©Journal of Sports Science and Medicine (2014) **13,** 801-807
http://www.jssm.org

Research article

Psychometric Properties of the "Sport Motivation Scale (SMS)" Adapted to Physical Education

Antonio Granero-Gallegos [1], Antonio Baena-Extremera [2]✉, Manuel Gómez-López [2], José Antonio Sánchez-Fuentes [2] and J. Arturo Abraldes [2]

[1] Teachers' Center of Cuevas-Olula, Almería, Spain; [2] Department of Physical Activity and Sport, University of Murcia, Murcia, Spain

Abstract

The aim of this study was to investigate the factor structure of a Spanish version of the Sport Motivation Scale adapted to physical education. A second aim was to test which one of three hypothesized models (three, five and seven-factor) provided best model fit. 758 Spanish high school students completed the Sport Motivation Scale adapted for Physical Education and also completed the Learning and Performance Orientation in Physical Education Classes Questionnaire. We examined the factor structure of each model using confirmatory factor analysis and also assessed internal consistency and convergent validity. The results showed that all three models in Spanish produce good indicators of fitness, but we suggest using the seven-factor model (χ^2/gl = 2.73; ECVI = 1.38) as it produces better values when adapted to physical education, that five-factor model (χ^2/gl = 2.82; ECVI = 1.44) and three-factor model (χ^2/gl = 3.02; ECVI = 1.53).

Key words: Questionnaire, physical activity, self-determination, factorial validity.

Introduction

Motivation is considered a variable with a great of influence in educational settings (Baena-Extremera et al., 2013). One of the most important and widely used research perspectives to study motivation in sports and the educational settings is Self-Determination Theory (SDT) (Deci and Ryan, 1985; Deci et al., 1991). Motivation in relation to self-determination is understood as a continuum through which a participant's behavior is ranked according to their degree of self-determination. In 1995, Brière and collaborators created the Échelle de Motivation dans les Sports (ÉMS) in order to assess self-determination in sports. This instrument was created based on the Academic Motivation Scale (AMS; Vallerand et al., 1992), which was the English language version of l´Échelle de Motivation en Éducation (EME; Vallerand et al., 1989).

The ÉMS measures the three types of intrinsic motivation (knowledge, achievement and stimulating experiences), three of the four types of extrinsic motivation, namely identified, introjected and external regulation (leaving out integrated external motivation as suggested by Brière et al., 1995 and Pelletier et al., 1995a) and finally, A-motivation. The ÉMS scale has 28 items and 7 subscales with four items each. It was translated into English by Pelletier et al. (1995a) as the Sport Motivation Scale (SMS). With regard to the validity and reliability of the SMS, factor analytic studies have supported the 7-factor structure, with supporting by Doganis (2000) in Greece, Burtscher et al. (2011) in Germany, Bara et al. (2011) in Brazil, and Núñez et al. (2005) in Spain. In physical education, researchers such as Moreno et al. (2008, 2009a, 2009b) used the 7-factor SMS by Núñez et al. (2006) with Spanish high school students and obtained good consistency, reliability and fitness indicators.

There remains some discussion on what model constitutes the best fit to explain data. Li and Harmer (1996) and Ntoumanis (2001) found that a 5-factor model produced a better fitting model than a 7-factor model. These authors subsumed the three types of intrinsic motivation into one and considered it as one sole dimension. Accordingly, the scale was composed of 5 dimensions: intrinsic motivation, identified regulation, introjected regulation and external regulation extrinsic motivation and A-motivation. Further, Mallett et al. (2007) found that a 6-factor model of the SMS version demonstrated acceptable fit. Finally, Guzmán et al. (2006) in Spain concluded that the results obtained by analyzing intrinsic motivation, extrinsic motivation and A-motivation separately showed better fitness indices than the complete model. Therefore, for some authors the best model would be one composed of a structure of 3-factor or motivational dimensions (Alexandris et al., 2002; Zahariadis et al., 2005).

The fact that the physical education research carried out in Spain has always use the version of SMS for sports (see e.g. Moreno et al., 2008; 2009a; 2009b) is an essential aspect that should be highlighted; however, all these studies point out that the instrument has been adapted to physical education, but no included results of reliability or validity. That said, there are currently no published studies in Spain that have tested the psychometric properties of the SMS adapted to PE, such studies exist in other countries like Greece, for instance (Zahariadis et al., 2005).

