

**CORRELATES OF PHYSICAL ACTIVITY FOR PORTUGUESE ADOLESCENTS ACCORDING TO GENDER**JOÃO MARTINS<sup>1,2</sup> - ADILSON MARQUES<sup>1</sup> - FRANCISCO CARREIRO DA COSTA<sup>1,2</sup><sup>1</sup> Faculty of Human Kinetics

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**ABSTRACT**

Many adolescents have low levels of physical activity (PA). This study sought to identify the factors associated with Portuguese adolescents' leisure time physical activity (LTPA), according to gender. A total of 336 adolescents (150 boys and 186 girls) aged 17-20 years ( $17.7 \pm 1.0$ ) completed a questionnaire. Questions collected information on LTPA, demographic, psychological and social variables. Based on LTPA, subjects were assigned as inactive (0-4 times/week) and active ( $\geq 5$  times/week). Logistic regression analyses were applied to the results. The incidence of adolescents in the active groups was low (41% boys, 21% girls). For boys, perceived competence ( $OR=3.17$ ,  $p=0.047$ ), mastery orientation ( $OR=3.08$ ,  $p=0.036$ ) and perceived health status ( $OR=2.03$ ,  $p=0.047$ ) were associated to likelihood to be more active. Conversely, middle education level of parents (i.e., 10-12 years of education) was negatively associated with LTPA ( $OR=0.19$ ,  $p=0.023$ ). The model explained 46% of the success to practice LTPA ( $R^2=0.462$ ). For girls, having a high perception of competence ( $OR=4.56$ ,  $p=0.003$ ) and height status ( $OR=1.88$ ,  $p=0.047$ ) were positive and associated with being more active. The model explained 38% of the LTPA ( $R^2=0.380$ ). The modifiable correlates for adolescents were mainly related to psychological factors. Moreover, correlates were different for boys and girls, except for the perception of competence. To increase adolescents PA levels it is important to take these differences into account.

**Key words:** physical activity, correlates, adolescents, Portugal

**INTRODUCTION**

Regular physical activity (PA) in adolescence is associated with health, specifically improved bone mineral density, cardiovascular risk factors, muscular strength and endurance, mental health and aerobic fitness (Janssen & Leblanc, 2010). In spite of the health benefits related to PA, research shows that Portuguese adolescents are not active enough to benefit their health (Baptista et al., 2012). This high prevalence of physical inactivity is a cause of concern. Further studies could help better understand youth behaviour towards PA and enlighten the design of intervention studies to promote healthy and active lifestyles.

Several factors correlated with PA have been identified (Bauman et al., 2012; Uijtdewilligen et al., 2011). These factors can be systematized as non-modifiable and modifiable. The non-modifiable factors, such as gender, age and socioeconomic status (SES), help in identifying groups at risk of being inactive. On the other hand, modifiable factors can be used to guide design intervention programs such as motivation (Papaioannou, Tsigili, Kosmidou, & Milosis, 2007), perceptions of competence (Van Der Horst, Paw, Twisk, & Van Mechelen, 2007), body image and health (Ledent, Cloes, & Piéron, 1997), and attitudes (Uijtdewilligen et al., 2011). The studies should rely mainly upon the modified factors because they are more likely and easier to change with intervention.

Despite the number of studies about the correlates of PA, there is little information about Portuguese adolescents. Thus this study sought to identify the factors associated with Portuguese adolescents' leisure time PA (LTPA) and their gender.

**METHODS****Participants**

The participants were 387 adolescents (170 boys, 217 girls; mean age  $17.7 \pm 1.0$ , range 16-19 years) from two Portuguese public secondary schools.

**Measures**

PA was self-reported, using a questionnaire adapted from Telama et al. (2002). Students were asked how many days per week they practiced organized and unorganized PA.

Demographic and biological variables included age, gender, school type, body mass index (BMI), social class, and parents' educational level. The schools selected were from suburban and urban areas to guarantee that students were from different socioeconomic backgrounds. Weight and height were self-reported. Body mass index was calculated using the Quetelet index [weight (kg)/height (m)<sup>2</sup>]. Social class was calculated based on the occupation of the parents. This was regrouped in order to classify the subjects as lower and middle/high class. Parents' educational level was categorized according to the Portuguese educational system – *lower* for those with less than 9 years of education, *middle* for those with middle education, and *high* for those with higher education or college degrees.

