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Validation of the Spanish Language Version of the Learning and Performance Orientations in Physical Education Classes Questionnaire

Validación de la versión Española del Cuestionario de Orientaciones al Aprendizaje y el Rendimiento en las clases de Educación Física

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Abstract

The objective of this study was to examine the factorial validity and reliability of the Learning and Performance Orientations in Physical Education Classes Questionnaire (LAPOPECQ) with adolescent Spanish physical education students. Exploratory and confirmatory factor analysis were utilized to address this question. Results of the exploratory factor analysis revealed the presence of five factors and was consistent with previous research. Confirmatory factor analysis indicated that the Spanish version of the LAPOPECQ had fit indices that were similar to the original Greek and English versions of the instruments and that a five-factor correlated model was more parsimonious than a hierarchical model. The implications of these findings on future research are discussed.

Key words: achievement goals; motivational climate; factorial validity; internal consistency.

Resumen

El objetivo de este estudio fue examinar la validez de constructo y fiabilidad del Cuestionario de orientaciones al aprendizaje y al rendimiento en las clases de Educación Física (LAPOPECQ) en adolescentes españoles estudiantes de educación física. Fueron empleados análisis factoriales exploratorios y confirmatorios para abordar esta cuestión. Los resultados del análisis factorial exploratorio revelaron la presencia de cinco factores. Esta estructura era coherente con la investigación anterior. El análisis factorial confirmatorio indicó que la versión en español del LAPOPECQ presentaba índices de ajuste similares a las versiones en griego e inglés del test. El modelo de cinco factores correlacionados fue más parsimonioso que un modelo jerárquico. Se discuten las implicaciones de estos hallazgos en la investigación futura.

Palabras clave: metas de logro; clima motivacional; validez factorial; consistencia interna.

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Introduction

A great amount of recent research carried out on motivation in the physical education and sport domain has emerged from an achievement goal perspective (Ames, 1992; Duda, 1996, 2001; Duda & Hall, 2000; Mills, 1997; Nicholls, 1989; Ntoumanis & Biddle, 1999; Papaioannou, 1994, 1995, 1998; Roberts, 1992, 2001; Roberts, Treasure & Kavussanu, 1997; Treasure, 1997). The main premise of achievement goal theory is that individuals in achievement situations desire to demonstrate competence and to avoid the demonstration of low competence (Nicholls, 1989). However, the criteria by which competence is defined may vary from one individual to another. The different manner in which individuals construe their competence and perceive themselves to be successful in achievement contexts results in two different goal perspectives: task involvement and ego involvement (Ames & Archer, 1988; Elliot & Dweck, 1988; Nicholls, 1989). Ego involvement consists of judging ability as a function of social comparison with others, so that one feels successful when one demonstrates more ability than others. When an individual is task-involved, the conception of ability is based on the level of personal mastery of the task being carried out, with no regard in this case for social comparison as a source of competence.

The adoption of a task or ego involved goal perspective in an achievement activity is a function of one's dispositional tendencies (task and ego orientations) and the perceived characteristics of the achievement situation (Gernigon, d'Arripe-Longueville, Delignières & Ninot, 2004; Nicholls, 1989). The achievement goal perspective also assumes that perception of situational dimensions of the achievement context affect individuals' cognitive, affective, and behavioral responses. These situational factors are known in achievement goals theory as motivational climate (Ames, 1992). Motivational climate is multidimensional in nature, in that it includes the perceived goal structure of the achievement environment as well as perceptions of significant others' evaluations and feedback about performance and includes those contextual and situational indicators that contribute to individuals' success and failure definitions. Teachers, coaches, parents and peers provide implicit and explicit cues that relate to definitions of success and failure (Ames, 1992; Cervelló, Calvo, Ureña, Martínez & Guzmán, in press). As Duda and Hall (2000) commented, "differential structures such as the standards, methods, and criteria underlying evaluation, the nature of recognition and the manner in which it is expressed, the source of authority, the way tasks are structured, and the manner in which individuals are grouped are held to constitute the overriding climate operating in achievement settings" (p. 419).

