

Influence of Perceived Sport Competence and Body Attractiveness on Physical Activity and other Healthy Lifestyle Habits in Adolescents

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The purpose of this study was to test an explanatory model of the relationships between physical self-concept and some healthy habits. A sample of 472 adolescents aged 16 to 20 answered different questionnaires assessing physical self-concept, physical activity, intention to be physically active and consumption of alcohol and tobacco. The results of the structural equation model showed that perceived sport competence positively correlated with current physical activity. Body attractiveness positively correlated with physical activity in boys and negatively in girls. Current physical activity positively correlated with the intention to be physically active in the future and negatively with the consumption of alcohol and tobacco. Nevertheless, this last relationship was only significant in boys. The results are discussed in connection with the promotion of healthy lifestyle guidelines among adolescents. This model shows the importance of physical self-concept for engaging in physical activity in adolescence. It also suggests that physical activity is associated with the intention to continue being physically active and with healthy lifestyle habits.

Keywords: physical activity, physical self-concept, healthy habits, adolescence, theory of planned behavior.

El objetivo de este estudio fue testar un modelo explicativo de las relaciones entre el autoconcepto físico y algunos hábitos saludables. Se utilizó una muestra de 472 adolescentes, con edades comprendidas entre los 16 y 20 años, que respondieron a diferentes cuestionarios que evaluaban el autoconcepto físico, la actividad física, la intención de ser físicamente activo y el consumo de alcohol y tabaco. Los resultados del modelo de ecuaciones estructurales mostraron que la percepción de competencia deportiva correlacionaba positivamente con la actividad física actual. La percepción de atractivo corporal correlacionaba positivamente con la actividad física en los chicos y negativamente en las chicas. La actividad física actual correlacionaba positivamente con la intención de ser físicamente activo en el futuro y negativamente con el consumo de alcohol y tabaco. Sin embargo, esta última relación sólo fue significativa en los chicos. Los resultados se discuten en relación a la promoción de pautas de vida saludable entre los adolescentes. Este modelo muestra la importancia del autoconcepto físico para el compromiso con la actividad física en la adolescencia. Además, sugiere que la práctica de actividad física está asociada con la intención de continuar siendo físicamente activo y con hábitos de vida saludables.

Palabras clave: actividad física, autoconcepto físico, hábitos saludables, adolescencia, teoría del comportamiento planeado.

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Numerous studies demonstrate the importance physical activity has on human development. It has been reported that children who acquire healthy lifestyle habits at an early age may continue over time (Pate, Baranowski, Dowda, & Trost, 1996). Specifically, participation in physical activities on a regular basis helps growth and development (Malina, Bouchard, & Bar-Or, 2004), maintains optimal skill and health (Armstrong & Welsman, 1997) and prevents diseases that affect physical and psychological aspects, such as obesity (Bar-Or et al., 1998), anxiety and depression (Alfermann & Stoll, 2000; Fox, 2000). However, many children and adolescents are not committed to physical exercise and, therefore, they do not reap the associated health benefits (García-Ferrando, 2006; Taylor & Sallis, 1997). Furthermore, adolescence is a stage in which physical activity starts to decrease consistently (e.g. Caspersen, Pereira, & Curran, 2000). This study was designed to test an explanatory model of engagement in physical activity and the adoption of healthy lifestyle behaviors in older adolescents.

The researchers implemented various social-cognitive models to try to encourage children and adolescents to participate in physical activity. They include the theory of planned behavior (TPB; Ajzen, 1985), which seems particularly useful and effective for helping to explain people's physical activity behavior (for a review see Hagger, Chatzisarantis, & Biddle, 2002). This theory establishes that intention is the main determinant of behavior. Intention represents a person's immediate orientation towards commitment to a specific behavior, such as physical activity. According to the TPB, intention is determined by three social-cognitive variables: attitude, subjective norm and perceived behavioral control. Attitude refers to a person's belief in the benefits (s)he will reap from certain behavior. Subjective norm represents a person's assessment of whether others want him/her to commit to a certain behavior. As far as perceived behavioral control is concerned, Terry and O'Leary (1995) identified an internal and an external component. The internal component is self-efficacy, which refers to the capacity or perceived ability to perform a certain behavior. The external component refers to barriers to performing a certain behavior, such as bad weather. According to Ajzen and Madden (1986), perceived behavioral control can also have a direct influence on behavior.

Hagger, Chatzisarantis, Culverhouse, and Biddle (2003) consider that the TPB does not explain all the variance of exercise behavior and it would be interesting to incorporate constructs such as perceived competence and self-concept into their study. These constructs are closely connected with perceived behavioral control (Marsh, Papaioannou, & Theodorakis, 2006). Physical self-concept is a multidimensional mental representation that individuals have of their actual physical appearance, including perceptive, cognitive, affective and emotional

elements, as well as other physical attributes (Cash & Pruzinsky, 1990). Fox and Corbin (1989) identified four dimensions of physical self-concept: physical condition, sport competence, body attractiveness and physical strength.

The present study was based on an analysis of the relationship between the internal component of perceived behavioral control and engagement in physical activity, using physical self-concept measures for that purpose. Specifically, the relationships between both perceived sport competence and body attractiveness and physical activity were examined. The sport competence variable was chosen because it has proved to be the physical self-concept component that best relates to physical activity (e.g. Crocker, Eklund, & Kowalski, 2000; Pastor, Balaguer, & García-Merita, 2006). The body attractiveness variable was also used since the studies conducted have found contradictory results on the relationship between this variable and physical activity (Crocker et al., 2000; Raustorp, Stahle, Gudasic, Kinnunen, & Mattsson, 2005).

Different studies (Crocker et al., 2000; Hagger, Ashford, & Stambulova, 1998; Moreno-Murcia & Cervelló, 2005; Raudsepp, Liblik, & Hannus, 2002) have connected these dimensions of physical self-concept with physical activity in adolescents, demonstrating reciprocal relationships, so those adolescents that do sport regularly improved their perception of sport competence and those who perceived themselves as more competent were involved in sport to a greater extent. Crocker et al. (2000), with a sample of Canadian students aged between 10 and 14, and using structural equation models, demonstrated that perceived sport competence was positively related with physical activity, whilst body attractiveness was negatively associated. However, Raustorp et al. (2005), with children aged 11 and 12, showed that body attractiveness could be positively related with physical activity, although the results obtained are not very conclusive, since this relationship was not significant in the regression analysis. Raustorp et al. (2005) also showed a negative association between body mass index (BMI) and body attractiveness, which indicates that a focus on the body combining youth, health, slimness and physical activity as an ideal model is adopted at early ages. On the one hand, given the positive effect physical activity seems to have on the perception of body image (Burgess, Grogan, & Burwitz, 2006), it is possible that those individuals who perceive themselves with low body attractiveness want to exercise to improve this aspect. On the other, it is also possible that those people that notice an improvement in their body attractiveness by engaging in physical activity may wish to continue the activity to feel good.