Balaguer et al. (2007) have recently analyzed the 3, 5 and 7-factor structures in sports and found the 7-factor model showed the best fit. In general, the various studies analyzing the psychometric properties of the SMS scale have shown adaptation and fitness problems in the confirmatory factor analysis supporting the different 3, 5 and 7-factor theoretical models. There are two problems: one is lack of factor validity (Riemer et al., 2002), the other is low internal consistency (Martin and Cutler, 2002; Pelle-

Received: 14 October 2013 / Accepted: 14 July 2014 / Published (online): 01 December 2014

tier et al., 1995a; Raedeke and Smith, 2001). These problems are probably the result of the inherent difficulty in searching for the correct words to convey the essence of the different types of motivation. This might have affected the process of translating the original ÉMS French version into English (SMS), contributing perhaps to a loss of meaning (Mallett et al., 2007).

In view of all the above and bearing in mind the absence of studies in the field of education, it is necessary to carry out an analysis of the three models from a physical education perspective in order to identify the model which best adapts itself to this area for future research. Therefore, the object of our study is to provide evidence on the dimensionality of the Spanish version of the SMS adapted to physical education in a sample of teenage high school students by means of confirmatory procedures. The psychometric properties of the three hypothesized SMS models (three, five and seven-factor; Figure 1) were analyzed, to this end we carried out (a) a study of the factor structure of each model with confirmatory factor analysis (CFA), (b) an assessment of internal consistency using Cronbach's alpha, composite reliability coefficient and average variance extracted, (c) a determination of the model with the best data fitness and (d) an assessment of convergent validity.

Methods

Participants

A total number of 758 high school students from the Murcia region in Spain (347 males = 45.8%; 411 females = 54.2%) participated in this study. Age ranged from 13 to 18 years old (M = 15.22; SD = 1.27), median age for males being 15.2 (SD = 1.29 and 15.18 (SD = 1.26) for females.

Instruments

Sport Motivation Scale (SMS). The original scale was called Échelle de Motivation dans les Sports (ÉMS; Brière et al., 1995) and was translated to English by Pelletier et al. (1995a) with the name Sport Motivation Scale (SMS); psychometric properties similar to those in the French version were obtained. The Spanish version validated by Balaguer et al. (2007) and adapted to physical education was used, according preliminary exploration of Granero-Gallegos and Baena-Extremera (2013). The answers were scored on a scale of polytomous items and ranged from 1 (totally disagree) and 7 (totally agree). Participants' socio-demographic data was also collected.