A variety of instruments have been developed to measure perceptions of learning and performance motivational climates in sport, including the Perceived Motivational Climate in Sport Questionnaire-1 (Seifriz, Duda & Chi, 1992; Walling, Duda & Chi, 1993) and the Perceived Motivational Climate in Sport Questionnaire-2 (Newton & Duda, 1993; Newton, Duda & Yin, 2000), with each showing acceptable validity and reliability in sport settings. To measure perceptions of motivational climates in school physical education classes and drawing on the work of Ames and Archer (1988), Papaioannou (1994) developed the Learning and Performance Orientations in Physical Education Classes Questionnaire (LAPOPECQ). The final version of this instrument consists in a pool of 27 items. Exploratory factor analysis with a sample of 697 Greek students showed a five factor solution. These five factors were labelled teacher initiated-

learning orientation, students' learning orientation, students' competitive orientation, students' worries about mistakes and outcome orientation without effort. Confirmatory factor analysis conducted in two studies with 697 and 394 participants showed that a hierarchical structure of the instrument provided the most parsimonious explanation of the questionnaire's factor structure. These findings indicated a structure of two higher-order factors (performance and learning) and five lower-order factors. The factors teacher-initiated learning orientation and students' learning orientation comprised the learning factor. The students' competitive orientation, students' worries about mistakes and outcome orientation without effort factors loaded on the performance factor. Different investigations have employed the LAPOPECQ to measure motivational climate in physical education. These studies have demonstrated predictive validity of LAPOPECQ in correlational studies and have demonstrated positive relationships between perception of learning climate and levels of intrinsic motivation (Ferrer-Caja & Weiss, 2000; Papaioannou, 1995), and sensibility to changes in perception of motivational climate in interventional studies (Morgan & Carpenter, 2002).

To date, however, only the English (Goudas & Biddle, 1994) and Greek versions of this instrument have demonstrated cross-cultural validity. Goudas and Biddle (1994) developed a new measure of motivational climate that included four of the five scales of LAPOPECQ (the "outcome orientation without effort" factor was excluded), and two new factors (students' perceptions of choice and students' perceptions of teachers support). The new scale was called the Physical Education Class Climate Scale (PECCS) and consisted of 26 items. This scale had six first order factors and two second order factors with the second order factors being perception of mastery climate (including perceived choice, teacher support, teacher initiated-learning and students' learning factors) and perception of performance climate (including students' competitive orientations and worries about mistakes). This questionnaire has been validated in the French context by Biddle, Cury, Goudas, Sarrazin, Famose and Durand (1995). Exploratory (Cury, Biddle, Famose, Goudas, Sarrazin & Durand, 1996) and confirmatory (Biddle et al., 1995) factor analysis revealed two higher order factors called mastery and comparison (synonymous with performance climate). However, in the process of translation to French, some items were deleted to improve the internal consistency of the scales.

To date, no research has evaluated the validity of the LAPOPECQ for use with a Spanish population. As Ntoumanis and Biddle (1999) have suggested more work needs to be done so that this questionnaire can be utilized in other countries and languages.

To extend the analysis of the validity and reliability of this instrument, the objective of the present work has been to test the LAPOPECQ in a sample of Spanish physical education students via exploratory and confirmatory factor analysis. Two measurement models were tested using confirmatory factor analysis. First, a hierarchical model composed of two second-order factors and five first-order factors was tested. Second, a measurement model consisting of five inter-correlated first-order factors was examined. Based on theory and previous research, we expected that the hierarchical model would provide a good fit to the data.

Method

Participants and procedure

1285 Spanish students participated in the study. A sample of 853 pupils (M age = 14.92; SD = 1.20) was included in Study 1. In a second study, 432 Spanish students (M age = 15.58; SD = 1.18) participated in the study. All participants are members of physical education classes in schools in two large Spanish cities. All subjects volunteered to participate in the study.