The review by Hagger et al. (2002) also shows the need to include past behavior or habits in the study of TPB as a determinant of the final behavior of physical activity. Various studies with children and adolescents (Armitage, 2005; de Bruijn et al., 2006; Hagger, Chatzisarantis, & Biddle, 2001;

Rhodes, Macdonald, & McKay, 2006) have shown that past physical activity positively correlates with intentions and current physical activity. Exercise is important for children and adolescents as this is a development stage when habits acquired may well last into adult life (Malina, 2001). Nevertheless, the tracking of physical activity is generally moderate to low. Many factors have an influence on physical activity during childhood and adolescence, and the majority of tracking studies do not include them. Furthermore, measurement techniques of physical activity are imperfect and have limitations (Malina, 2001), which is why research on these relationships needs to continue. This study analyzed the relationship between physical activity and the intention to be physically active in the future.

Besides the relationship between exercise and the intention to continue to be physically active, there are studies that have analyzed the correlation of physical activity on other healthy behaviors. Engaging in physical activity is likely to lead people to adopt positive attitudes towards committing to healthy lifestyles. As mentioned above, attitude is one of the determinants of intention and behavior in the TPB. Engaging in physical activity could make the person see the benefits of adopting healthy behaviors (attitude) and committing to them. Pate, Heath, Dowda, and Trost (1996) found that the presence of low levels of physical activity in American adolescents was associated with negative health behaviors, such as smoking cigarettes and marijuana, low consumption of fruit and vegetables or more time watching television. Similarly, Balaguer, Pastor, and Moreno (1999), in a study on the lifestyles of Spanish adolescents, found that exercise was associated with less consumption of tobacco in boys and it was negatively related with the consumption of tobacco and the frequency of drunkenness in girls. Other recent studies with Spanish adolescents have shown that exercise can have a positive relationship with rest habits, balanced diet and stable mealtimes, and a negative relationship with the consumption of drugs (Jiménez, Cervelló, García Calvo, Santos-Rosa, & Del Villar, 2006; Jiménez, Cervelló, García Calvo, Santos-Rosa, & Iglesias, 2007).

Pastor et al. (2006) analyzed the relationships between self-concept and a healthy lifestyle in adolescents. The results showed that perceived sport competence positively correlated with participation in sports. In turn, participation in sports negatively correlated with the consumption of alcohol and tobacco, and positively with the consumption of healthy food in boys and girls. Furthermore, participation in sports negatively correlated with the consumption of cannabis in girls. The relationships between body attractiveness and participation in sports were not tested. Nevertheless, the results showed that body attractiveness in boys was not related with the healthy behaviors studied, whilst in the girls it was positively related with the consumption of unhealthy food.

With the aim of furthering our knowledge about some factors that contribute to the adoption of healthy behaviors among adolescents, the purpose of this study was to test an explanatory model of the relationships between perceived sport competence, body attractiveness, current physical activity, the intention to be physically active in the future and the consumption of harmful substances, such as tobacco and alcohol. A better understanding of the variables which might influence the adoption of healthy and active lifestyles will allow health professionals to implement intervention strategies. A two-step structural equation model was performed. The first step was a measurement model which tested the factor loadings, the error variances, and the general reliability of the factors in the study. The second step was a structural equation model that analyzed the associations among the various study variables. Based on the review of specialized bibliography, it was hypothesized that perceived sport competence would positively correlate with current exercise and sport activity, and that body attractiveness would negatively correlate. In turn, current physical activity would positively correlate with the intention to be physically active in the future and negatively with the consumption of alcohol and tobacco. In addition, an invariance analysis across gender was conducted to check if the paths were significantly different in the model between boys and girls.

Although many of the relationships proposed in this study have been analyzed in the past, no previous investigation has tested a complete model of relationships between perceived sport competence, body attractiveness, current physical activity, intention to be physically active and consumption of alcohol and tobacco. This methodological design makes it possible to summarise how some variables are associated with others and how, in their turn, the latter may be associated with other different variables. In this case the complete sequence would allow the verification of how some dimensions of physical self-concept might affect participation in physical activity, which could lead to the adoption of specific health behaviors. This type of design also allows, via invariance analysis, to test if proposed relationships show the same form in both males and females, which would constitute a methodological advance with regard to previous studies.

Moreover, the present study would complement the findings of other investigations, taking into consideration two questions. On the one hand it concerns the evaluation of the level of habitual physical activity, taking into account energy exertion (as well as time and frequency) as a function of the sport or exercise performed, for which the guide of MET intensities of Ainsworth et al. (2000) is followed. This strategy permits better quantification of physical activity. On the other hand, an attempt is made to clarify how the perception of body attractiveness might be related to participation in physical activity. As we have mentioned above, previous studies have not managed to elucidate this question.

Method

Participants

The sample was comprised of 472 students (259 boys and 213 girls) in the academic year prior to beginning university studies, aged between 16 and 20 ($M = 17.37$, $SD = .95$), from different schools in a large Spanish city. Out of the entire sample, 354 individuals said that they did sport (75%), whilst 118 did not (25%). In connection with the consumption of alcohol and tobacco, 366 individuals had consumed alcohol in the last 30 days at some time (67.2%), whilst 106 had not consumed alcohol (32.8%). Furthermore, 247 students had smoked (52.3%) a whole cigarette in the last 30 days compared with 225 who had not smoked (47.7%). These values are higher than those in the last Spanish survey on the use of drugs in secondary education (Ministry of Health and Consumption of Spain, 2007), although this survey was performed with students aged between 14 and 18. This survey showed that 58% had had an alcoholic drink and 27.8% had smoked tobacco in the last 30 days before the survey.

