–.03
	ST	–0.26	.80	–.01
R^2 = .15	GPS	0,70	.49	.05
	GS	0.91	.36	.05
S.E. of the estimate = 1.43	TO	0.81	.42	.04
	EO	0.56	.58	.02
	E	–0.93	.36	–.06
	A	–2.07	.04	–.12
	S	2.33	.02	.12
	F	0.33	.75	.02
	CMP	0.71	.48	.05
	MPAQ	1.17	.24	.05

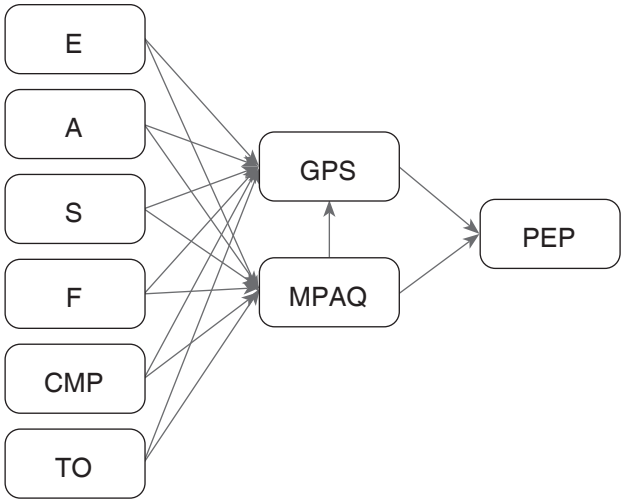
Note. PEP: PE performance; SS:Sports skill; PC: Physical condition; PA: Physical attractiveness; ST: Strength; GPS: General physical self-concept; GS : General self-concept; TO: Task orientation; EO: Ego orientation; E: Enjoyment; A: Appearance; S: Socialisation; F: Fitness; CMP: Competence; MPAQ: Index of extracurricular physical activity.

appearance and socialisation variables, with statistically significant likelihood of *t*, entered the equation ($p < .05$). These variables accounted for 15% of the variance ($R^2 = .15$).

According to the studies examined and the results of the multiple regression analysis, the model in Figure 1 was proposed, in which the variable to be explained was PE performance, while the others were the predictive variables. Engaging in extracurricular physical activity was related to general physical self-concept, while these two variables were shown to be determined by reasons for engaging in physical activity such as enjoyment, appearance, socialisation, fitness or sense of competence, in addition to task goal orientation.

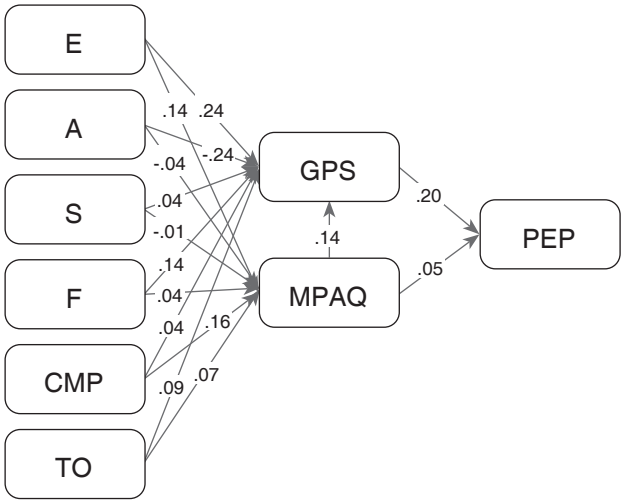
The fit indices that correspond to the completely standardised solution of the model in Figure 2 were: $\chi^2 = 14.25$; $df = 21$; $p = .00$; $RMSEA = .0$; $GFI = 1.00$; $AGFI = .99$. In order to establish the degree of fit, the indices compare the variance-covariance matrix reproduced by the model to the one observed in the sample. The value of the chi-squared statistic is very sensitive to the number of participants, so it is complemented by the calculation of other indices. For RMSEA, values under .05 indicate good fit, and for GFI and AGFI, values equal to or higher than .9 indicate that the model presents goodness of fit.

