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ORIGINAL

SPANISH VALIDATION OF THE LOCUS OF CONTROL QUESTIONNAIRE IN SPORT FOR CHILDREN

VALIDACIÓN ESPAÑOLA DEL CUESTIONARIO DE LOCUS DE CONTROL EN DEPORTE INFANTIL

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ABSTRACT

Locus of control has been studied in the sport context, however there was no valid instrument to evaluate it in children's sport. This study adapts into Spanish and validates the Children's Locus of Control Scale for Sport (CSLCS) in the Spanish language. This CSLCS was developed by Tsai y Hsieh (2015). The adaptation has two phases: an initial screening of 248 children between the ages of 7 and 16 to observe the qualitative behavior of the items; and a second one with 221 athletes with children between the ages of 8 and 22 in which the questionnaire was modified to fit the results. A final 10-item scale was obtained, with 5 items per dimension (internal and external), which presents an adequate fit. Results show that the Spanish version of the scale possesses adequate psychometric qualities for its use in research and applied fields in child's sport evaluation.

KEY WORDS: locus of control, children, sports, assessment scale.

RESUMEN

El locus de control ha sido estudiado en el deporte, sin embargo no existía un instrumento válido para evaluarlo en deporte infantil. Este estudio lleva a cabo la validación española del *Children's Sport Locus of Control Scale* (CSLCS) que desarrollaron Tsai y Hsieh (2015). La adaptación presenta dos fases: una primera exploratoria con 248 niños entre 7 y 16 años para observar el comportamiento cualitativo de los ítems; y una segunda con 221 deportistas entre 8 y 22 años en la que se modificó el cuestionario para ajustarlo a los resultados obtenidos. Se obtiene una escala final de 10 ítems, con 5 ítems por dimensión (interna y externa), que presenta un ajuste adecuado. Los resultados demuestran que la versión española de la escala posee cualidades psicométricas adecuadas para ser utilizada en la investigación y la práctica aplicada en la evaluación deportiva infantil.

PALABRAS CLAVE: locus de control, niños, deporte, escala de evaluación.

INTRODUCTION

Since Rotter (1966) developed the concept of locus of control within his theory of social learning (Rotter, 1954), this construct has been extensively investigated in different domains of human behavior such as health (Champagne, Fox, Mills, Sadler And Malan, 2016, Shojaee and French, 2014, Tripathi, Asthana, and Asthana, 2016) or work (Duffy, Jadidian, Douglass and Allan, 2015, Johnson, Rosen, Chang, and Lin, 2015, Wu, Griffin and Parker , 2015). The locus of control refers to the belief regarding how much control people have over the events that occur in their lives (Rotter, 1966). The theory points to two types -or places- of locus of control: internal and external (Rotter, 1966). People with high external locus of control believe that the events of their life are due to the luck -or the lack of it-, the environment or any external variable. However, people with internal locus of control attribute the situations to variables such as responsibility, effort and their own capacity.

Rotter (1966) developed a scale to measure the locus of control, the Rotter I-E Scale, conceived in a one-dimensional way in which a higher score indicated an external locus of control. In the same vein, the Nowicki and Strickland (1971) - Nowicki-Strickland Locus of Control Scale for Children- approach conceived the control locus unidimensionally, while later approaches like that of Levenson (1973) understand that the control locus is a multidimensional construct. The Rotter IE Scale has different adaptations to Spanish, both for Spaniards (Ferrando, Demestre, Anguiniano-Carrasco and Chico, 2011; Pérez-García, 1984) and Latin Americans (Bibiano, Oruelas, Aguirre and Rodríguez-Villalobos, 2016) in which a multidimensional structure is demonstrated. However, these instruments are not specific to the sporting context.

The locus of control has been studied in the sporting context in relation to the management of psychological abilities and performance (Fallby, Hassmén, Kenttä and Durand-Bush, 2006; Rial, Marsillas, Isorna and Louro, 2013), the occurrence and rehabilitation of injuries (García-Más, Pujals, Furter-Parra,

Núñez y Rubio, 2014; Ortín, Olmedilla, Garcés de los Fayos e Hidalgo, 2008), and competitive anxiety (Arnaud, Codou, and Palazzolo, 2012; Kerr y Goss, 1997; Ntoumanis y Jones, 1998),, transgression of norms and moral disconnection (Tsai, Wang and Lo, 2014), etcetera. While this research has been developed in adult athletes, investigation of the locus of control of the child athlete population has at the moment been rather scarce (Tsai, Wang and Lo, 2014). To apply scales to young athletes (between 8 and 14 years old) it is important to carefully adapt the items and their wording (Nicholls, 1989, Piaget and Inhelder, 1969, Tsai and Hsieh, 2015), Tsai and Hsieh (2015) developed the locus of control in sports children's scale (CSLCS) based on Rotter's theory (1966).

In regards to the relationship between competitive anxiety and its relation to the locus of control, several studies have demonstrated the existence of a positive correlation between both variables (Arnaud and Codou, 2012; Ntoumanis and Jones, 1998; Polman, Rowcliffe, Borkoles, and Levy, 2007; Wong and Bridges, 1995), so that the external locus of control in athletes has preceded high levels of competitive anxiety, especially for cognitive anxiety (Arnaud, Codou and Palazzolo, 2012; Ntoumanis and Jones, 1998).