Measures

Perceived Sport Competence and Body Attractiveness. The Spanish adaptation (Moreno-Murcia & Cervelló, 2005) of the Physical Self-Perception Profile (Fox & Corbin, 1989) was used to measure the students' perception of sport competence and body attractiveness. The perception of their sport competence was measured using six items (e.g. "I am very good at almost all sports"), whilst the perception of their body attractiveness was measured using eight items (e.g. "I am always happy with the way I look"). The questionnaire used a Likert scale ranging from 1 (*totally disagree*) to 4 (*totally agree*). In this study, the confirmatory factor analysis showed that one of the perceived competence items had a very low factor loading, which had a negative effect on the model's fit. Furthermore, modification indices suggested a high correlation of this item with body attractiveness. This item was removed to prevent measurement problems. Cronbach's alpha values of .88 were obtained for perceived sport competence and of .83 for body attractiveness.

Habitual Physical Activity. The Spanish version (Sarria et al., 1987) of the Habitual Physical Activity Questionnaire by Baecke, Burema, and Frijters (1982) was used to measure the participants' habitual physical activity. This questionnaire has demonstrated suitable validity and reliability (Florindo & Latorre, 2003). Specifically, physical exercise in leisure (PEL) was measured using four questions. The first of them referred to the type of sport or sports done (modality), the weekly frequency and the months in which this takes place. The score of this

first question was calculated with the following formula: $\text{Modality 1} = (\text{Intensity} \times \text{Time} \times \text{Proportion}) + \text{Modality 2} = (\text{Intensity} \times \text{Time} \times \text{Proportion})$. Different coefficients were allocated to calculate this formula, depending on the intensity of sport done, the weekly hours and the months in which this takes place (see Ainsworth et al., 2000; Florindo & Latorre, 2003). A coefficient of 0.76 was used for the modalities of mild energy exertion, 1.26 for the modalities of moderate energy, and 1.76 for the modalities of strenuous energy exertion (energy exertion was checked in Ainsworth's compendium of physical activities). In connection with time, a coefficient of 0.5 was used for less than one hour a week, 1.5 from more than one hour and less than two hours a week, 2.5 for more than two hours a week and less than three hours a week, 3.5 for more than three and up to four hours a week, and 4.5 for more than four hours a week. As far as proportion is concerned, the coefficients used were: 0.04 for less than one month, 0.17 for between one and three months, 0.42 for between four and six months, 0.67 for between seven and nine months, and 0.92 for more than nine months. This question's score was obtained by multiplying the intensity coefficient by the time and proportion coefficients. If two modalities were engaged in, the scores obtained in each of the modalities were added together to arrive at the question's score.

The other three questions assessed the level of physical exercise in leisure time ("when compared to others of my age, I think my physical activity during leisure hours is", "during leisure hours, I sweat", "during leisure hours, I practice sports or physical exercises") using a Likert scale ranging from 1 (*much less-never*) to 5 (*much more-very often*). To calculate the PEL score, the first question's score was reconverted into values from 1 to 5 [0 (no physical exercise) = 1; between 0.01 up to < 4 = 2; between 4 up to < 8 = 3; between 8 up to < 12 = 4; $\geq 12 = 5$] and the mean of the four questions was calculated. The level of physical activity increased as the mean score went up. The questionnaire obtained a Cronbach's alpha value of .81 in this study.

Intention to be Physically Active. The Spanish version (Moreno-Murcia, Moreno, & Cervelló, 2007) of the instrument developed by Hein, Müür, and Koka (2004) was used to measure the students' intention to be physically active in the future, after finishing their studies at school. Two items were removed ("outside physical education lessons I like to do sport", "I often do sport in my free time") as we considered that they asked about current physical activity rather than about the intention to do physical activity. Consequently, this instrument was formed by three items (e.g. "after secondary school I would like to be physically active") which were answered using a Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). A Cronbach's alpha value of .70 was obtained in this study.

Alcohol and Tobacco Consumption. The students were asked by just one item if they had consumed alcohol or not in the last 30 days and by another item whether they had smoked or not in the last 30 days.

Procedure

The head teachers of the different schools were contacted to inform them about the objectives and to request permission to conduct the study. Students who were minors were asked for written authorization from their parents to take part in the study. The questionnaires were administered by the main researcher, who gave the instructions required to fill them in and who stressed that the replies were anonymous and should be sincere. Participation was voluntary and all ethical data collection procedures were respected.

Data Analysis

Firstly, the descriptive statistics of the variables perceived sport competence, body attractiveness, habitual physical activity and intention to be physical activity were calculated. Next, the bivariate correlations among these variables and the consumption of alcohol and tobacco were calculated. Since the alcohol and tobacco variables were ordinal, Spearman's correlation coefficient was used when one of these two variables was involved in the analysis. Pearson's correlation was used for relationships among perceived sport competence, body attractiveness, physical activity and intention.

Later a structural equation model in two steps (Anderson & Gerbing, 1988) was tested. The first step was to test the construct validity of the measurement model used by means of an analysis in which the different latent variables freely correlated, which corresponded to a confirmatory factor analysis. This procedure allows tests of the significance for all pattern coefficients and an assessment of whether any structural model would give acceptable fit. The measurement model evaluates measurement assumptions, relating the structural equation model's indicators with latent variables. The structural model cannot be tested until the measurement model obtains a satisfactory fit (Mulaik & James, 1995). The second step was the structural model, which analyzed the relationships among the perceptions of sport competence and body attractiveness, habitual physical activity, the intention to be physically active and the consumption of alcohol and tobacco.

The maximum likelihood estimation method, together with the bootstrapping procedure (Mardia's coefficient = 45.96) and the covariance matrix were used to start the data analysis. The input covariance matrix was based on the previously calculated correlation matrix. The results of the bootstrapping analysis made it possible to assume that the results of the estimations were robust, and, therefore, they were not affected by the lack of normality (Byrne,

2001). The following were analyzed: the coefficient χ^2 , the chi-square to degrees of freedom ratio ($\chi^2/d.f.$), the CFI (Comparative Fit Index), the IFI (Incremental Fit Index), the TLI (Tucker Lewis Index), the RMSEA (Root Mean Square Error of Approximation) and the SRMR (Standardized Root Mean Square Residual). Since χ^2 is very sensitive to sample size and p tends to be significant with large samples (Jöreskog & Sörbom, 1989), it is useful to take into account the coefficient $\chi^2/d.f.$ Values between 2 and 3 are considered acceptable, whilst values below 2 are considered good (Schermelleh-Engel, Moosbrugger, & Müller, 2003). CFI, IFI and TLI demonstrate an acceptable fit when values of .95 or higher are obtained (Hu & Bentler, 1999). Nevertheless, some psychometric experts think this cut-off point is too restrictive and difficult to achieve when complex models are tested with multiple indicators (Marsh, Hau, & Grayson, 2005). Values equal to or below .06 for RMSEA and .08 for SRMR are considered acceptable (Hu & Bentler, 1999).

