

# Predictive variables of motivation and barriers for the practice of physical exercise in adolescence

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## ABSTRACT

Within the framework of health, it is rightly considered that physical exercise reduces risk factors and contributes significantly to quality of life. So, the goal of this study was to find the predictive capacity of the different variables influencing motivations and barriers for the practice of physical exercise in adolescents. The sample was 852 students of Compulsory Secondary Education and Baccalaureate of the Autonomous Community of Galicia (Spain) ages 12 to 17 (Average = 14.9, DT = 1.75). An ad hoc questionnaire (sociodemographic variables), the Self-report of Motives for the Practice of Physical Exercise (AMPEF) and the Self-report on Barriers to Physical Exercise (ABPEF) were applied. A multiple linear regression analysis was performed using the *stepwise* method. The main motivational predictor variables for exercising are: competition, social recognition and challenge (16.1%), muscular strength/endurance (13.3%), and prevention/positive health (12%). The barriers for the practice of physical exercise with a greater predictive influence are: fatigue/laziness (14.9%), body image/physical-social anxiety (15%), and obligations/lack of time (3.6%). The contribution of sociodemographic variables is significant but scarce. These novel results will allow these variables to be included in effective prevention and intervention programs for the promotion of physical exercise in adolescents. **Keywords:** Physical activity; Health; Questionnaire.

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## INTRODUCTION

The clear decline of physical activity during adolescence and its impact on health and quality of life is, doubtlessly, one of the great challenges facing social, educational and health institutions (Cairney, Veldhuizen, Kwan, Hay, & Faught, 2014). Recent years have shown the presence of social and environmental variables, dependent on the personality of each individual, conditioning both the motivations and barriers for the practice of physical exercise (Franco, Coterón, Gómez, Brito, & Martínez, 2017; Guedes, Legnani, & Legnani, 2012).

Many studies have revealed the importance of motivation and barriers for starting and maintaining a regular practice of physical exercise. Regarding motivation, keeping with the practice of physical exercise is determined by factors such as fun, perceptions of competence, influence of friends, family context, boredom, satisfaction, wellbeing and keeping oneself physically active (Barnett, Cliff, Morgan, & Van Beurden, 2013; Verloigne et al., 2014). In the same way, a significant amount of research shows the influence of different barriers that hinder or prevent the practice of physical exercise. For instance, a study by Ramírez-Vélez, Triana-Reina, Carrillo & Ramos-Sepúlveda (2016) shows that the most perceived barriers are lack of time or resources and tiredness or laziness, showing higher values in the female gender than in males. Besides, a higher self-perception of the barriers for physical activity is related in a greater extent with obesity and other dimensions as skill and physical condition, the physical self-concept or self-concept in general (Reigal-Garrido, Videra, Márquez, & Parra, 2013).

Therefore, it's considered necessary to strengthen motivations and to reduce the barriers for physical exercise, with the aim of instilling and consolidating an active and healthy lifestyle among the adolescent population. So, the goal of this study is to analyse the predictive power of variables important for both motivating and hindering the practice of physical exercise, with the final objective of encouraging the practice of physical exercise among adolescents.

## SUBJECTS AND METHODS

### *Participants*

The sample was composed of 852 students (48.9% male, 51.1% female) of Compulsory Secondary Education (70.7%) and Baccalaureate (29.3%), with ages between 12 and 17 years ( $M = 14.90$ ;  $SD = 1.75$ ), from public and charter schools of the Autonomous Community of Galicia (Spain).

### *Evaluation instrument*

An "ad hoc" questionnaire was prepared and applied with the aim of obtaining different demographical data from the individuals in the sample. Besides, the questionnaire Self-Report of Motives for the Practice of Physical Exercise (AMPEF) was used, a scale adapted to Spanish by Capdevila, Niñerola & Pintanel (2004). The questionnaire contains 48 items in the form of Likert-like scale of ten options (from not true at all: 0, to totally true: 10). The questionnaire in this study has a good reliability (Cronbach's  $\alpha = .96$ ). In the same way, in order to analyse the barriers or perceived difficulties for the practice of physical exercise, the Self-Report on Barriers to Exercising (ABPEF) have been used, adapted by Niñerola, Capdevila & Pintanel (2006). This version contains 17 items to be answered in a Likert scale from 0 (unlikely reason that prevents me from practicing physical exercise in the next weeks) to 10 (a very likely reason that prevents me from practicing physical exercise). This questionnaire shows a moderate reliability (Cronbach's  $\alpha = .86$ ).