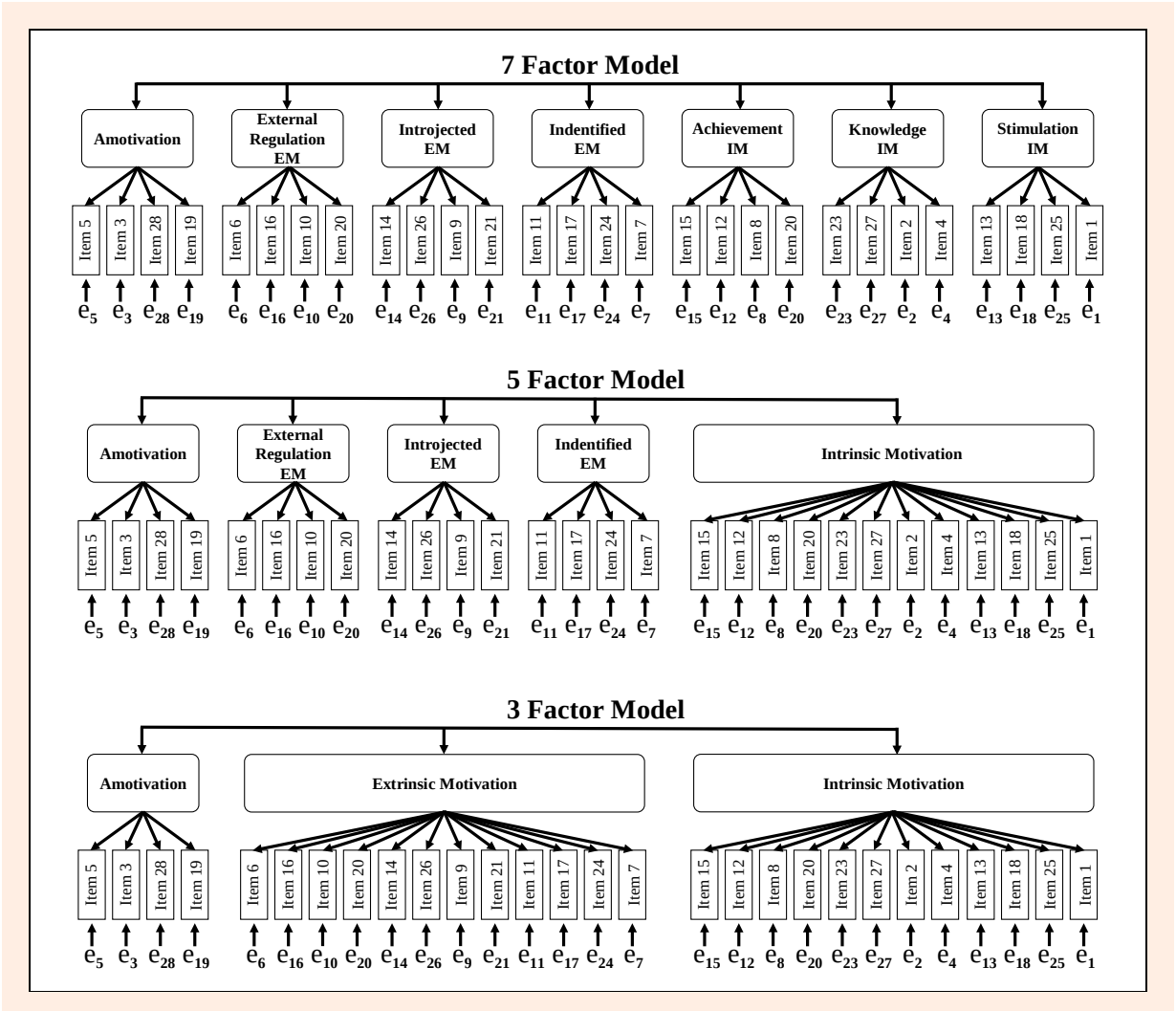

Figure 1. Structure of the SMS adapted to PE Spanish version models analyzed (seven, five and three-factor).

Learning and Performance Orientations in Physical Education Classes Questionnaire (LAPOPECQ) (Papaioannou, 1994): We used the Spanish version (Cervelló et al., 2002) to assess the perception on the part of students of the motivational climate in PE lesson, and thus, contrast it with the motivation. It is composed of 27 items and has two dimensions: learning motivational climate (13 items) and performance motivational climate (14 items). The answers were collected on a polytomous scales with scores from 0 (totally disagree) to 10 (totally agree). Recent studies with teenagers in an educational context have proved the reliability and internal validity of the factor structure in two first-order subscales (Moreno et al., 2011), internal consistency values of (α) >0.75 were obtained. In our study, the internal consistency of the task climate subscale was $\alpha = 0.93$, average variance extracted (*AVE*) = 0.83 and composite reliability = 0.98, and that of ego climate was $\alpha = 0.87$, *AVE* = 0.75, composite reliability = 0.97; also the fit indices obtained were as follows: Chi-square test (χ^2) = 1336.06, degrees of fredom (*df*) = 323, $p < 0.001$, $\chi^2/df = 4.14$, Goodness of Fit Index (GFI) = 0.96, Normed Fit Index (NFI) = 0.95, Non-normed Fit Index (NNFI) = 0.96, Comparative Fit Index (CFI) = 0.97, Root Mean Square Error of Aproximation (RMSEA) = 0.06.

Adaptation process

The Spanish version of the SMS (Balaguer et al., 2007) was adapted, its object of study being sports and ours being physical education. The qualitative assessment of items (contents validity) was carried out by means of judgments provided by four experts (Osterlind, 1989): two experts in scale design and two experts knowledgeable of the construct to be assessed. They were provided with an items' specifications table (Spaan, 2006), which presented the semantic definition of the construct to be assessed and that of its component. They were shown the items list after the adapting of the originals. They had to make a judgment regarding its suitability and comprehensibility on a scale from 1(strongly disagree) to 5 (strongly agree). Furthermore, they were provided with a section to write notes and general observations about each of the items and they had the possibility of providing an alternative wording of each item if they considered it necessary. Items, which obtained average scores of <3 both in suitability and comprehension were revised (Nuviala et al., 2008). The heading read: "I participate and make efforts in physical education lessons…" The changes proposed by the experts fundamentally referred to a coeducational wording of the items, meeting the current Spanish educational legislation. The wording of items was intended to be gender neutral, so that both boys and girls could identify to an equal extent with each of the items.

The new version was handed out to 50 high school students between 13 and 19 years old. Their comments regarding instructions and wording led to some minor changes. After an analysis of the psychometric results obtained and one last revision carried out by the research team, it was achieved a final version of the SMS adapted to physical education (see Appendix).

Procedure

Permission to carry out our research was granted by the governing bodies at the different high schools, thus the ethical approval. Also, this research has ethical approval. The students were briefed on the purpose of the study and on their rights as participants, based on the Helsinki Declaration (2008). The questionnaires were completed for the students in 20 minutes approximately.

Data analysis

A confirmatory factor analysis (CFA) using LISREL 8.80 was carried out in order to assess the factor structure of the scale. Analysis of the items, homogeneity and internal structure, correlation and internal consistency and differences according to the sex variable were carried out using SPSS 17.0.