Five items were used as indicators for the perceived sport competence latent variable. The items of the body attractiveness latent variable were parceled randomly into four groups of two items, and their means were used as indicators. This variable's items had to be parceled because if its eight items had been used as indicators, the number of parameters would have been too high for the sample used. Kline (2005) states that 5 times (or less) as many cases as parameters is insufficient for significance testing of model effects. Four questions were used for the physical activity latent variable and three items for the intention latent variable. The consumption of alcohol and the consumption of tobacco were used as indicators for the consumption latent variable.

The invariance of the model across gender was checked using a multi-group analysis. First, a totally noninvariant multisample model was tested, which served as a baseline for comparing the next models. This model was compared with various models with invariance. Successive steps checked whether there were any statistically significant differences in χ^2 between the unconstrained (noninvariant) model and the models with invariant measurement weights, structural weights, structural covariances, structural residuals, and measurement residuals (Byrne, 2004). In this analysis, a new constraint was added to the previous constraints in every model tested. The various analyses were conducted with the statistical packages SPSS 15.0 and AMOS 7.0.

Results

Descriptive Statistics and Bivariate Correlations

The descriptive statistics of every measurement for the whole sample and the sub-samples of boys and girls are shown in Table 1. The students obtained higher mean scores in body attractiveness than in perceived sport competence.

Table 1
Descriptive Statistics and Bivariate Correlations Among Variables

Variables	M			SD			1	2	3	4	5	6
	Total	Boys	Girls	Total	Boys	Girls						
1. Sport competence	2.52	2.77	2.20	.85	.82	.78	-	.35**	.63**	.60**	.01	-.18**
2. Body attractiveness	2.77	2.85	2.66	.64	.62	.65	-	-	.21**	.23**	-.02	-.11*
3. PEL	2.80	3.03	2.52	.92	.89	.87	-	-	-	.62**	-.09*	-.21**
4. Intention	3.72	3.89	3.52	1.00	.96	1.02	-	-	-	-	-.14**	-.24**
5. Alcohol	-	-	-	-	-	-	-	-	-	-	-	.37**
6. Tobacco	-	-	-	-	-	-	-	-	-	-	-	-

Note. Spearman's correlation coefficient was used when one of the correlated variables was alcohol or tobacco, and Pearson's correlation was used for the rest of the relationships

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

Furthermore, they showed a moderate score in PEL taking into account that the scores fluctuated between 1 and 5. The mean in the intention to be physically active was slightly higher than the midpoint of the scale. The boys showed a higher mean score than the girls in all the variables. The bivariate correlation analysis with the total sample showed that perceptions of competence and body attractiveness were positively related with habitual physical activity. Habitual physical activity was positively related with the intention to be physically active after finishing school and negatively with the consumption of alcohol and tobacco.

Structural Equation Modeling

Firstly, an analysis was conducted to give the measurement model construct validity, in which the different latent variables were freely correlated. This step makes it possible to focus on the factor structure underlying the composite scores of each construct. The fit indices obtained were: $\chi^2 (125, N = 472) = 246.14, p = .001$; $\chi^2/df = 1.96$; CFI = .97; IFI = .97; TLI = .96; RMSEA = .04; SRMR = .04. All the correlations between the latent variables were statistically significant, fluctuating between -.35 and .84. These results showed that the measurement model was appropriate. The next step was to test the hypothesized structural model. The results of this model (Figure 1) showed fit indices within an acceptable range: $\chi^2 (130, N = 472) = 277.86, p = .001$; $\chi^2/df = 2.13$; CFI = .96; IFI = .96; TLI = .95; RMSEA = .04; SRMR = .04. The perception of sport competence positively correlated with habitual physical activity ($\beta = .77$), whilst the perception of body attractiveness did not significantly correlate. Habitual physical activity positively correlated with the intention to be physically active after finishing school ($\beta = .88$) and negatively with the consumption of alcohol and tobacco ($\beta = -.27$), with a total explained variance of 77% and 7%, respectively.

Multi-Group Invariance Analysis

A multi-group analysis was conducted to check whether the structural model was invariant across gender. Table 2 shows the fit indices for the six compared models in the invariance analysis. The analysis showed that there were no significant gender differences at a measurement level, although there were some at a construct level. Specifically, significant chi-squared differences were found between the unconstrained model (Model 1) and the models with invariant structural weights (Model 3), structural covariances (Model 4), structural residuals (Model 5), and measurement residuals (Model 6). These results suggested that the relationships put forward in the model were not invariant across gender. Consequently, it was decided to test the model separately in the boys and the girls (see Figure 1). The fit indices for the boys were acceptable: $\chi^2 (130, N = 259) = 222.37, p = .001$; $\chi^2/df = 1.71$; CFI = .96; IFI = .96; TLI = .95; RMSEA = .05; SRMR = .04. Nevertheless, body attractiveness positively correlated with habitual physical activity. The following fit indices were obtained in the girls: $\chi^2 (130, N = 213) = 226.88, p = .001$; $\chi^2/df = 1.74$; CFI = .93; IFI = .94; TLI = .92; RMSEA = .05; SRMR = .06. Body attractiveness negatively correlated with physical activity, and physical activity did not significantly correlate with the consumption of alcohol and tobacco.

Discussion

The purpose of this study was to further our knowledge of variables that could explain the adoption of healthy lifestyle guidelines among adolescents. Consequently, a structural equation model was tested, which tried to explain relationships among perceived sport competence, body attractiveness, current physical activity, the intention to be physically active in the future and the consumption of substances that are harmful to health, such as alcohol and