Figure 1
Hypothetical predictive model for PE marks



Note. E: Enjoyment; A: Appearance; S: Socialisation; F: Fitness; CMP: Competence; TO: Task orientation; GPS: General physical self-concept; PEP: PE performance; MPAQ: Index of extracurricular physical activity.

Figure 2
Completely standardised solution of the hypothesised model for PE marks



Note. E: Enjoyment; A: Appearance; S: Socialisation; F: Fitness; CMP: Competence; TO: Task orientation; GPS: General physical self-concept; PEP: PE performance; MPAQ: Index of extracurricular physical activity.

Discussion

The results obtained from the correlational analyses enable us to confirm that engaging in extracurricular physical activity is significantly related to self-concept, similar to the results of authors such as Navas and Soriano (2016), demonstrating one of the many advantages of engaging in physical activity. From this analysis we also found a somewhat logical relationship between engaging

in extracurricular physical activity and physical self-concept, confirming the results found by Espinoza et al. (2011) or Reigal and Videra (2011). According to these results, physical self-concept is also significantly related to self-concept, in line with the results of Reigal et al. (2013); this relationship also seems logical, bearing in mind that since the 1970s a multidimensional conception of self-concept had been accepted as a construct which encompasses dimensions of physical self-concept, among others. Other conclusions which can be drawn from this analysis are the significant relationships between task orientation and engaging in extracurricular sports, corroborating the results of Cechinni et al. (2008). This relationship could translate into attitudes related more to the process of physical-sport activity and less to the results of these activities. Similarly, the appearance variable is also noteworthy, since according to this correlational analysis, this kind of reason for engaging in extracurricular physical activity does not present statistically significant relationships with the physical attractiveness, general physical self-concept and PE performance variables.

In relation to the explanatory predictive model (see Figure 1), we can assert that the model fits the data according to the physical attractiveness, general physical self-concept and PE performance variables. Engaging in extracurricular physical activity positively predicts PE performance, as found by Luis de Cos et al. (2010) and Fraile et al. (2019), demonstrating that marks in PE are also positively determined by general physical self-concept. This relationship is justified since physical self-concept is a dimension of self-concept, a construct that is clearly related to academic performance. On the other hand, of the scales related to the reasons for engaging in extracurricular physical activity, enjoyment is the most decisive one, identical to the results of Martínez et al. (2012). These results endorse what was discussed above about task orientation and attitudes towards physical activity related to the process. The enjoyment reason is also positively related to general physical self-concept and engaging in extracurricular physical activity, in line with the findings of Reigal et al. (2013). We should note that significant relationships were found in the correlational analyses between the enjoyment reason and PE performance, as in the study by Fraile et al. (2019). Finally, goal orientation to the task was also found to be related to general physical self-concept, as asserted by Hellín (2007).

Conclusions

The data obtained point to several practical implications of the study, such as the importance of extracurricular physical activity in contributing to better physical self-concept (Reigal & Videra, 2011). Both our literature review and this study took weekly frequency of physical activity was into account, it transpiring that the greater the degree of physical activity, the higher the relationship, without such physical activity having to be competitive.

On the other hand, the enjoyment reason is the most decisive one, and it is also related to general physical self-concept and engaging in extracurricular physical activity (Fraile et al., 2019). Physical activity professionals can use this information when planning their activities. Activities removed from the traditional patterns that used to prioritise exercises, repetitions and quantitative aspects and which are closer to pedagogical styles that cater to the emotions can be a valuable element in educating young people.

Some of these data can be used to guide the methodology of physical activity professionals, such as the fact that goal orientation towards the task affects general physical self-concept (Hellín, 2007) and the practice of extracurricular sports (Cechinni et al., 2008).

Finally, the fact that engaging in extracurricular physical activity has a positive effect on PE marks (Fraile et al., 2019; Luis de Cos et al., 2010) can serve as an incentive for families to enrol their children in some kind of extracurricular physical activity or even to reorient family leisure time.

The possibility of mainstreaming these findings is limited by the fact that all the participants were from the same autonomous community and that the instruments used are self-reporting questionnaires, meaning that the data could possibly be contaminated by the social desirability bias. These factors should be borne in mind in future studies.

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