Results

Confirmatory factor analysis results indicate that the analysis showed the factor distribution observed in the original instrument (Balaguer et al., 2007; Brière et al., 1995; Pelletier et al., 1995a) was maintained. All the items met the criteria to maintain it within each dimension: corrected item-total correlation (CITC-c) ≥0.30, standard deviation (SD) >1, and all the answer options were used at some point (Nunnally and Bernstein, 1994).

In order to confirm the original dimensionalization proposed, the factor structure of the instrument was assessed with CFA using the weighted least squares (WLS) estimation method for ordinal variables in the LISREL 8.80 (Jöreskog and Sörbom, 2003) program. The polychoric correlations matrix and the asymptotic covariance's matrix were used as input for data analysis. One measurement model assuming the existence of seven latent variables (7-factor), one model with five-factor and one with three-factor were hypothesized.

In view of the recommendations discouraging the use of one sole global fitness measure of the model, different fitness indices were calculated, following the recommendations by Bentler (2007), among other authors. Therefore, the model fitness was measured using a combination of absolute and relative fitness indices. Among the absolutes ones, the *p-value* associated with the Chi-square test, the ratio between χ^2 and degrees of freedom (χ^2/df) and the GFI, were used.

In terms of relative indices we used the NFI, NNFI and CFI. In incremental indices, authors like Kline (2005) recommend using RMSEA. The estimated parameters are considered significant when the value associated with the *t-value* is higher than 1.96 ($p < 0.05$). The standardized factor loadings of each of the items in the factor they belong to according to the theoretical model hypothesized was analyzed, as well as individual reliability (R^2) and the t-value of each item. In the 7-factor model, all the items showed standardized factor loadings >0.60, ranging from 0.73 in item 19 (A-motivation) to 0.97 in item 25 (stimulation as IM), a *t-value* > 1.96 and >0.05 individual reliability. In the 5-factor model, all the items showed standardized factor loadings >0.60, ranging from 0.73 in item 19 (A-motivation) to 0.97 in item 25 (stimulation as IM)

Table 1. **Models fit indices.**

	χ^2	*df*	χ^2/df	*p*	*GFI*	*NFI*	*NNFI*	*CFI*	*RMSEA*	*ECVI*
7-Factor Model	897.80	329	2.73	<.000	.98	.97	.98	.98	.04	1.38
5-Factor Model	960.08	340	2.82	<.000	.98	.97	.98	.98	.05	1.44
3-Factor Model	1047.22	347	3.02	<.000	.98	.96	.97	.98	.05	1.53

Table 2. **Scale reliability and validity.**

Dimensions	7-Factor Model			5-Factor Model			3-Factor Model		
	Composite Reliability	*AVE*	α	Composite Reliability	*AVE*	α	Composite Reliability	*AVE*	α
Stimulation IM	.98	.92	.84						
Knowledge IM	.98	.91	.72						
Achievement IM	.97	.89	.78						
Identified EM	.98	.92	.83	.98	.92	.83			
Introjected EM	.96	.86	.76	.97	.88	.76			
External Reg. EM	.95	.81	.79	.96	.86	.79			
A-motivation	.86	.60	.75	.85	.60	.75	.85	.58	.75
Intrinsic Motivation				.99	.91	.91	.99	.92	.91
Extrinsic Motivation							.99	.88	.91

and 3 (A-motivation), a t-value >1.96 and individual reliability >0.05. In the 3-factor model, all the items showed standardized factor loadings >0.60, ranging from.73 in item 19 (A-motivation) and 0.97 in item 13 and 25 (stimulation as IM), a *t-value* >1.96 and individual reliability >0.05. This data shows convergent validity of each model (Hair et al., 2009). Table 1 shows the goodness of fit indices of each model (three, five and seven-factor).

Two procedures were followed in order to determine the best fitting model according to the results. The differences between the χ^2 values associated with the nested models ($\Delta\chi^2$) were analyzed. This difference is distributed as a χ^2 with a *df* equal to the difference of the *df* of the nested models; thus the difference between the two nested models is statistically proven (Bentler and Bonnet, 1980). Next, the expected cross-validation index (ECVI) of each model was calculated; this index covers both the model's fitness and parsimony, the one showing the lowest value being the one showing best fitness. This procedure is one the of most widely recommended ones for the comparison of alternative models (Browne and Cudeck, 1992) and it was also used by Balaguer et al. (2007) in their comparative study of SMS in sports.

The analysis of the differences in χ^2 between the seven-factor model and the one using a five-factor structure is $\Delta\chi^2_{(11)} = 62.28$; and that between the seven-factor model and the three-factor one is $\Delta\chi^2_{(18)} = 149.42$. These results show that the seven-factor structural model is the one with best data fitness. This seven-factor model also showed the lowest ECVI. The results have shown that two alternative models (three and five-factor) have satisfactory fitness, but the best model to PE, is seven-factor model (Table 1).