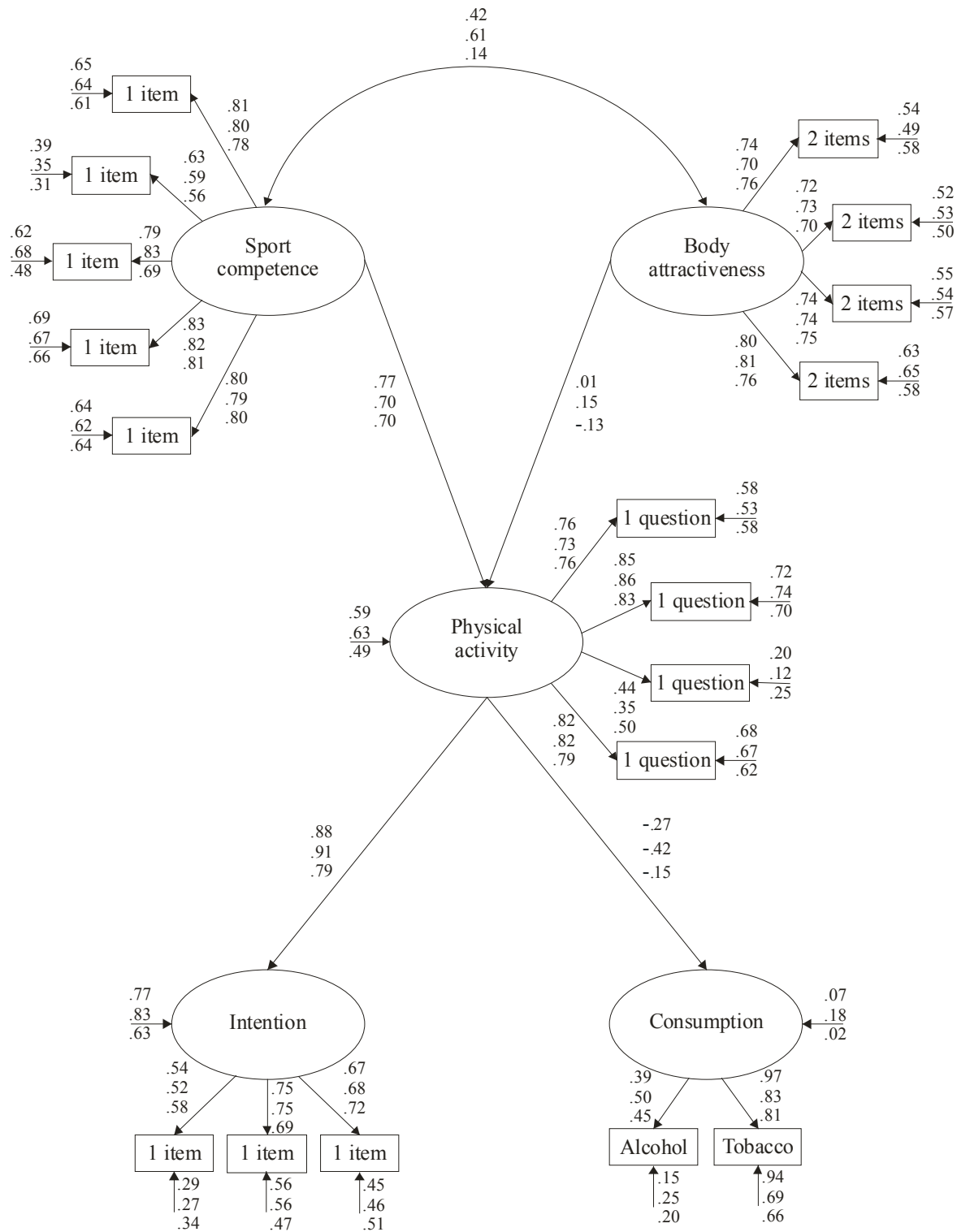


Figure 1. Structural equation model showing the relationships between perceived sport competence and body attractiveness, habitual physical activity, intention to be physically active and consumption of alcohol and tobacco. Standardized parameters are shown from analyses of the data for the sample as a whole (top), the subsample of boys (middle) and the subsample of girls (bottom). The relationship between body attractiveness and physical activity was not statistically significant in the total sample. In the girls, the relationships between sport competence and body attractiveness and between physical activity and consumption were not statistically significant either. The rest of the parameters were statistically significant ($p < .05$). The explained variances are shown on the small arrows.

tobacco. The results have suggested various ideas for the implementation of intervention strategies aimed at the promotion of an active lifestyle and other healthy behaviors.

The TPB was used as a theoretical framework of reference to achieve this objective. Firstly, the relationship between the internal component of perceived behavioral control and engagement in physical activity was analyzed using the physical self-concept measure. The results demonstrated that the perception of sport competence positively correlated with habitual physical activity. As some authors have proposed (Crocker et al., 2000; Pastor et al., 2006), the perception of sport competence seems to be one of the physical self-concept dimensions that best explains adolescents' sport adherence habits. In line with the TPB, the perception of self-efficacy seems to be related with physical activity behavior. Furthermore, the relationship between physical activity and perceived sport competence seem to be reciprocal (Hagger et al., 1998; Raudsepp et al., 2002). If an adolescent does physical activity, (s)he may feel more competent, and this feeling can encourage him/her to continue doing the activity. For that reason, educational implications are aimed at reinforcing the adolescent's feeling of sport competence by means of motivational climates that encourage the achievement of attainable objectives, such as effort and personal improvement (Ntoumanis & Biddle, 1999). In this sense it would be interesting if some of the following strategies were used to promote the perception of competence in the different contexts of physical activity (physical education, sport and exercise): establish clear objectives, in the short term and adapted to the level of the participants, make learning progressions, ask the participants in private if they would like to perform a demonstration instead of surprising and obliging them to do so (Alderman, Beighle, & Pangrazi, 2006), provide sufficient time to perform the tasks, administer positive feedback and never punish mistakes, convince the individuals that they can always improve, avoid stressing those who have less level of competence when we make groups, and make private and meaningful assessments.

The results of the model also showed that body attractiveness was positively related with physical activity

in the boys and negatively in the girls. These results could suggest that boys who perceive themselves with a good body image tend to engage in physical activity to maintain that good image. Although a priori this variable appears to positively promote the participation in physical activity, one must take care because, on occasion, an excessive obsession with body image involves the development of disorders of exercise dependence (Fortier & Farrell, 2009). However, girls might engage in physical activity if their perception of their body image were low, in order to improve it. Nevertheless, this is just one possible explanation of the results obtained. The correlation between body attractiveness and physical activity is very weak, and, therefore, the results must be interpreted with caution. Furthermore, prior studies that have related body attractiveness and physical activity provide contradictory results. Crocker et al. (2000) found a negative relationship between these two variables, whilst Raustorp et al. (2005) showed a positive relationship. It is no surprise that this relationship has only been negative in girls in this study, since prior research has shown that women have more physical appearance reasons to do sport than men do (Moreno-Murcia, Cervelló, & Martínez Camacho, 2007; Ryan, Frederick, Lepes, Rubio, & Sheldon, 1997). Furthermore, Pastor et al. (2006) demonstrated that body attractiveness in boys was not related with various healthy behaviors, whilst in the girls it was positively related with the consumption of unhealthy food. These results suggest that girls who are satisfied with their appearance are probably less concerned about doing sport and controlling their diet. In this respect, it would be important to highlight reasons for adolescents to do physical exercise other than their appearance to get them to commit to doing sport. This would mean that they would continue to do sport even though they had improved their body image.