Lintunen's scale was used to measure how students perceived physical competence (Lintunen, 1990), using a 5-point Likert scale. Perception of body image, height and body shape was assessed using one single item each in a 5-point Likert scale. Perception of health was assessed with a selection on a 4-point scale ranging from "I am not feeling well" (=1) to "I am very healthy" (=4).

The students were also asked questions like "What do you think about going to school?" and "What do you think about your PE lessons?" to measure their attitude towards school and Physical Education (PE) (Delfosse et al., 1997). The answers were rated on a 5-point scale, ranging from "I dislike it very much" to "I like it very much".

The students' goal orientation and motivational climate in PE were measured using the Achievement Goals Questionnaire and the Perceptions of Teacher's Emphasis on Goals Questionnaire (Papaioannou et al., 2007).

Academic performance was measured using students' grades at the end of their academic year in subjects like Portuguese and PE. In Portuguese middle school students' grades range from 0 (very poor) to 20 (very good).

Students were also asked about the frequency (1 to 7 days/week), duration (less than 45 minutes, 60 minutes or more and more than 90 minutes) and intensity (light, moderate-to-vigorous, only vigorous), in order to identify the minimum recommended amount of PA for overall health benefits.

**Procedures**

The study's protocol was introduced to and approved by the Portuguese Minister of Education. The respective School administrators authorized the study, students' legal guardians provided a written informed consent and the students also agreed to participate. The questionnaire was distributed by PE teachers during class, in the spring of 2011.

**Data analysis**

Students were divided into two groups according PA's participation – those who participated less than five times a week and those who participated five or more times per week. The effects of each independent variable on the PA participation were assessed by a binary logistic regression. Adjusted odds ratio (OR) with 95% confidence intervals (CI) were calculated. Adjustments were performed for all studied variables. An OR greater than 1 reflects an increased likelihood of participation in PA five or more times a week. The analyses were stratified by gender to evaluate potential gender differences. All statistical analyses were performed using IBM SPSS Statistics 20.0. The level of significance was set at 0.05.

**RESULTS**

The general sample's characteristics are presented in Table 1. The incidence of adolescents in the active groups was low (41.2 % boys, 21.2 % girls). More than half of the respondents were from a middle/high social class (61.8%) and attended a school placed in an urban area (69.3%). Regarding the BMI, the mean level of the whole sample (21.4±2.9) is in the healthy weight zone. Table 1 also shows the data regarding: perceptions; goal orientation and perceived motivational climate in PE; attitudes; academic performance in 11<sup>th</sup> year; and knowledge of PA recommendations.

Table 1 General characteristics of the study population by gender

Variables	Total	Boys	Girls
<b>Classification of LTPA</b>			
Inactive	271 (70.1%)	100 (58.8%)	171 (78.8%)
Active	116 (29.9%)	70 (41.2%)	46 (21.2%)
<b>Social class</b>			
Lower	133 (34.4%)	55 (32.4%)	78 (35.9%)
Middle/High	239 (61.8%)	109 (64.1%)	130 (59.9%)
<b>Educational level</b>			
Lower	87 (22.5%)	34 (20.0%)	53 (24.4%)
Middle	119 (30.7%)	54 (31.8%)	65 (30.0%)
High	175 (45.2%)	79 (46.5%)	96 (44.2%)
<b>School type</b>			
Suburban	119 (30.7%)	58 (34.1%)	61 (28.1%)
Urban	268 (69.3%)	112 (65.9%)	156 (71.9%)
<b>Age</b>	17.7±1.0	17.9±1.0	17.6±0.9
<b>Weight (kg)</b>	62.1±11.3	69.9±10.9	55.9±8.3
<b>Height (m)</b>	1.69±10.0	1.76±10.1	1.64±6.1
<b>BMI</b>	21.4±2.9	22.3±3.0	20.7±2.7
<b>Perceptions</b>			
Perception of height*	2.9±0.9	2.7±0.8	3.1±0.9
Perception of body shape*	2.7±0.8	2.7±0.8	2.7±0.7
Perception of body image*	2.1±1.1	2.0±1.0	2.4±1.1
Perception of health	3.1±0.8	3.1±0.8	3.0±0.8
Perception of competence	3.5±0.8	3.8±0.7	3.3±0.7
<b>Goal orientation in PE</b>			
Mastery	4.1±0.7	4.3±0.6	4.1±0.8
Performance-approach	3.4±0.9	3.7±0.9	3.3±1.0
Performance-avoidance	2.1±0.9	1.8±0.8	2.3±1.0
<b>Motivational climate in PE</b>			
Mastery	3.8±0.9	3.7±0.9	3.8±0.9
Performance-approach	2.9±1.0	2.9±1.0	2.9±0.9
Performance-avoidance	1.7±0.7	1.6±0.7	1.7±0.7
<b>Attitudes</b>			
Toward school	3.4±0.8	3.3±0.8	3.5±0.8
Toward PE	3.9±0.9	4.3±0.7	3.7±1.0
<b>Academic performance</b>			
Portuguese classification	12.7±2.3	12.1±2.2	13.2±2.3
PE classification	15.6±2.2	16.2±2.1	15.1±2.0
<b>Knowledge of PA recommendations</b>			
Do not know	373 (96.4%)	164 (96.5%)	209 (96.3%)
Do know	14 (3.6%)	6 (3.5%)	8 (3.7%)
* Reversed item			