It is also important to provide composite reliability and AVE in the confirmatory factor analysis of the scales with an ordinal nature in the data correlation matrix for each of the critical dimensions. Composite reliability analyzes the relationships between the answers to the items and the latent variable measured (Elosua and Zumbo, 2008) and is considered more suitable than Cronbach's alpha. AVE shows the total variance of the indicators collected by the latent contract; the higher its value, the more representative the indicators of the critical dimension they are loaded onto. According to Hair et al. (2009) composite reliability should have a minimum value of 0.70 and AVE should be 0.50. Table 2 shows the positive reliability and scale validity data, both in the model using a seven-factor structure and the five and three-factor models.

Correlation analysis

In order to assess the construct validity the correlations between the SMS dimensions (Pearson coefficient) and those of the LAPOPECQ were calculated (Table 3). Stimulation as IM, knowledge as IM, achievement as IM, identified EM and introjected EM correlations and the LAPOPECQ subscales were significant, but they were higher in the task climate dimension, with values r > 0.60. A-motivation, on the other hand, showed a higher and more significant correlation with ego climate.

Table 3. **Correlation between SMS and LAPOPECQ subscales.**

Subscales	Task climate	Ego climate
Stimulation a IM	.60**	.40**
Knowledge as IM	.62**	.41**
Achievement as IM	.63**	.36**
Identified EM	.63**	.42**
Introjected EM	.61**	.37**
External Regulation EM	.49**	.51**
A-motivation	.10*	.45**

* p < 0.05 level; ** p < 0.01

Discussion

The object of this study was to provide and compare evidence on the dimensionality of the SMS Spanish version adapted to physical education in its three versions (three, five and seven-factor). Results show validity and reliability levels suitable in all three versions of SMS, as did the results obtained by Balaguer et al. (2007) in athletes. Cronbach's alpha values were similar to, and on occasion higher than those obtained in previous physical education studies with the SMS (Moreno et al., 2008; 2009a, 2009b), which provides suitable evidence in terms of the subscales' internal consistency. Likewise, the AVE shows

acceptable values. However, the analysis of the three estimated models in terms of the factor structure of the SMS adapted to physical education provided stronger support for the seven-factor structure (stimulation as IM, knowledge as IM and achievement as IM; Identified EM, Introjected EM and External Regulation EM and A-motivation); this was the model that showed the best data fit (see Table 1).

These results lend support to previous studies conducted in physical education by Moreno et al. (2008, 2009a, 2009b) and Zahariadis et al. (2005) with 7-factor, and those obtained by Brière et al. (1995), Nuñez et al. (2005; 2006), Pelletier et al. (1995b), in sports. Besides, the 3 and 5-factor models also showed suitable fitness, confirming the findings of the five-factor model previously used by Li and Harmer (1996) and the three-factor model used by Alexandris et al. (2002) and Guzmán et al. (2006).

The correlation analysis shows that all the IM subtypes and two types of EM had higher correlations with task climate whereas A-motivation showed a higher and more significant correlation with ego climate (Biddle et al., 1995; Curry et al., 1996; Granero-Gallegos et al., 2012; Goudas, 1998).

Conclusion

To conclude, it is worth noting that the three SMS Spanish versions adapted to physical education (3, 5, and 7-factor) can actually be applied. However, the results of our research suggest that using the 7-factor model is the best option in this particular field. It should be noted that evidence regarding the validity and reliability of the instrument must be interpreted tentatively. In the same way, further studies are necessary to corroborate or refute the data obtained by this work in order to further prove that 3, 5, and 7-factor structures are valid for research in the field of education.

References

Alexandris, K., Tsorbatzoudis, C. and Grouios, G. (2002) Perceived constraints on recreational sport participation: Investigating their relationship with intrinsic motivation, extrinsic motivation and amotivation. *Journal of Leisure Research* **34**, 233-252.

Baena-Extremera, A., Granero-Gallegos, A., Pérez-Quero, J., Bracho-Amador, C. and Sánchez Fuentes, J.A. (2013) Prediction of perceived importance of physical education in Spain. *South African Journal for Research in Sport, Physical Education and Recreation* **35(2),** 1-13.

Balaguer, I., Castillo, I. and Duda, J. L. (2007) Propiedades psicométricas de la escala de motivación deportiva en deportistas españoles. *Revista Mexicana de Psicología* **24(2),** 197-207. (In Spanish: English abstract).

Bara, F.M., Andrade, D., Miranda, R., Núñez, J.L., Martín-Albo, J. and Ribas, P.R. (2011) Preliminary validation of a brazilian version of the sport motivation scale. *Universitas Psychologica* **10**, 557-566.