Secondly, the aim of this study was to relate current physical activity with the intention to be physically active. This was done by following the suggestion made by Hagger et al. (2002) of including prior behavior as a determinant of final behavior in the study of the TPB. The structural model showed that current physical activity positively correlated with the adolescent's intention to be physically

Table 2
Multi-Group Invariance Analysis Across Gender

Models	χ^2	<i>d.f.</i>	$\chi^2/d.f.$	$\Delta\chi^2$	$\Delta d.f.$	CFI	IFI	TLI	RMSEA	SRMR
Model 1	449.27	260	1.72	-	-	.95	.95	.94	.03	.04
Model 2	462.93	273	1.69	13.65	13	.95	.95	.94	.03	.05
Model 3	477.60	277	1.72	28.32*	17	.94	.94	.94	.03	.05
Model 4	508.67	280	1.81	59.39*	20	.94	.94	.93	.04	.08
Model 5	512.71	283	1.81	63.43*	23	.93	.94	.93	.04	.08
Model 6	536.19	301	1.78	86.92*	41	.93	.93	.93	.04	.09

Notes. Model 1 = unconstrained; Model 2 = invariant measurement weights; Model 3 = invariant structural weights; Model 4 = invariant structural covariances; Model 5 = invariant structural residuals; Model 6 = invariant measurement residuals.

**p* < .05.

active in the future. As demonstrated by prior research (de Bruijn et al., 2006; Hagger et al., 2001; Rhodes et al., 2006), current physical activity would be positively related with future intentions and adherence. If a person does sport in adolescence, the possibility of him/her continuing with the activity throughout his/her life increases (Malina, 2001). Consequently, it seems important to try to encourage exercise from an early age to create habits that will last. Taking the TPB as a reference, positive attitudes towards physical activity and feelings of competence need to be developed at an early age. It is also a good idea for the various significant agents (parents, teachers, coaches, etc.) surrounding adolescents to reinforce the importance that engaging in physical activity may have for their health. According to the trans-contextual model of motivation (Hagger & Chatzisarantis, 2007), autonomy support in physical education classes and in leisure time is a fundamental element for promoting physical activity in adolescence.

Thirdly, taking into account that engaging in physical activity could lead to positive attitudes towards healthy lifestyles, the relationship between physical activity and the consumption of alcohol and tobacco was analyzed. In this study, physical activity was negatively related with alcohol and tobacco consumption, but this relationship was only significant in the boys. Perhaps lower levels of physical activity in girls have influenced the relationship between physical activity and consumption not to be significant. The physical activity engaged in might not be positively related with other healthy behaviors if it does not reach certain levels of intensity, time and proportion. Prior studies already pointed out a possible relationship between sport adherence and healthy lifestyles in adolescence (Jiménez et al., 2006; 2007; Pastor et al., 2006; Pate, Heath et al., 1996). These lifestyles were characterized by correct rest habits, healthy and balanced food with stable mealtimes and a suitable consumption of fruit and vegetables, less sedentary behavior (e.g. less time watching television) and less consumption of drugs (alcohol, tobacco, cannabis and marijuana). In this respect, besides the physical, psychological and social benefits produced by physical activity and sport, it is important to highlight its association with healthy lifestyle guidelines. This is yet another reason for promoting sport adherence among children and adolescents, trying to create habits that last all their lives. Adolescence is a critical stage for this, since physical activity decreases consistently from this time on (Caspersen et al., 2000). Physical education classes evolve into an excellent medium for the promotion of active and healthy behaviors, even if one must expect the disadvantage of few hours per week and an imbalance between the curriculum and the preferences for physical activity of adolescents. Nevertheless, it needs to be taken into account that the variance of the consumption of alcohol and tobacco explained by physical activity is not very high, since there are many other variables both personal and environmental that can affect this consumption.

This study has a series of limitations that should be rectified in future research. Firstly, it is a correlational study

that does not allow causal relationships to be established, although it does provide an explanatory model that furthers our understanding of the relationship among the various variables that can have an influence on the adoption of healthy behaviors in adolescence. Secondly, the structural equation technique has a problem with equivalent models (Hershberger, 2006), since the model put forward in this study is only one of the various ones possible. To solve these problems, it would be interesting for future research to use longitudinal studies and experimental designs. New studies must make a longitudinal record of physical activity, the intention to be physically active and the consumption of alcohol and tobacco, and then check the relationships among these variables at different moments in time. For example, it would be interesting to analyze the role played by physical education classes for the maintenance of a healthy lifestyle when compulsory education ends. Similarly, the effect of certain motivational interventions could be tested in physical activity programs on exercise adherence and the adoption of healthy lifestyles among adolescents. It would also be a good idea to explore further the reasons for gender differences in the adoption of active and healthy lifestyles in adolescence.

Future studies also need to improve on any measurement problems this study may have. It would be interesting if new studies included the BMI measurement to better understand the relationships between physical self-concept and physical activity, since BMI seems to be associated with body attractiveness (Raustorp et al., 2005). In connection with intention, the problem when it is assessed is that there is a delay between intention and behavior. It would be a good idea to include items related with short-, medium- and long-term intention. As far as alcohol and tobacco consumption is concerned, this study's main problem is the use of a dichotomic measurement. Future research must measure alcohol and tobacco consumption by establishing different levels based on frequency and the amount consumed. Finally, some of the correlations obtained in this study are weak, and the results obtained could be due to the sample size rather than the effect size.

To sum up, this study provides a model of relationships among perceived sport competence, body attractiveness, habitual physical activity, the intention to be physically active in the future and the consumption of harmful substances. On the one hand, this model provides us with more knowledge about the importance of physical self-concept on sport habits for adolescents. On the other, it points towards the possibility of individuals who exercise having healthier habits and more positive prospects of being physically active people in the future.