Permission to conduct this investigation was received from parents and head-teachers. The pupils were told the purpose of the research, their rights as study participants and were asked to sign a consent form. The instruments for measuring the different variables were administered in a classroom to the chosen subjects when the teacher was not present and responses to the instrument were kept anonymous. The participants were told to ask for help if they had confusion concerning either instructions or the clarity of particular items.

Measures

The English version of LAPOPECQ was translated into Spanish by two experts in sport psychology who are conversant in both English and Spanish. Prior to developing this investigation, a pilot study with 30 students was designed to control for possible semantic instrument worries. In a second phase, the Spanish version of LAPOPECQ was translated from Spanish to English by an independent bilingual translator who confirmed the consistency of the retranslated version to the original one.

The 27 items on the Spanish version of the Learning and Performance Orientations in Physical Education Classes Questionnaire (LAPOPECQ) were presented to students . In the Spanish academic context, all assessments of pupils' academic performance are graded between 0 to 10 and in order to facilitate the students' responses in a more habitual way, the respondents all answered on the same -point Likert scales anchored by strongly disagree (0) and strongly agree (10).

Results

Exploratory and confirmatory factor analysis was employed to test the validity of LAPOPECQ. Cronbach alpha and item-total correlations were used to analyze reliability subscales and items. The common alpha criterion for acceptability of a subscale is .70 (Nunnally, 1978) but some researchers consider that values of .60 are acceptable for subscales with four items (Loewenthal, 2001). To analyze the relationships between the subscales, bivariate correlations were calculated.

Study 1: Exploratory Factor Analysis (EFA)

Principal components exploratory factor analysis with varimax and oblique rotations was conducted. Because the results from the varimax and oblique rotations were similar, only the oblimin structure matrix was presented. An eigenvalue of 1.0 or greater was used as the criterion for extracting factors and a loading of .40 or greater was the

criteria for selecting items. In this investigation, the item "The way the lesson is taught helps me learn how to exercise by myself" which was included in the students' learning orientation and the item "Students feel most satisfied when they win with little effort" which was included in the outcome orientation without effort subscale demonstrated a low item-total correlation (below .30), and when these items were deleted the Cronbach alpha level improved accordingly (.76 to .80 and .60 to .64 respectively). These two items were thus deleted during the EFA.

Results of the EFA are presented in Table 1. Five factors with eigenvalues greater than 1.0 were obtained accounting for 54.9% of the variance. The first factor comprised six items reflecting teacher-initiated learning orientation. The second factor included five items, indicating students' worries about mistakes. The third factor comprised three items reflecting outcome orientation without effort. The fourth factor consisted of six items relative to students' learning orientation. Finally, the last factor was comprised of five items and reflected students' competitive orientation.

Table 1. Principal components factor analysis of the Learning and Performance Orientations in Physical Education Classes Questionnaire following Oblique rotation.

Items	Factor				
	1	2	3	4	5
1	**.834**	.077	-.108	.400	-.047
6	**.833**	.060	-.152	.368	-.058
16	**.608**	.062	-.234	.467	.050
11	**.576**	-.015	-.228	.292	-.066
21	**.559**	.089	-.242	.418	-.112
25	**.556**	.175	-.035	.373	-.111
18	.015	**.813**	.149	.133	-.329
23	.029	**.792**	.165	.134	-.312
3	.069	**.745**	.158	.005	-.328
13	.113	**.720**	.173	.159	-.342
8	.031	**.703**	.269	-.081	-.312
9	-.120	.227	**.753**	-.148	-.195
4	-.190	.105	**.738**	-.307	-.204
19	-.208	.269	**.734**	-.007	-.337
20	.376	.063	-.154	**.821**	-.065
24	.386	.157	-.164	**.770**	-.039
15	.509	.033	-.315	**.758**	-.010
27	.453	.031	-.131	**.744**	.046
26	.554	-.051	-.132	**.615**	.066
10	.312	.054	-.164	**.461**	-.159
2	.154	.383	.165	-.012	**-.780**
12	.110	.321	.129	.164	**-.764**
7	.016	.343	.338	-.083	**-.717**
17	-.152	.395	.478	-.094	**-.640**
22	-.152	.328	.526	.081	**-.537**