### **Procedure**

Once having the sample and the questionnaires to be used, permission was requested from the administrations of the schools and the families. Afterward, an information meeting was held to present the study, so it could be known by the rest of the educational community. The same survey taker gave the same instructions in all the classrooms, to avoid a bias factor. The study was conducted following the ethical standards laid down in the Declaration of Helsinki (Hong Kong revision, September 1989) and in accordance with the EEC Good Clinical Practice guidelines (document 111/3976/88, July 1990) and current Spanish law, which regulate research in humans.

### **Data analysis**

This study is based on an empirical research (Ato, M., López, J.J. & Benavente, A., 2013), using a multiple linear regression analysis employing the *stepwise* method, with the intention of establishing the predictive power of the different variables that make up the motivations and barriers for the practice of physical exercise, fulfilling the assumptions of linearity, independence, normality, homoscedasticity y no collinearity, to guarantee the validity of the model. The data was analysed using the software tool SPSS 22.

## **RESULTS**

### **Motivational predictor variables for the practice of physical exercise**

Firstly (Table 1), regarding prevention and positive health (P/PH), the data obtained from the regression analysis indicate the inclusion of the variables MS/E, A/F/Wb, W/BI, Gender, SC, A/E, C/SR/C and Weight. Taking into account the order of entry of each variable in the final regression equation, certain predictive power have been shown by MS/E ( $\beta=.24$ ;  $t=7.21$ ;  $p<.001$ ), A/F/Wb ( $\beta=.36$ ;  $t=10.90$ ;  $p<.001$ ), W/BI ( $\beta=.19$ ;  $t=7.30$ ;  $p<.001$ ), Gender ( $\beta=.11$ ;  $t=4.59$ ;  $p<.001$ ), SC ( $\beta=.16$ ;  $t=5.94$ ;  $p<.001$ ), A/E ( $\beta=.17$ ;  $t=5.71$ ;  $p<.001$ ), C/SR/Ch ( $\beta=-.09$ ;  $t=-2.53$ ;  $p<.05$ ), and Weight ( $\beta=-.06$ ;  $t=-2.50$ ;  $p<.05$ ). Next, regarding competition, social recognition or challenge (C/SR/Ch), is predicted also by seven variables: A/F/Wb ( $\beta=.47$ ;  $t=15.99$ ;  $p<.001$ ), MS/E ( $\beta=.21$ ;  $t=6.54$ ;  $p<.001$ ), A/E ( $\beta=.18$ ;  $t=6.72$ ;  $p<.001$ ), SC ( $\beta=.11$ ;  $t=4.55$ ;  $p<.001$ ), Gender ( $\beta=-.10$ ;  $t=-4.43$ ;  $p<.001$ ), W/BI ( $\beta=.07$ ;  $t=2.99$ ;  $p<.05$ ), and P/PH ( $\beta=-.08$ ;  $t=-2.46$ ;  $p<.05$ ). In regard to weight and body image (W/BI), the data show the inclusion of nine variables: P/PH ( $\beta=.27$ ;  $t=6.6$ ;  $p<.001$ ), HE ( $\beta=.20$ ;  $t=6.84$ ;  $p<.001$ ), Weight ( $\beta=.21$ ;  $t=7.90$ ;  $p<.001$ ), MS/E ( $\beta=.24$ ;  $t=5.84$ ;  $p<.001$ ), A/F/Wb ( $\beta=-.28$ ;  $t=-6.58$ ;  $p<.001$ ), Gender ( $\beta=.12$ ;  $t=.43$ ;  $p<.001$ ), C/SR/Ch ( $\beta=.12$ ;  $t=2.68$ ;  $p<.05$ ), SC ( $\beta=-.09$ ;  $t=2.60$ ;  $p<.05$ ), and A/E ( $\beta=.08$ ;  $t=2.30$ ;  $p<.05$ ). In the same way, affiliation, fun and wellbeing (A/F/Wb) is predicted by eight variables: C/SR/Ch ( $\beta=.47$ ;  $t=15.80$ ;  $p<.001$ ), P/PH ( $\beta=.33$ ;  $t=10.85$ ;  $p<.001$ ), W/BI ( $\beta=-.17$ ;  $t=-6.83$ ;  $p<.001$ ), MS/E ( $\beta=.11$ ;  $t=3.54$ ;  $p<.001$ ), SC ( $\beta=.09$ ;  $t=3.64$ ;  $p<.001$ ), age ( $\beta=-.10$ ;  $t=-4.34$ ;  $p<.001$ ), Weight ( $\beta=.08$ ;  $t=3.47$ ;  $p<.05$ ), and Gender ( $\beta=-.05$ ;  $t=-2.21$ ;  $p<.05$ ).