Bentler, P.M. and Bonnet, D.G. (1980) Significance tests and goodness-of-fit in the analysis of covariance structures. *Psychological Bulletin* **88**, 588-606.

Bentler, P.M. (2007) On tests and indices for evaluating structural models. *Personality and Individual Differences* **42**, 825-829.

Biddle, S., Cury, F., Goudas, M., Sarrazin, P., Famose, J.P. and Durand, M. (1995) Development of scales to measure perceived physical education class climate: A cross national project. *British Journal of Education Psychology* **65**, 341-358.

Brière, N.M., Vallerand, R.J., Blais, M.R. and Pelletier, L.G. (1995) Développement et validation d'une mesure de motivation intrinsèque, extrinsèque et d'amotivation en contexte sportif: l'Échelle de motivation dans les sports (ÉMS). *International Journal of Sport Psychology* **26**, 465-489. (In French: English abstract).

Browne, M.W. and Cudeck, R. (1992) Alternative ways of assessing model fit. *Sociological Methods & Research* **21**, 230-258.

Burtscher, J., Furtner, M., Sachse, P. and Burtscher, M. (2011) Validation of a German version of the Sport Motivation Scale (SMS28) and motivation analysis in competitive mountain runners. *Perceptual & Motor Skills* **112(3),** 807-820.

Cervelló, E., Jiménez, R., Fenoll, A., Ramos, L., Del Villar, F. and Santos-Rosa, F. J. (2002) A social-cognitive approach to the study of coeducation and discipline in Physical Education Classes. *SOCIOTAM, Revista Internacional de Ciencias Sociales y Humanidades* **11**, 43-64.

Cury, F., Biddle, S., Famose, J.P., Goudas, M., Sarrazin, P. and Durand, M. (1996) Personal and situational factors influencing intrinsic interest of adolescent girls in school physical education: A structural equation modeling analysis. *Educational Psychology* **16**, 305-315.

Deci, E.L. and Ryan, R.M. (1985) The general causality orientations scale: Self-determination in personality. *Journal of Research in Personality* **19**(2), 109-134.

Deci, E.L., Vallerand, R.J., Pelletier, L.G. and Ryan, R.M. (1991) Motivation and education: The self-determination perspective. *The Educational Psychologist* **26**, 325-346.

Doganis, G. (2000) Development of a Greek version of the Sport Motivation Scale. *Perceptual & Motor Skills* **90**, 505-512.

Elosua, P. and Zumbo, B.D. (2008) Coeficientes de fiabilidad para escalas de respuesta categórica ordenada. *Psicothema* **20(4),** 896-901. (In Spanish: English abstract).

Goudas, M. (1998) Motivational climate and intrinsic motivation of young basketball players. *Perceptual and Motor Skills* **86**, 323-327.

Granero-Gallegos, A., Baena-Extremera, A., Pérez-Quero, F.J., Ortiz-Camacho, M.M. and Bracho-Amador, C. (2012) Analysis of motivational profiles of satisfaction and importance of physical education in high school adolescents. *Journal of Sports Science and Medicine* **11**, 614-623.

Granero-Gallegos, A. and Baena-Extremera, A. (2013) Análisis preliminar exploratorio del "*Sport Motivation Scale (SMS)*" adaptado a la Educación Física. *Espiral. Cuadernos del Profesorado* **6**(12), 3-14. (In Spanish: English abstract).

Guzmán, J.F., Carratalá. E., García-Ferriol, Á. and Carratalá, V. (2006) Propiedades psicométricas de una escala de motivación deportiva. *Motricidad* **16**, 85-98. (In Spanish: English abstract).

Hair, J.F., Black, W.C., Babin, B.J. and Anderson, R.E. (2009) *Multivariate Data Analysis.* 7th edition. New York: Pearson Prentice Hall.

Helsinki Declaration. (2008) Ethical Principles for Medical Research Involving Human. *World Medical Association*. Available from: http://www.wma.net/es/30publications/10policies/b3/17c_es.pdf

Jöreskog, K.G. and Sörbom, D. (2003) *Structural equation modeling with the SIMPLIS command language*. Chicago: Scientific Software International.

Kline, R.B. (2005) *Principles and Practice of Structural Equation Modeling.* 2nd edition. New York: The Guilford Press.

Li, F. and Harmer, P.H. (1996) Testing the simplex assumption underlying the sport motivation scale: a structural equation modeling analysis. *Research Quarterly for Exercise and Sport* **67**, 396-405.

Mallett, C., Kawabata, M., Newcombe, P., Otero-Forero, A.,and Jackson, S. (2007. Sport Motivation Scale-6 (SMS-6): A revised six-factor sport motivation scale. *Psychology of Sport and Exercise* **8**, 600-614.