The alpha coefficients were .76 for the teacher-initiated learning orientation factor, .81 for the students' worries about mistakes factor, .64 for the outcome orientation without effort factor, and .80 and .75 for the students' learning orientation factor and the

students' competitive orientation subscales, respectively. Reliability was also calculated for items included in the theoretical second-order dimensions. Results revealed alphas of .85 and .83 for the learning and performance dimensions, respectively.

Study 2: Confirmatory Factor Analysis (CFA)

Prior to conducting the confirmatory factor analysis, the two items that had low item-total correlations in the EFA were deleted. Based on previous research (Papaioannou, 1994) two models were tested; a hierarchical two second-order model (competitive and learning climate) and a five factor inter-correlated first order model. Confirmatory factor analysis using AMOS 4.0 was used to test the hypothesized models. Maximum likelihood method was employed in the present study and the covariance matrix was calculated. This method assumes multivariate normality. Because the data violated the multivariate normality assumption (Mardia = 55.61) the bootstrapping technique (Efron, 1982; Byrne, 2001) to improve non-normality of data was employed. This approach calculates the parameter estimates from an empirical sampling distribution rather than from the theoretical distribution of statistics test as chi-square and normality test (Mooney & Duval, 1993).

As Hoyle and Panter (1995) have mentioned there is little agreement among researchers about the best index of overall fit to be used in confirmatory factor analysis. Consequently, to achieve a comprehensive evaluation of model fit, a range of different indices was employed. We have selected the same indices as those used by Papaioannou (1994) to compare our results with these previous findings.

The chi-square statistic tests the absolute fit of the hypothesized model with the population covariance matrix. It is well known that this index is sensitive to sample size and data distribution (Joreskog & Sorbom, 1989). In this research, the chi-square/degrees of freedom index was utilized as it had been previously by Papaioannou (1994). Four incremental fit indices were used to analyze model fit. Incremental fit indices are based on comparisons between the hypothesized model and a null model and are not influenced by sample size (Marsh, Balla & Hau, 1996). Values around .90 are considered acceptable (Cea, 2002). The goodness-of-fit index (GFI) is based on a ratio of the sum of the squared discrepancies between the observed and population variances. The adjusted goodness-of-fit index (AGFI) adjusts the GFI for degrees of freedom in the hypothesized model. The Tucker-Lewis index (TLI) indicates the amount of improvement in fit over a baseline model, adjusted to the number of degrees of freedom in the model. Finally, the last incremental index used in this investigation was the comparative fit index (CFI) that measures improvement in fit of the hypothesized model compared with a completely independent model. The standardized root mean square residual (SRMR) assesses the degree to which the a priori structure reproduces the data, and for well-specified models, the SRMR value should be close to .08 (Hu & Bentler, 1999).

The mean discrepancy between the observed covariances and those implied by the model per degree of freedom was evaluated using the root mean square error of approximation (RMSEA) and by the confidence interval associated with the RMSEA, as an index of stability in other samples. A value of .05 of lower indicates a good fit, and values less than .08 are interpreted as a reasonable fit (Browne & Cudek, 1993).

To identify the most parsimonious model, the AIC index was used. The Akaike's (1987) information criterion (AIC) is a non-normed index with parameters to compare two or

more competing models, indicating the better and most parsimonious model. When evaluating models with this technique, the model with smaller AIC values is considered the better model. This approximationindex has been adopted recently in sport psychology when conducting confirmatory factor analysis (Standage, Treasure, Duda & Prusak, 2003) and is recommended when non-tested models are compared. Similar to other investigations that have employed confirmatory factor analysis to validate instruments that measure perception of motivational climate (e.g. Newton et al., 2000), the approach adopted for this investigation consisted of evaluating multiple indices and identifying the better-fitting model among competing models.