References

- Ainsworth, B. E., Haskell, W. L., Whitt, M. C., Irwin, M. L., Swartz, A. M., Strath, ... Leon, A. S. (2000). Compendium of physical activities: an update of activity codes and MET intensities. *Medicine & Science in Sports & Exercise*, 32, 498-516. doi:10.1097/00005768-200009001-00009

- Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl, & J. Beckmann (Eds.), *Action Control: From cognition to behavior* (pp. 11-39). Heidelberg: Springer.
- Ajzen, I., & Madden, T. J. (1986). Prediction of goal-directed behavior: Attitudes, intentions, and perceived behavioral control. *Journal of Experimental Social Psychology*, 22, 453-474. doi:10.1016/0022-1031(86)90045-4
- Alderman, B. L., Beighle, A., & Pangrazi, R. P. (2006). Enhancing motivation in physical education. *Journal of Physical Education, Recreation and Dance*, 77(2), 41-51.
- Alfermann, D., & Stoll, O. (2000). Effects of physical exercise on self-concept and well-being. *International Journal of Sport Psychology*, 31, 47-65.
- Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, 103, 411-423. doi:10.1037//0033-2909.103.3.411
- Armitage, C. J. (2005). Can the theory of planned behavior predict the maintenance of physical activity? *Health Psychology*, 24, 235-245. doi:10.1037/0278-6133.24.3.235
- Armstrong, N., & Welsman, J. R. (1997). *Young people and physical activity*. Oxford: Oxford University Press.
- Baecke, J. A., Burema, J., & Frijters, J. E. (1982). A short questionnaire for the measurement of habitual physical activity in epidemiological studies. *American Journal of Clinical Nutrition*, 36, 936-942.
- Balaguer, I., Pastor, Y., & Moreno, Y. (1999). Algunas características de los estilos de vida de los adolescentes de la Comunidad Valenciana [Some characteristics of the adolescents' lifestyles in Valencian Community]. *Revista Valenciana D'estudis Autonòmics*, 26, 33-56.
- Bar-Or, O., Foreyt, J., Bouchard, C., Brownell, K. D., Dietz, W. H., Ravussin, E.,... Torun, B. (1998). Physical activity, genetic and nutritional considerations in childhood weight management. *Medicine & Science in Sports & Exercise*, 30, 2-10. doi:10.1097/00005768-199801000-00002
- Burgess, G., Grogan, S., & Burwitz, L. (2006). Effects of a 6-week aerobic dance intervention on body image and physical self-perceptions in adolescent girls. *Body Image*, 3, 57-66. doi:10.1016/j.bodyim.2005.10.005
- Byrne, B. M. (2001). *Structural equation modeling with Amos: Basic concepts, applications, and programming*. Mahwah, NJ: Erlbaum.
- Byrne, B. M. (2004). Testing for multigroup invariance using AMOS Graphics: A road less traveled. *Structural Equation Modeling*, 11, 272-300. doi:10.1207/s15328007sem1102_8
- Cash, T. F., & Pruzinsky, T. (1990). *Body images: Development, deviance and change*. New York, NY: Guilford Press.
- Caspersen, C. J., Pereira, M. A., & Curran, K. M. (2000). Changes in physical activity patterns in the United States, by sex and cross-sectional age. *Medicine & Science in Sports & Exercise*, 32, 1601-1609. doi:10.1097/00005768-200009000-00013
- Crocker, P. R. E., Eklund, R. C., & Kowalski, K. C. (2000). Children's physical activity and physical self-perceptions. *Journal of Sports Sciences*, 18, 383-394. doi:10.1080/02640410050074313
- de Bruijn, G.-J., Kremers, S. P. J., Lensvelt-Mulders, G., de Vries, H., van Mechelen, W., & Brug, J. (2006). Modeling individual and physical environmental factors with adolescent physical activity. *American Journal of Preventive Medicine*, 30, 507-512. doi:10.1016/j.amepre.2006.03.001
- Florindo, A. A., & Latorre, M. R. D. O. (2003). Validation and reliability of the Baecke questionnaire for the evaluation of habitual physical activity in adult men. *Revista Brasileira de Medicina do Esporte*, 9, 129-135. doi:10.1590/S1517-86922003000300002
- Fortier, M. S., & Farrell, R. J. (2009). Comparing self-determination and body image between excessive and healthy exercisers. *Hellenic Journal of Psychology*, 6, 223-243.
- Fox, K. R. (2000). Self-esteem, self-perceptions and exercise. *International Journal of Sport Psychology*, 31, 228-240.
- Fox, K. R., & Corbin, C. D. (1989). The Physical Self-Perception Profile: Development and preliminary validation. *Journal of Sport and Exercise Psychology*, 11, 408-430.
- García-Ferrando, M. (2006). *Posmodernidad y deporte: Entre la individualización y la masificación. Encuesta sobre hábitos deportivos de los españoles 2005* [Postmodernity and sport: Between individualization and massification. Survey on Spanish sport habits 2005]. Madrid: CSD y CIS.
- Hagger, M., Ashford, B., & Stambulova, N. (1998). Russian and British children's physical self-perceptions and physical activity participation. *Pediatric Exercise Science*, 10, 137-152.
- Hagger, M. S., & Chatzisarantis, N. L. D. (2007). The trans-contextual model of motivation. In M. S. Hagger, & N. L. D. Chatzisarantis (Eds.), *Intrinsic motivation and self-determination in exercise and sport* (pp. 53-70). Champaign, IL: Human Kinetics.
- Hagger, M. S., Chatzisarantis, N. L. D., & Biddle, S. J. H. (2001). The influence of self-efficacy and past behaviour on the physical activity intentions of young people. *Journal of Sports Sciences*, 19, 711-725. doi:10.1080/02640410152475847
- Hagger, M. S., Chatzisarantis, N. L. D., & Biddle, S. J. H. (2002). A meta-analytic review of the theories of reasoned action and planned behavior in physical activity: Predictive validity and the contributions of additional variables. *Journal of Sport and Exercise Psychology*, 24, 3-32.
- Hagger, M. S., Chatzisarantis, N. L. D., Culverhouse, T., & Biddle, S. J. H. (2003). The processes by which perceived autonomy support in physical education promotes leisure-time physical activity intentions and behavior: A trans-contextual model. *Journal of Educational Psychology*, 95, 784-795. doi:10.1037/0022-0663.95.4.784
- Hein, V., Müür, M., & Koka, A. (2004). Intention to be physically active after school graduation and its relationship to three types of intrinsic motivation. *European Physical Education Review*, 10, 5-19. doi:10.1177/1356336X04040618
- Hershberger, S. L. (2006). The problem of equivalent structural models. In G. R. Hancock, & R. O. Mueller (Eds.), *Structural equation modeling: a second course* (pp. 13-42). Greenwich, CT: Information Age Publishing.
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6, 1-55. doi:10.1080/10705519909540118