Table 1. Linear regression analysis (stepwise), criterion variables: P/PH, C/SR/Ch, W/BI and A/F/Wb

Criterion variable	R	R <sup>2</sup>	F	Predictor variables	$\beta$	t	Explained variance	
<b>P/PH</b>	.80	.63	181.782 ( $p=.000$ )					
				MS/E	.24	7.21	( $p=.000$ )	44 %
				A/F/Wb	.36	10.90	( $p=.000$ )	8.3 %
				W/BI	.19	7.30	( $p=.000$ )	5.2 %
				Gender	.11	4.59	( $p=.000$ )	2.3 %
				SC	.16	5.94	( $p=.000$ )	1.3 %
				A/E	.17	5.71	( $p=.000$ )	1.2 %
				C/SR/Ch	-.09	-2.53	( $p=.012$ )	0.4 %
				Weight	-.06	-2.50	( $p=.012$ )	0.3 %
<b>C/SR/Ch</b>	.82	.67	243.506 ( $p=.000$ )					
				A/F/Wb	.47	15.99	( $p=.000$ )	55.5 %
				MS/E	.21	6.54	( $p=.000$ )	7.5 %
				A/E	.18	6.72	( $p=.000$ )	1.6 %
				SC	.11	4.55	( $p=.000$ )	1.0 %
				Gender	-.10	-4.43	( $p=.000$ )	.90 %
				W/BI	.07	2.99	( $p=.003$ )	.30 %
				P/PH	-.08	-2.46	( $p=.014$ )	.20 %
<b>W/BI</b>	.67	.46	77.534 ( $p=.000$ )					
				P/PH	.27	6.6	( $p=.000$ )	27 %
				HE	.20	6.84	( $p=.000$ )	6.3 %
				Weight	.21	7.90	( $p=.000$ )	3.8 %
				MS/E	.24	5.84	( $p=.000$ )	2.7 %
				A/F/Wb	-.28	-6.58	( $p=.000$ )	2.4 %
				Gender	.12	.434	( $p=.000$ )	1.6 %
				C/SR/Ch	.12	2.68	( $p=.008$ )	1.1 %
				SC	.09	2.60	( $p=.009$ )	.60 %
A/E	.08	2.30	( $p=.022$ )	.50 %				
<b>A/F/Wb</b>	.81	.66	207.952 ( $p=.000$ )					
				C/SR/Ch	.47	15.80	( $p=.000$ )	55.2 %
				P/PH	.33	10.85	( $p=.000$ )	7.0 %
				W/BI	-.17	-6.83	( $p=.000$ )	1.4 %
				MS/E	.11	3.54	( $p=.000$ )	.70 %
				SC	.09	3.64	( $p=.000$ )	.60 %
				Age	-.10	-4.34	( $p=.000$ )	.50 %
				Weight	.08	3.47	( $p=.001$ )	.40 %
				Gender	-.05	-2.21	( $p=.028$ )	.20 %

Note: **P/PH**: Prevention/Positive Health; **C/SR/Ch**: Competition/Social Recognition/Challenge; **W/BI**: Weight/Body Image; **A/F/Wb**: Affiliation/Fun/Wellbeing; **SC**: Stress Control; **MS/E**: Muscular Strength/Endurance; **HE**: Health Emergency; **A/E**: Agility/Elasticity.