Finally, to identify the most parsimonious model, the contribution of each item to the hypothesized factor was assessed using the estimate and the associated *t*-value (unstandardized estimate divided by the standard error). The strength of an item is indicated by high estimates and low standard errors. Values of .40 for standardised estimates and *t*-values grater than 1.96 are considered acceptable (Comrey & Lee, 1992).

In the present investigation, two items were deleted because alpha improved substantially with their deletion. The item "The P.E. teacher looks completely satisfied when students are improving after trying hard", included in the teacher-initiated learning orientation subscale and the item "Students feel most satisfied when they win with little effort" were included in the outcome orientation without effort subscale.

In this investigation the Cronbach alpha coefficients were .74 for the teacher-initiated learning orientation, .75 for the students' competitive orientation factor, .84 for the students' worries about mistakes subscale, .66 for the outcome orientation without effort factor, and .75 for the students' learning orientation subscale. These values indicate acceptable internal reliability for all factors.

The results of the hierarchical model and the five intercorrelated factors model are shown in Table 2. The SRMR indicated an acceptable fit for both models; hierarchical model, χ^2 (269) = 743.20, $p < .001$, (χ^2 / *df)* = 2.76, GFI = .87, AGFI = .84, TLI = .85, CFI = .87, SRMR = .079, RMSEA = .064; five first-order factors model, χ^2 (265) = 705.172, $p < .001$, (χ^2 / *df)* = 2.66, GFI = .88, AGFI = .85, TLI = .86, CFI = .88, SRMR = .064, RMSEA = .062. The inspection of the AIC, showed, that the first order model is more parsimonious than the hierarchical model (AIC = 825.17 and 855.20 respectively).

Table 2. Confirmatory factor analysis of the LAPOPECQ (Spanish version).

Fit Index	Hierarchical (first and second order) model	First order model
Chi-square	743.205*	705.172*
Degrees of freedom	269	265
Chi-square/df	2.76	2.66
GFI	.87	.88
AGFI	.84	.85
TLI	.85	.86
CFI	.87	.88
SRMR	.079	.064
RMSEA (LO-HI)	.064 (.058-069)	.062(.056-067)
AIC	855.205	825.172

* $p < .001$

The incremental indexes were marginally acceptable. Modification indices were calculated to identify problematic parameters. Modification indices suggest that several errors should be correlated to improve model fit. However, some researchers indicate that theoretical aspects are needed to justify the assumption of modification indices (Cea, 2002). No theoretical justification was identified and we did not evaluate this method for model respecification. Another method was analysed. We inspected if some items cross-loaded on more than one factor. Items with values on modification indices above 5 were considered to appropriate to modify the model. No items showed values above 5, and consequently, this approximation was not employed.

Factor loadings and standard errors showed that all items with the exception of the item "the way the lesson is taught helps me learn how to exercise by myself" had values better than .40. However, this problematic item was retained because the *t*-value associated was greater than 1.96 and fit indices decreased when this item was deleted.

Correlation between subscales

Correlations between the subscales of LAPOPECQ are presented in Table 3. Positive correlations were found between teacher initiated learning orientation and students' learning orientation, and between students' competitive orientation and students' worries about mistakes and outcome orientation without effort. Low and negative correlations were found between students' learning orientation and outcome orientation without effort.

Table 3. Correlations between LAPOPECQ sub-scales.

Variables	1	2	3	4	5
1. Teacher-initiated learning orientation					
2. Students' competitive orientation	-.04				
3. Students worries about mistakes	.09	.53*			
4. Outcome orientation without effort	-.23*	.47*	.23*		
5. Students' learning orientation	.64*	.03	.08	-.18*	

* $p < .05$

Discussion

The first aim of this study was to analyze the validity and reliability of the LAPOPECQ (Papaioannou, 1994) in a cross-cultural setting using a sample of Spanish physical education students. The LAPOPECQ assesses the perception of motivational climate in physical education classes and serves several important functions. First, this questionnaire provides information about the motivational climate that students usually perceive in physical education classes. Second, LAPOPECQ has been used to analyze the effectiveness of interventions to change perceptions of motivational climate in educational settings (e.g. Morgan & Carpenter, 2002; Papaioannou & Kouli, 1999).