Table 2 presents the results of the adjusted regression analysis. For boys, perceived competence (OR=3.17,  $p=0.047$ ), mastery orientation (OR=3.08,  $p=0.036$ ) and perceived health status (OR=2.03,  $p=0.047$ ) were associated to a likelihood of being more active. Conversely, Parents with middle education level was negatively associated with LTPA (OR=0.19,  $p=0.023$ ). The model explained 46% of the success to practice LTPA ( $R^2=0.462$ ). For girls, having a high perception of competence (OR=4.56,  $p=0.003$ ) was positive and associated with being more active. On the other hand, as height status was introduced in the analysis as a reverse variable, the perception of a low height status (OR=1.88,  $p=0.047$ ) is positively associated with the practice of LTPA. Finally, the model explained 38% of the girls' LTPA ( $R^2=0.380$ ).

Table 2 Adjusted odds ratio for participation in LTPA among Portuguese adolescents

Explanatory variables	Participation in LTPA			
	Boys		Girls	
	Adjusted OR (95% CI)	p	Adjusted OR (95% CI)	p
<b>Social class</b>				
Lower	1.00 (ref)		1.00 (ref)	
Middle/High	2.14 (0.530-4.918)	0.173	0.924 (0.205-2.584)	0.894
<b>Educational level</b>				
Lower	1.00 (ref)		1.00 (ref)	
Middle	0.19 (0.030-0.520)	<b>0.023</b>	0.363 (0.069-1.437)	0.141
High	0.372 (0.06-0.990)	0.159	0.488 (0.98-2.937)	0.353
<b>School type</b>				
Suburban	1.00 (ref)		1.00 (ref)	
Urban	1.370 (0.195-2.164)	0.586	1.484 (0.299-7.226)	0.582
<b>Age</b>	0.725 (0.367-1.309)	0.303	0.641 (0.182-0.877)	0.177
<b>Weight (kg)</b>	0.688 (0.988-1.455)	0.363	0.625 (0.296-2.240)	0.356
<b>Height (m)</b>	1.504 (0.888-1.088)	0.209	1.525 (0.621-2.577)	0.238
<b>BMI</b>	4.517 (0.399-1.394)	0.251	4.293 (0.121-32.190)	0.301
<b>Perceptions</b>				
Perception of height*	1.299 (0.317-1.490)	0.501	1.887 (0.266-1.002)	<b>0.047</b>
Perception of body shape*	0.980 (0.434-1.811)	0.954	0.869 (0.355-2.436)	0.758
Perception of body image*	1.155 (0.625-1.788)	0.587	1,221 (0.586-1.857)	0.436
Perception of health	2.025 (0.860-3.515)	<b>0.047</b>	0.954 (0.330-1.505)	0.893
Perception of competence	3.168 (1.108-10.820)	<b>0.047</b>	4.555 (1.849-16.589)	<b>0.003</b>
<b>Goal orientation in PE</b>				
Mastery	3.080 (1.452-13.251)	0.036	1.239 (0.416-3.543)	0.671
Performance-approach	0.719 (0.412-1.279)	0.719	1.069 (0.482-1.488)	0.805
Performance-avoidance	1.390 (0.791-3.077)	1.390	0.741 (0.453-1.704)	0.345
<b>Motivational climate in PE</b>				
Mastery	0.594 (0.345-1.156)	0.091	0.999 (0.466-1.686)	0.097
Performance-approach	0.811 (0.657-1.756)	0.388	1.174 (0.822-2.775)	0.569
Performance-avoidance	0.736 (0.345-2.157)	0.519	0.036 (0.191-1.368)	0.331
<b>Attitudes</b>				
Toward school	1.115 (0.666-2.216)	0.717	1.213 (0.787-3.381)	0.431
Toward PE	1.705 (0.453-4.324)	0.347	0.791 (0.222-1.336)	0.583
<b>Academic performance</b>				
Language classification	0.886 (0.682-1.096)	0.300	0.995 (0.718-1.185)	0.144
PE classification	1.043 (0.655-1.299)	0.810	1.040 (0.787-1.639)	0.966
<b>Knowledge of PA recommendations</b>				
Do not know	1.00 (ref)		1.00 (ref)	
Do know	8.725 (0.116-736.87)	0.326	4.374 (0.738-41.166)	0.966
* Reversed item				