Next (Table 2), stress control (SC) shows the inclusion of six variables: P/PH ( $\beta=.22$ ;  $t=5.79$ ;  $p<.001$ ), C/SR/Ch ( $\beta=.18$ ;  $t=4.36$ ;  $p<.001$ ), HE ( $\beta=.19$ ;  $t=6.15$ ;  $p<.001$ ), Education Stage ( $\beta=.17$ ;  $t=6.30$ ;  $p<.001$ ), A/F/Wb ( $\beta=.16$ ;  $t=3.66$ ;  $p<.001$ ), and W/BI ( $\beta=.10$ ;  $t=3.21$ ;  $p<.05$ ).

Table 2. Linear regression analysis (stepwise), criterion variables: SC, S/ME, HE and A/E

Criterion variable	R	R <sup>2</sup>	F	Predictor variables	$\beta$	T	Explained variance	
<b>SC</b>	.66	.44	110.140 ( $p=.000$ )					
				P/PH	.22	5.79	( $p=.000$ )	31 %
				C/SR/Ch	.18	4.36	( $p=.000$ )	6.5 %
				HE	.19	6.15	( $p=.000$ )	2.7 %
				Stage	.17	6.30	( $p=.000$ )	2.5 %
				A/F/Wb	.16	3.66	( $p=.000$ )	.70 %
				W/BI	.10	3.21	( $p=.001$ )	.60 %
<b>S/ME</b>	.80	.64	247.666 ( $p=.000$ )					
				C/SR/Ch	.23	6.76	( $p=.000$ )	47 %
				P/PH	.25	7.60	( $p=.000$ )	10.9 %
				A/E	.21	7.35	( $p=.000$ )	2.4 %
				Gender	-.14	-6.35	( $p=.000$ )	1.8 %
				W/BI	.16	6.09	( $p=.000$ )	1.3 %
				A/F/Wb	.13	3.64	( $p=.000$ )	.60 %
<b>HE</b>	.57	.33	58.517 ( $p=.000$ )					
				W/BI	.27	7.01	( $p=.000$ )	22 %
				SC	.24	6.66	( $p=.000$ )	5.7 %
				Stage	-.14	-4.39	( $p=.000$ )	2.4 %
				P/PH	.09	2.26	( $p=.024$ )	1.3 %
				Gender	-.12	-3.88	( $p=.000$ )	.80 %
				Height	-.07	-2.03	( $p=.042$ )	.50 %
A/E	.09	2.66	( $p=.008$ )	.30 %				
<b>A/E</b>	.72	.51	126.558 ( $p=.000$ )					
				MS/E	.27	7.08	( $p=.000$ )	38 %
				P/PH	.21	5.84	( $p=.000$ )	6.7 %
				C/SR/Ch	.25	7.09	( $p=.000$ )	2.5 %
				Gender	.15	5.80	( $p=.000$ )	2.3 %
				HE	.06	2.12	( $p=.035$ )	.60 %
				Stage	-.07	-2.56	( $p=.011$ )	.50 %
W/BI	.08	2.48	( $p=.013$ )	.40 %				

Note: **P/PH**: Prevention/Positive Health; **C/SR/Ch**: Competition/Social Recognition/Challenge; **W/BI**: Weight/Body Image; **A/F/Wb**: Affiliation/Fun/Wellbeing; **SC**: Stress Control; **MS/E**: Muscular Strength/Endurance; **HE**: Health Emergency; **A/E**: Agility/Elasticity.

Muscular strength and endurance (MS/E) is predicted by six variables: C/SR/Ch ( $\beta=.23$ ;  $t=6.76$ ;  $p<.001$ ), P/PH ( $\beta=.25$ ;  $t=7.60$ ;  $p<.001$ ), A/E ( $\beta=-.21$ ;  $t=7.35$ ;  $p<.001$ ), Gender ( $\beta=-.14$ ;  $t=-6.35$ ;  $p<.001$ ), W/BI ( $\beta=.16$ ;