However, as has been highlighted by previous researchers, the validity of the instruments should be demonstrated for different populations and cultures when used in these contexts (Ntoumanis & Biddle, 1999). The present study was designed to analyze the validity and reliability of LAPOPECQ in Spanish physical education students using exploratory and confirmatory techniques.

In the first study, an exploratory evaluation of LAPOPECQ was conducted. We attempted to extend previous work on the questionnaire and to develop a Spanish language version of the instrument. Principal component analysis revealed that, consequent with previous research, the LAPOPECQ captured five dimensions of achievement orientations in physical education, including teacher-initiated learning orientation and students' learning orientation, students' competitive orientation, students' worries about mistakes and outcome orientation without effort.

Preliminary support was provided for the internal consistency of the LAPOPECQ. The two proposed second-order factors of perception of learning climate and perception of performance climate exhibited good internal consistency. Adequate consistency was also reported for the instrument's subscales. Unfortunately, two items designed to tap the students' learning orientation dimensions (e.g. "The way the lesson is taught helps me learn how to exercise by myself), and the outcome orientation without effort subscale (e.g. "Successful students are thought to be those who score the most points with little effort") respectively, showed very low item-total correlations and alpha improved when these items were deleted. These items were re-structured and modified.

However, we found, in the confirmatory factor analysis, that these items showed lower scores on their a priori factor. It is possible that these items did not adequately capture these facets of the achievement orientation in our samples. Future research should address the possibility that participants did not understand the meaning of these problematic items and these items will need to be modified in future investigations. In the second study, the confirmatory factor analysis showed moderated fit index values for the hierarchical (first and second order) and the five first-order factor models. Only the SRMR showed good values for the two models but the incremental indices were below the traditionally acceptable value of .90 and the RMSEA statistic can be considered marginally acceptable. In this respect, some researchers have suggested that the LAPOPEQ has some items that also measure students' goal orientation (Duda & Whitehead, 1998). Concretely, the students' learning orientation subscale and the students' competitive orientation subscale contain some items that measure the disposition to hold task or ego conceptions of ability in physical education classes (e.g. "In P.E. classes, I feel very satisfied when I learn something new" and "In P.E. classes, the most important thing is for a student to demonstrate that he or she is better in sports than others").

These results indicate that when the LAPOPECQ is used to measure motivational climate in achievement settings like physical education classes we can consider the possibility that we are measuring perceptions of motivational climate and also the conception of ability operating in this achievement context. This possibility has been considered by some researchers, indicating the possibility that LAPOPECQ measures the two constructs (Duda & Whitehead, 1998). Contrary to the previous findings obtained by Papaioannou (1994) the post hoc approach using the AIC index suggests that the five second-order factor model provides a more parsimonious structure than the traditional hierarchical model. More investigation needs to be done to determine if the differences of our study are due to cultural variables or should be examined as a theoretical distinction to consider in future research.

The relationships between the subscales of LAPOPECQ revealed stronger relationships between the teacher-initiated learning orientation subscale and students' learning orientation, and between students' competitive orientation and students' worries about

mistakes and outcome orientation without effort subscales. These results indicated that factors that define the motivational climate are related with students' own personal goal orientations. These relationships have been found in other studies that have analyzed the relationships between goal orientations and motivational climate (for a revision see Ntoumanis & Biddle, 1999; Duda, 2001). It is not surprising that the two measures correlate and we are agree with Duda and Whitehead (1998) that the stronger relationships between the subscales that measures dispositional orientations and situational perceptions in some instruments that measure perception of motivational climate "probably is an artefact of the way the instruments have been constructed"(p. 40).