Martens, M.P. and Webber, S.N. (2002) Psychometric properties of the Sport Motivation Scale: an evaluation with college varsity athletes from the U.S. *Journal of Sport and Exercise Psychology* **24**, 254-270.

Martin, J.J. and Cutler, K. (2002) An exploratory study of flow and motivation in theatre actors. *Journal of Applied Sport Psychology* **14**, 344-352.

Moreno, J.A., Cervelló, E., Zomeño, T.E. and Marín, L.E. (2009a) Predicción de las razones de disciplina en Educación Física. *Acción Psicológica* **6**(2), 7-15. (In Spanish: English abstract).

Moreno, J.A., Conte, L., Hellín, P., Hellín, G., Vera, J.A. and Cervelló, E. (2008) Predicción de la motivación autodeterminada según las estrategias para mantener la disciplina y la orientación motivacional en estudiantes adolescentes de educación física. *Apuntes de Psicología* **26**, 501-516. (In Spanish: English abstract).

Moreno, J.A., Martínez, C. and Cervelló, E. (2011) Relación predictiva entre la percepción del alumnado de las estrategias de disciplina del profesor y la percepción del trato de igualdad-discriminación en las clases de educación física. *Revista de Educación* **355**, 381-403. (In Spanish: English abstract).

Moreno, J.A., Zomeño, T.E., Marín, L.M., Cervelló, E. and Ruiz, L.M. (2009b) Variables motivacionals relacionades amb la pràctica esportiva extraescolar en estudiants adolescents d'educació física. *Apunts* **95**, 38-43. (In Spanish: English abstract).

Ntoumanis, N. (2001) A self-determination approach to the understanding of motivation in physical domain. *British Journal of Educational Psychology* **71**, 225-242.

Núñez, J.L., Martín-Albo, J. and Navarro, J.G. (2005) Validación de la versión española de la Échelle de Motivation en Éducation. *Psicothema* 17 (2), 344-349. (In Spanish: English abstract).

Núñez, J.L., Martín-Albo, J., Navarro, J.G. and González, V.M. (2006) Preliminary validation of a Spanish version of the Sport Motivation Scale. *Perceptual and Motor Skills* **102**, 919-930.

Nunnally, J.C. and Bernstein, I.H. (1994) *Psychometric theory*. New York: McGraw-Hill.

Nuviala, A., Tamayo, J.A., Iranzo, J. and Falcón, D. (2008) Creación, diseño, validación y puesta en práctica de un instrumento de medición de la satisfacción de usuarios de organizaciones que prestan servicios deportivos. *Retos. Nuevas tendencias en Educación Física, Deporte y Recreación* **14,** 10-16. (In Spanish: English abstract).

Osterlind, S.J. (1989) *Constructing Test Items*. Londres: Kluwer Academic Publishers.

Papaioannou, A. (1994) Development of a questionnaire to measure achievement goals in physical education. *Research Quarterly for Exercise and Sport* **65**, 11-20.

Pelletier, L.G., Fortier, M.S., Vallerand, R.J., Tuson, K.M., Brière, N.M. and Blais, M.R. (1995a) Toward a new measure of intrinsic motivation, extrinsic motivation, and amotivation in sports: the Sport Motivation Scale (SMS). *Journal of Sport and Exercise Psychology* **17**, 35-53.

Pelletier, L.G., Vallerand, R.J., Green-Demers, I., Brière, N.M. and Blais, M.R. (1995b) Leisure and mental health: relationship between leisure involvement and psychological well-being. *Canadian Journal of Behavioural Science* **27**, 214-225.

Raedeke, T.D., and Smith, A.L. (2001) Development and preliminary validation of an athlete burnout measure. *Journal of Sport and Exercise Psychology* **23,** 281-306.

Riemer, H., Fink, J.S. and Fitzgerald, M. (2002) External validity of the sport motivation scale. *Avante* **8**(2), 57-66.

Spaan, M. (2006) Test and item specifications development. *Language Assessment Quarterly* **3**(1), 71-79.

Vallerand, R.J., Blais, M.R., Brière, N.M. and Pelletier, L.G. (1989) Construction et validation de l´Échelle de Motivation en Education (EME). *Canadian Journal of Behavioural Science* **21**, 323-349.

Vallerand, R.J., Pelletier, L.G., Blais, M.R., Brière, N.M., Senécal, C. and Vallières, E.F. (1992) The Academic Motivation Scale: A measure of intrinsic, extrinsic, and amotivation in education. *Education and Psychological Measurement* **52**, 1003-1017.

Zahariadis, P.N., Tsobatzoudis, H. and Grouios, G. (2005) The Sport Motivation Scale for children: Preliminary analysis in physical education classes. *Perceptual and Motor Skills*, **101**(1), 43-54.