$t=6.09$ ;  $p<.001$ ), and A/F/Wb ( $\beta=.13$ ;  $t=3.64$ ;  $p<.001$ ). Regarding health emergency (HE), the following variables have shown certain predictive power: W/BI ( $\beta=.27$ ;  $t=7.01$ ;  $p<.001$ ), SC ( $\beta=.24$ ;  $t=6.66$ ;  $p<.001$ ), Stage ( $\beta=-.14$ ;  $t=-4.39$ ;  $p<.001$ ), P/PH ( $\beta=.09$ ;  $t=2.26$ ;  $p<.05$ ), Gender ( $\beta=-.12$ ;  $t=-3.88$ ;  $p<.001$ ), Height ( $\beta=-.07$ ;  $t=-2.03$ ;  $p<.05$ ), and A/E ( $\beta=.09$ ;  $t=2.66$ ;  $p<.05$ ). Finally, agility and elasticity (A/E) is predicted by seven variables: MS/E ( $\beta=.27$ ;  $t=7.08$ ;  $p<.001$ ), P/PH ( $\beta=.21$ ;  $t=5.84$ ;  $p<.001$ ), C/SR/Ch ( $\beta=.25$ ;  $t=7.09$ ;  $p<.001$ ), Gender ( $\beta=.15$ ;  $t=5.80$ ;  $p<.001$ ), HE ( $\beta=.06$ ;  $t=2.12$ ;  $p<.05$ ), Stage ( $\beta=-.07$ ;  $t=-2.56$ ;  $p<.05$ ), and W/BI ( $\beta=.08$ ;  $t=2.48$ ;  $p<.05$ ). These variables together explain a 51% of the total variance.

Table 3. *Linear regression analysis (stepwise), criterion variables: BI/PSA, F/L, O/LT and E/I*

Criterion variable	R	R <sup>2</sup>	F	Predictor Variables	$\beta$	t	Explained Variance	
<b>BI/PSA</b>	.61	.37	98.252 ( $p=.000$ )					
				F/L	.45	14.95	( $p=.000$ )	30 %
				E/I	.22	7.56	( $p=.000$ )	4.05 %
				Stage	-.13	-4.41	( $p=.000$ )	1.05 %
				Weight	.12	4.08	( $p=.000$ )	1.0 %
				Gender	.11	3.99	( $p=.000$ )	.90 %
<b>F/L</b>	.62	.41	94.920 ( $p=.000$ )					
				BI/PSA	.42	14.20	( $p=.000$ )	30 %
				O/LT	.22	7.49	( $p=.000$ )	6.6 %
				Age	.23	4.86	( $p=.000$ )	1.7 %
				E/I	.13	4.38	( $p=.000$ )	1.4 %
				Gender	.09	3.13	( $p=.002$ )	.70 %
				Stage	-.13	-2.60	( $p=.010$ )	.60 %
<b>O/LT</b>	.48	.23	49.496 ( $p=.000$ )					
				F/L	.28	8.38	( $p=.000$ )	13.1 %
				Stage	.39	7.22	( $p=.000$ )	4.6 %
				E/I	.19	5.80	( $p=.000$ )	3.0 %
				Age	-.21	-3.88	( $p=.000$ )	1.7 %
				Gender	.06	2.09	( $p=.037$ )	.60 %
<b>E/I</b>	.47	.22	61.848 ( $p=.000$ )					
				BI/PSA	.28	7.61	( $p=.000$ )	15 %
				O/LT	.18	5.42	( $p=.000$ )	4.3 %
				F/L	.17	4.59	( $p=.000$ )	1.5 %
				Gender	-.11	-3.71	( $p=.000$ )	1.2 %

Note: **BI/PSA**: Body Image/Physical-social Anxiety; **F/L**: Fatigue/Laziness; **O/LT**: Obligations/Lack of time; **E/I**: Environment/Infrastructure.