In conclusion, the results of the present study provide only partial evidence of the psychometric properties of LAPOPECQ and future research should examine the pertinence of factorial validity and reliability of the instrument in populations involving different cultures. To validate the instrument further, new studies should also examine the relationships among the subscales of LAPOPECQ and other measures that confer concurrent validity to the instrument in Spanish students' samples and for students belonging to other cultures.

References

Akaike, H. (1987). Factor analysis and AIC. *Psychometrika, 52*, 317-332.

Ames, C. (1992). Achievement goals, motivational climate and motivational processes. In G. C. Roberts (Ed.), *Motivation in sport and exercise* (pp. 161-176). Champaign, IL.: Human .Kinetics.

Ames, C., & Archer, J. (1988). Achievement goals in the classroom: Student's learning strategies a motivation processes. *Journal of Educational Psychology*, *80*, 260-267.

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

Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. S. Long (Eds.), *Testing Structural Equation Models* (pp. 136-162). Newbury Park, C.A.: Sage.

Byrne, B. M. (2001). *Structural Equation Modelling with AMOS: Basic Concepts Application, and Programming*. Mahwah, N.J.: Lawrence Erlbaum Associate.

Cea, M. A. (2002). *Análisis multivariable. Teoría y práctica en la investigación social.* Madrid: Síntesis.

Cervelló,, E. M., Calvo, R.; Ureña, A.; Martínez, M., & Guzmán, J. F. (in press). Situational and dispositional predictors of task involvement in Spanish professional volleyball players. *Journal of Human Movement Studies*

Chen, A. (2001). A theoretical conceptualization for motivation research in Physical Education: An integrated perspective. *Quest, 53,* 35-58.

Comrey, A. L., & Lee, H. B. (1992). *A first Course in Factor Analysis*. Mahwah, N: .2nd Ed. Lawrence Erlbaum Associates.

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

Duda, J. L. (1996). Maximizing motivation in sport and physical education among children and adolescents. *Quest*, *48*, 290-302.

Duda, J. L. (2001). Achievement goal research in sport: Pushing the boundaries and clarifying some misunderstandings. In G. C. Roberts (Ed.), *Advances in motivation in sport and exercise* (pp. 129-182). Champaign, I: Human Kinetics.

Duda, J. L., & Hall, H. (2000). Achievement Goal Theory in Sport. In R. N. Singer, H. A. Hausenblas & C. M. Janelle (Eds.), *Handbook of Sport Psychology* (pp. 417-43). New York: John Wiley.

Duda, J. L., & Whitehead, J. (1998). Measurement of goal perspectives in the physical domain. In J. L. Duda (Ed.), *Advances in Sport and Exercise Psychology Measurement* (pp. 21-48) Morgantown, WV: Fitness Information Technology.

Efron, B. (1982). *The jackknife, the bootstrap and other resampling plans.* Philadelphia: SIAM.

Gernigon, C.; D'Arripe-Longueville, F.; Delignières, D., & Ninot, G. (2004). A Dynamical Systems perspective on goal involvement states in sport. *Journal of Sport and exercise Psychology, 26*, 572-596.

Ferrer-Caja, E., & Weiss, M. R. (2000). Predictors of intrinsic motivation among adolescent students in physical education. *Research Quarterly for Exercise and Sport, 23,* 267-279.

Goudas, M., & Biddle, S. (1994). Perceived motivational climate and intrinsic motivation in school physical education classes. *European Journal of Psychology of Education, 9*, 241-250.

Hoyle, R. H., & Panter, A. T. (1995). Writing about structural equation models. In R. H. Hoyle (Ed.), *Structural Equation Modeling: Concepts, Issues, and Applications* (pp. 158-175) Londo & Sage.

Jöreskog, K. G., & Sörbom, D. (1989). *LISREL 7: A guide to the program and applications (2nd ed.). Chicago: SPSS.*

Loewenthal, K. M. (2001). *An Introduction to Psychological Tests and Scales* (2nd Edn.). London: UCL Press.