Key points

- Physical education research conducted in Spain has used the version of SMS designed to assess motivation in sport, but validity reliability and validity results in physical education have not been reported.
- Results of the present study lend support to the factorial validity and internal reliability of three alternative factor structures (3, 5, and 7 factors) of SMS adapted to Physical Education in Spanish.
- Although all three models in Spanish produce good indicators of fitness, but we suggest using the seven-factor model.

AUTHORS BIOGRAPHY

Antonio GRANERO-GALLEGOS
Employment
Member of Research Group Physical Activity and Quality of Life at the University of Murcia. Teacher Center Cuevas-Olula, Andalusian Ministry of Education, Culture and Sport (Spain).
Degree
PhD
Research interests
Habits of physical activity; psychosocial determinants of sport and exercise participation; Social influence and motivation in sport and exercise; healthy lifestyle.
E-mail: agranerog@hotmail.com

Antonio BAENA-EXTREMERA
Employment
Member of Research Group Physical Activity and Quality of Life at the University of Murcia. Ass. Prof. Faculty of Sports Sciences, University of Murcia, Spain.
Degree
PhD
Research interests
Habits of physical activity; psychosocial determinants of sport and exercise participation; Social influence and motivation in sport and exercise; healthy lifestyle.
E-mail: abaenaextrem@um.es

Manuel GÓMEZ-LÓPEZ
Employment
Ass. Prof. Faculty of Sports Sciences, University of Murcia, Spain.
Degree
PhD
Research interests
Habits of physical activity; psychosocial determinants of sport and exercise participation; Social influence and motivation in sport and exercise; healthy lifestyle.
E-mail: mgomezlop@um.es

José Antonio SÁNCHEZ-FUENTES
Employment
Member of Research Group Physical Activity and Quality of Life at the University of Murcia. Ass. Prof. Faculty of Sports Sciences, University of Murcia, Spain.
Degree
MSc
Research interests
Habits of physical activity; psychosocial determinants of sport and exercise participation; Social influence and motivation in sport and exercise; healthy lifestyle.
E-mail: jasfuentes@um.es

J. Arturo ABRALDES
Employment
Ass. Prof. Faculty of Sports Sciences, University of Murcia, Spain.
Degree
PhD
Research interests
Social influence and motivation in sport and exercise. Performance in lifesaving, swimming and water sports.
E-mail: abraldes@um.es

✉ **Antonio Baena-Extremera**
Department of Physical Activity and Sport, University of Murcia, Murcia, Spain

Appendix

Spanish version of "Sport Motivation Scale (SMS)" adapted to the context of Physical Education.

1. Por el placer de vivir experiencias estimulantes.
2. Por el placer de saber más sobre las actividades que practico
3. Antes participaba y me esforzaba en las clases, pero ahora me pregunto si debo continuar haciéndolo.
4. Por el placer de descubrir nuevas actividades físico-deportivas
5. Tengo la impresión de que no soy capaz de tener éxito en las actividades físico-deportivas que realizo.
6. Porque me permite estar bien considerado/a entre la gente que conozco.
7. Porque, en mi opinión, es una de las mejores formas de relacionarme.
8. Porque me siento muy satisfecho/a cuando consigo realizar adecuadamente las actividades físico-deportivas más difíciles.
9. Porque es una manera de estar en forma.
10. Por el prestigio de ser bueno/a en las actividades de clase.
11. Porque es una de las mejores formas de desarrollar otros aspectos de mí mismo/a.
12. Por el placer que siento cuando mejoro alguno de mis puntos débiles.
13. Por la sensación que tengo cuando estoy concentrado/a realmente en la actividad.
14. Porque debo practicar actividad físico-deportiva para sentirme bien conmigo mismo/a.
15. Por la satisfacción que experimento cuando estoy perfeccionando mis habilidades.
16. Porque las personas de mi alrededor piensan que es importante estar en forma.
17. Porque es una buena forma de aprender cosas que me pueden ser útiles en otros aspectos de mi vida.
18. Por las intensas emociones que experimento cuando practico una actividad físico-deportiva que me gusta.
19. Realmente no me siento capacitado/a para la práctica físico-deportiva.
20. Por el placer que siento mientras realizo ciertos movimientos difíciles.
21. Porque me sentiría mal si no participara en la clase.
22. Para mostrar a los demás lo bueno/a que soy cuando hago las actividades.
23. Por el placer que siento cuando aprendo a realizar actividades que nunca había hecho anteriormente.
24. Porque es una de las mejores formas de mantener buenas relaciones con mis amigos/as.
25. Porque me gusta el sentimiento de estar totalmente metido/a en la actividad.
26. Porque debo adquirir hábitos de práctica físico-deportiva.
27. Por el placer de descubrir nuevas estrategias de ejecución.
28. A menudo me digo a mi mismo/a que no puedo alcanzar las metas que me establezco.