### **Predictor variables for the barriers in the practice of physical exercise**

The results of the regression analysis (Table 3) show the variables with the highest explanatory weight for the barriers that hinder the practice of physical exercise. So, in the case of body image and physical-social

anxiety (BI/PSA), certain predictive power has been shown by F/L ( $\beta=.45$ ;  $t=14.95$ ;  $p<.001$ ), E/I ( $\beta=.22$ ;  $t=7.56$ ;  $p<.001$ ), Stage ( $\beta=-.13$ ;  $t=-4.41$ ;  $p<.001$ ), Weight ( $\beta=.12$ ;  $t=4.08$ ;  $p<.001$ ), and Gender ( $\beta=.11$ ;  $t=3.99$ ;  $p<.001$ ). Next, fatigue and laziness (F/L) is predicted by six variables: BI/PSA ( $\beta=.42$ ;  $t=14.20$ ;  $p<.001$ ), O/LT ( $\beta=.22$ ;  $t=7.49$ ;  $p<.001$ ), Age ( $\beta=.23$ ;  $t=4.86$ ;  $p<.001$ ), E/I ( $\beta=.13$ ;  $t=4.38$ ;  $p<.001$ ), Gender ( $\beta=.09$ ;  $t=3.13$ ;  $p<.05$ ), and Stage ( $\beta=-.13$ ;  $t=-2.60$ ;  $p<.05$ ). In the same way, for obligation and lack of time (O/LT) certain predictive power has been shown by F/L ( $\beta=.28$ ;  $t=8.38$ ;  $p<.001$ ), Stage ( $\beta=.39$ ;  $t=7.22$ ;  $p<.001$ ), E/I ( $\beta=.19$ ;  $t=5.80$ ;  $p<.001$ ), Age ( $\beta=-.21$ ;  $t=-3.88$ ;  $p<.05$ ), and Gender ( $\beta=.06$ ;  $t=2.09$ ;  $p<.05$ ). In last place, environment and infrastructure (E/I) is predicted by four variables: BI/PSA ( $\beta=.28$ ;  $t=7.61$ ;  $p<.001$ ), O/LT ( $\beta=.18$ ;  $t=5.42$ ;  $p<.001$ ), F/L ( $\beta=.17$ ;  $t=4.59$ ;  $p<.001$ ), and Gender ( $\beta=-.11$ ;  $t=-3.71$ ;  $p<.001$ ).

## DISCUSSION

The promotion of physical exercise in adolescents is considered an inescapable objective to establish healthy and active lifestyles. For that reason, it's vitally important to know the variables (sociodemographic, motivational and barriers) that function as positive or negative predictors for starting or maintaining the practice of physical exercise.

In general, it can be stated that the set of variables in this study have reached a satisfactory predictive power. It has been shown that the variables that reached the highest predictive power for motivation have been prevention and positive health, muscular strength and endurance, competition, social recognition and challenge. Those results are similar to other studies (Domínguez, J., López-Castedo, A. & Portela, I., 2018; Li, Rukavina, Xie, & Li, 2016). In this regard, Pauline (2013) made a distinction by gender, finding out that women were more motivated by weight control, appearance, agility, positive health and stress control, and men were more motivated by performance and ego-oriented factors, like challenge, muscular strength and endurance, competition, affiliation and social recognition.

In the second level of predictive findings, barriers for the practice of physical exercise, the highest weight is for fatigue o laziness, followed by body image/physical-social anxiety and obligations or lack of time. These results are similar to those reported in previous studies finding environmental and psychological barriers, knowledge, lack of medical support and energy or age (Blake, Stanulewicz, & McGill, 2017; Casper, Bocarro, Kanters, & Floyd, 2011; Maxwell-Smith, Zeps, Hagger, Platell, & Hardcastle, 2017). Likewise, the study by Boutevillain, Dupeyron, Rouch, Richard & Coudeyre (2017) also supports these results, emphasizing that group practice increases people's adherence to the practice of physical exercise.

Finally, the sociodemographic variables show a low level of prediction both for motivation and barriers (the explained variance is between 4.6% y .20%). The sociodemographic variable with the highest predictive capacity is gender, appearing in all the regression analysis except in the variable stress control. Similar results were found by, Karaca, Çağlar, Deliceoglu & Bilgili (2016) adding that, as usual, the amount of time devoted by male students to physical activities was higher than for female students.

Nevertheless, among the limitations of the study it must be pointed out that the relation of these variables it's not exclusively direct, but rather, the predictive power of each variable could be mediated by others not included in this research. However, it's clear the conclusion that the results show which sociodemographic, motivational or barriers factors have the most influence and could determine the success of sustainable health planning (Moyano, & Rivera, 2010) to encourage physical exercise in adolescents.

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