Marsh, H. W.; Balla, J. R., & Hau, K. T. (1996). An evaluation of incremental fit indices: a clarification of mathematical and empirical properties. In G. A. Marcoulides & R. E. Schumaker (Eds.), *Advanced Structural Equation Modelling* (pp. 315-353). Mahwah, N.: Lawrence Erlbaum Associates.

Mills, B. D. (1997). Pilot testing and instrument for determining the goal orientation of distance learning graduate students. *Journal of Human Movement Studies*, *33,* 93-118.

Mooney, C. Z., & Duval, R. D. (1993). *Bootstrapping: A Nonparametric Approach to Statistical Inference*. London: Sage Publications.

Morgan, K., & Carpenter, P. (2002). Effects of manipulating the motivational climate in physical education lessons. *European Physical Education Review*, *8*, 207-229.

Newton, M. L., & Duda, J. L. (1993). The Perceived Motivational Climate in Sport Questionnaire-2: Construct and predictive validity. *Journal of Sports and Exercise Psychology, 15* (Suppl.), S59.

Newton, M. L., Duda, J. L., & Yin, Z. (2000). Examination of the psychometric properties of the Perceived Motivational Climate in Sport Questionnaire-2 in a sample of female athletes. *Journal of Sports Sciences, 18,* 275-290.

Nicholls, J. G. (1989). *The competitive ethos and democratic education*. Cambridge, MA: Harvard University Press.

Ntoumanis, N., & Biddle, S. (1999). A review of motivational climate in physical activity. *Journal of Sport Sciences, 17,* 643-665.

Nunnally, J. C. (1978). *Psychometric theory*. New York: McGraw-Hill.

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

Papaioannou, A. (1995). Differential perceptual and motivational patterns when different goals are adopted. *Journal of Sport and Exercise Psychology*, *17*, 18-34.

Papaioannou, A. (1998). Students' perceptions of the physical education class environment for boys and girls and the perceived motivational climate. *Research Quarterly for Exercise and Sport, 69,* 267-275.

Papaioannou, A., & Kouli, O. (1999). The effect of task structure, perceived motivational climate, and goal orientations on students' task involvement and anxiety. *Journal of Applied Sport Psychology*, *11*, 51-71.

Roberts, G. C. (1992). Motivation in sport an exercise: Conceptual constraints and conceptual convergence. In G. C. Roberts (Ed.), *Motivation in sport and exercise* (pp. 3-30). Champaign, IL: Human Kinetics.

Roberts, G. C. (2001). Understanding the Dynamics of Motivation in Physical Activity: The influence of Achievement Goals on Motivational Processes. In G. C. Roberts (Ed.), *Motivation in sport and exercise* (pp. 1-50). Champaign, IL: Human Kinetics.

Roberts, G. C.; Treasure, D. C., & Kavussanu, M. (1997). Motivation in physical activity contexts: An achievement goal perspective. In P. Pintrich & M. Maehr (Eds.), *Advances in motivation and achievement* (pp. 413-447). Stanford, C: JAI Press.

Seifriz, J.; Duda, J. L., & Chi, L. (1992). The relationship of perceived motivational climate to intrinsic motivation and beliefs about success in basketball. *Journal of Sport and Exercise Psychology*, *14*, 375-391.

Standage, M.; Treasure, D. C.; Duda, J. L., & Prusak. K. A. (2003). Validity, Reliability, and Invariance of the Situational Motivation Scale (SIMS) across diverse physical activity contexts. *Journal of Sport and Exercise Psychology, 25,* 19-43.

Treasure, D. C. (1997). Perceptions of the motivational climate and elementary school children's cognitive and affective response. *Journal of Sport and Exercise Psychology*, *19,* 278-290.

Walling, M. D.; Duda, J. L., & Chi, L. (1993). The perceived motivational climate in sport questionnaire: Construct and predictive validity. *Journal of Sport and Exercise Psychology*, *15,* 172-183.