## DISCUSSION

The present study examined factors related with participation in LTPA in a sample of Portuguese adolescents. The results show that 70.1% of the students have low levels of LTPA participation. This is similar to findings observed in other studies, where the prevalence of inactivity among adolescents is high (Baptista et al., 2012; Hallal et al., 2012). Moreover, results indicate that boys are more active than girls. These results confirm that adolescent girls are a subgroup at risk of adopting inactive lifestyles and, therefore, need special attention for interventions (Van Der Horst et al., 2007).

The results from the study suggest that correlates of LTPA for girls are perception of competence and perception of height status (negative association). Correlates for boys' LTPA include perception of competence, mastery goal orientation, perceived health and parents with middle school education level (negative association).

Findings from this study on the perception of competence and goal orientation (only for the boys) are consistent with the findings from previous studies (Biddle, Whitehead, O'Donovan, & Nevill, 2005; Uijtewilligen et al., 2011; Van Der Horst et al., 2007). Although, Biddle et al. (2005) reported that the strength of the association regarding the perception of competence among adolescent girls was small. As for goal orientation, having a mastery orientation is more likely to benefit motivation and PA participation (Papaioannou et al., 2007). PE can assume a fundamental role in promoting this type of self-perceptions among children and adolescents (Braithwaite, Spray, & Warburton, 2011). Therefore, the PE teacher should consider creating a strong mastery climate, i.e., a climate where the tasks are challenging and students are provided with different choices, recognition, positive evaluation for personal improvement, and variability in pace of learning (Braithwaite et al., 2011).

Another psychological correlate identified in boy students was the perception of health status. Despite being identified in Sallis et al. (2000) review as a positive correlate of adolescents' PA, the findings regarding perception of health are inconsistent (Bauman et al., 2012; Van Der Horst et al., 2007). In girl students, the perception of a small height was positively associated with the practice of LTPA, while to some, being tall was perceived as a negative body characteristic. In this respect, Biddle et al. (2005) found that girls concerns about physical self-perceptions show a small but a positive association with activity. Therefore, it might be important for PE teachers to work with adolescents on their physical self-perceptions, because it could have some influence in their PA participation.

In previous studies, the parent's education and social status have said to influence young people' PA participation. But the findings are inconsistent and do not provide a clear message (Biddle et al., 2011). In this study, social class was not a correlate of adolescents' LTPA. On the other hand, middle parental education was negatively associated with students' LTPA. While, Van der Horst et al. (2007) found that parental education was positively associated with PA, Biddle et al. (2005) reported a mixed picture across parental education.

Age however, has been identified previously as a consistent positive correlate of PA in youth (Bauman et al., 2012; Uijtdewilligen et al., 2011; Van Der Horst et al., 2007). However, in this study, age was not identified as a correlate; possibly because all participants were 12th grade students and were close in age. BMI is one of the most consistently studied biological correlates. In this study, no relationship was noted for BMI and PA participation. These results are in accordance with the findings of various investigations (Bauman et al., 2012; Van Der Horst et al., 2007). Additionally, PE and Portuguese subject grades were also not associated with PA. Therefore, it can be concluded that being physically active or inactive, does not affect students' academic performance. Finally, it is worth noticing that 96.4% of the study participants did not know the PA recommendations. It seems that that PE, the media, and society are not correctly delivering this message to young people. These results highlight the need for an effective communication strategy that can ensure that young people are aware and understand PA guidelines.

### CONCLUSION

In conclusion, the modifiable correlates for adolescents were mainly psychological factors. Additionally, correlates were different for boys and girls students, except the perception of competence. In order to improve adolescents PA levels, it is important to factor in these same differences. However, further research is needed to identify the correlates of PA and sedentary behaviour. An important and challenging concern for researchers is to know how the different correlates vary over time. In this respect, qualitative studies may be helpful in gaining a deeper insight into the correlates of PA.

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