- Jiménez, R., Cervelló, E., García Calvo, T., Santos-Rosa, F. J., & Del Villar, F. (2006). Relaciones entre las metas de logro, la percepción del clima motivacional, la valoración de la educación física, la práctica deportiva extraescolar y el consumo de drogas en estudiantes de educación física [Relationship between the achievement goals, the perception of motivational climate, the assessment of physical education, the practice of extracurricular sport activity, and drug consumption in physical education students]. *Revista Mexicana de Psicología*, *23*, 253-265.
- Jiménez, R., Cervelló, E., García Calvo, T., Santos-Rosa, F. J., & Iglesias, D. (2007). Estudio de las relaciones entre motivación, práctica deportiva extraescolar y hábitos alimenticios y de descanso en estudiantes de Educación Física [Analysis of the relationship between motivation, the practice of extracurricular sport activities and the nutritional and resting habits in physical education students]. *International Journal of Clinical and Health Psychology*, *7*, 385-401.
- Jöreskog, K. G., & Sörbom, D. (1989). *LISREL 7: A guide to the program and applications* (2nd ed.). Chicago, IL: SPSS.
- Kline, R. B. (2005). *Principles and practice of structural equation modelling* (2nd ed.). New York, NY: Guilford Press
- Malina, R. (2001). Adherence to physical activity from childhood to adulthood: A perspective from tracking studies. *Quest*, *53*, 346-355.
- Malina, R., Bouchard, C., & Bar-Or, O. (2004). *Growth, maturation and physical activity* (2nd ed.). Champaign, IL: Human Kinetics.
- Marsh, H. W., Hau, K-T., & Grayson, D. (2005). Goodness of fit evaluation in structural equation modeling. In A. Maydeu-Olivares, & J. McCordle (Eds.), *Contemporary psychometrics: A Festschrift to Roderick P. McDonald* (pp. 275-340). Mahwah, NJ: Erlbaum.
- Marsh, H. W., Papaioannou, A., & Theodorakis, Y. (2006). Causal ordering of physical self-concept and exercise behavior: reciprocal effects model and the influence of physical education teachers. *Health Psychology*, *25*, 316-328. doi:10.1037/0278-6133.25.3.316
- Ministerio de Sanidad y Consumo (2007). *Observatorio español sobre drogas. Informe 2007* [Spanish observatory about drugs. 2007 Report]. Madrid: MSC.
- Moreno-Murcia, J. A., & Cervelló, E. (2005). Physical self-perception in Spanish adolescents: effects of gender and involvement in physical activity. *Journal of Human Movement Studies*, *48*, 291-311.
- Moreno-Murcia, J. A., Cervelló, E., & Martínez Camacho, A. (2007). Validación de la Escala de Medida de los Motivos para la Actividad Física-Revisada en españoles: Diferencias por motivos de participación [Validation of the perceived motives for physical activity measure in Spanish practitioners: Differences for participation reasons]. *Anales de Psicología*, *23*, 167-176.
- Moreno-Murcia, J. A., Moreno, R., & Cervelló, E. (2007). El autoconcepto físico como predictor de la intención de ser físicamente activo [The physical self-concept as predictor of the intention of being physically active]. *Psicología y Salud*, *17*, 261-267.
- Mulaik, S. A., & James, L. R. (1995). Objectivity and reasoning in science and structural equation modeling. In R. H. Hoyle (Ed.), *Structural equation modeling. Concepts, issues, and applications* (pp. 118-137). Thousand Oaks, CA: Sage Publications.
- Ntoumanis, N., & Biddle, S. J. H. (1999). A review of motivational climate in physical activity. *Journal of Sports Sciences*, *17*, 643-665. doi:10.1080/026404199365678
- Pastor, Y., Balaguer, I., & García-Merita, M. (2006). Relaciones entre el autoconcepto y el estilo de vida saludable en la adolescencia media: un modelo exploratorio [The relationship between self-concept and a healthy lifestyle in adolescence: an exploratory model]. *Psicothema*, *18*, 18-24.
- Pate, R. R., Baranowski, T., Dowda, M., & Trost, S. G. (1996). Tracking of physical activity in young children. *Medicine and Science in Sports and Exercise*, *28*, 92-96. doi:10.1097/00005768-199601000-00019
- Pate, R. R., Heath, G. W., Dowda, M., & Trost, S. G. (1996). Associations between physical activity and other health behaviors in a representative sample of US adolescents. *American Journal of Public Health*, *86*, 1577-1581. doi:10.2105/AJPH.86.11.1577
- Raudsepp, L., Liblik, R., & Hannus, A. (2002). Children's and adolescents' physical self-perceptions as related to moderate-to-vigorous physical activity and physical fitness. *Pediatric Exercise Science*, *14*, 97-106.
- Raustorp, A., Stahle, A., Gudasic, H., Kinnunen, A., & Mattsson, E. (2005). Physical activity and self-perception in school children assessed with the Children and Youth-Physical Self-Perception Profile. *Scandinavian Journal of Medicine and Science in Sports*, *15*, 126-134. doi:10.1111/j.1600-0838.2004.406.x
- Rhodes, R. E., Macdonald, H. M., & McKay, H. A. (2006). Predicting physical activity intention and behaviour among children in a longitudinal sample. *Social Science and Medicine*, *62*, 3146-3156. doi:10.1016/j.socscimed.2005.11.051
- Ryan, R. M., Frederick, C. M., Lipes, D., Rubio, N., & Sheldon, K. M. (1997). Intrinsic motivation and exercise adherence. *International Journal of Sport Psychology*, *28*, 335-354.
- Sarria, A., Selles, H., Cañedo-Arguelles, L., Fleta, J., Blasco, M. J., & Bueno, M. (1987). Un autotest como método de cuantificación de la actividad física en adolescentes [A self-test for quantifying physical activity in adolescents]. *Nutrición Clínica y Dietética Hospitalaria*, *7*, 56-61.
- Schermelleh-Engel, K., Moosbrugger, H., & Müller, H. (2003). Evaluating the fit of structural equation models: tests of significance and descriptive goodness-of-fit measures. *Methods of Psychological Research Online*, *8*(2), 23-74.
- Taylor, W. C., & Sallis, J. F. (1997). Determinants of physical activity in children. In A. P. Simopoulos, & K. N. Pavlou (Eds.), *Nutrition and fitness: Metabolic and behavioral aspects in health and disease* (pp. 159-167). Basel: Karger.
- Terry, D. J., & O'Leary, J. E. (1995). The theory of planned behavior: The effects of perceived behavioral control and self-efficacy. *British Journal of Social Psychology*, *34*, 199-220.

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