The aim of this study is to carry out the process of translation and adaptation to Spanish of the locus of control in sport's scale for children (Tsai and Hsieh, 2015) and to verify its psychometric properties in a sample of Spanish children's athletes. To do this, the SAS-2 Competitive Anxiety Scale for initiation athletes (Ramis, Torregrosa, Viladrich and Cruz, 2010) is used as a measure of evidence of external validity.

METHODOLOGY

Participants

Sample 1. Used to obtain data about the scale behavior and obtain both quantitative and qualitative data on the understanding of the items. The incidental sample consisted of 246 players between 7 and 16 years of age with an average age of $M = 10.43$ ($SD = 2.42$). The years of sports practice were in an average of $M = 5.60$ ($DT = 2.46$).

Sample 2. Used to obtain evidence of confirmatory validity. This incidental sample consisted of 206 athletes between 8 and 22 years of age, with a mean age of $M = 12.80$ ($SD = 2.32$). The years of sports practice were in an average of $M = 4.80$ ($DT = 3.10$). The absolute data and percentages of both subsamples can be found in Table 1.

Table 1. Socio-demographic data of both samples

		Sample 1*	Sample 2**
Gender	Male	215 (87.7%)	103 (50%)
	Female	30 (12.3%)	103 (50%)
Sport	Tennis	117 (47.5%)	56 (27.2%)
	Football	129 (52.5%)	0
	Basketball	0	39 (18.9%)
	Karate	0	15 (7.3%)
	Rythmic Gymnastics	0	8 (3.9%)
	Synchronized swimming	0	30 (14.6%)
	Athletics	0	19 (9.2%)
	Swimming	0	39 (18.9%)
Competitive level	Local	219 (89.4%)	77 (39.7%)
	Regional	9 (3.7%)	18 (9.3%)
	Provincial	4 (1.6%)	49 (25.3%)
	National	6 (2.4%)	49 (25.3%)
	International	7 (2.9%)	1 (0.5%)

*Lost value; **12 lost values at the competitive variable level.

Instruments

Children's Sport Locus of Control Scale (CSLCS). Tsai and Hsieh (2015) developed this scale taking as reference the theory of Rotter (1966). The instrument has 2 dimensions: internal control, including items of skill and responsibility, and external control, with items referring to the environment and luck. The original instrument consists of 12 items with a scale of 7 points from 1 (totally disagree) to 7 (totally agree). An example of an item in English is "Some players are just born with more luck". The reliability data of the original instrument were Cronbach's alpha of .92 for internal control and .86 for external. SAS-2 Competitive Anxiety Questionnaire (Ramis et al, 2010). This questionnaire is used to assess the anxiety that athletes experience when facing a competition. It contains 15 items divided into three subscales: somatic anxiety, worry and deconcentration. Each item is answered from a 4-point Likert scale from 1 (nothing) to 4 (much). The instrument reliability data in the original publication are .83 for the somatic scale, .78 for the scale of concern, and .73 for the deconcentration scale. In this sample the somatic scale presents a Cronbach's alpha of .83, .79 for the worry scale and .74 for the deconcentration scale.

Procedure

The criteria proposed by Hambleton (2004) and Muñiz, Elosúa and Hambleton (2013) have been followed for the process of adaptation and validation of the CSLCS scale into Spanish, which proposes the need to ensure equivalence guarantees of both concept and linguistics and metrics. Adaptation of the scales was performed using a back-translation process by two bilingual translators specialized in psychological terminology and followed a three-step process. In a first exploratory phase, the scale was administered to a pilot sample of athletes between 7 and 16 years old (Sample 1) to observe the behavior of the scale and to obtain data on the understanding of the items, both quantitative and qualitative. In a second phase, the questionnaire was modified to fit the results obtained. In the third phase a new administration of the instrument was carried

out to the second sample of athletes with the objective of obtaining evidence of external validity, factorial structure and adjustment indexes. Due to the importance of adapting to a child sample in this validation process, Table 2 shows both drafting versions and the qualitative difficulties encountered by athletes aged between 7 and 16 years. The different versions of the questionnaire were consulted with the original authors.

For the administration of the questionnaires in Phases 1 and 3, after establishing the collaboration and acceptance of the parents of the athletes so that their children participated in the investigation through informed consent, the scale was administered by personnel trained to that effect to the arrival in training, and in pencil and paper format. The instructions to the participants indicated that their participation was voluntary, that the questionnaire had to be completed individually and that confidentiality and anonymity of the data would be maintained at all times.

Table 2. *Qualitative results of the adaptation of the scale of locus of control in infantile sport*

Initial item	Qualitative assessment	Final item
Puedo perder una competición por culpa de mi equipamiento, el campo o las instalaciones.	That variable is not valued as important.	Puede ir mal en una competición por culpa del entrenador.
Puedo perder una competición porque el árbitro/juez no es justo o imparcial.	It indicates the lack of the evaluation of the trainer.	Puedo perder una competición porque el árbitro/juez no es justo o imparcial.
Si tengo mal resultado en una competición puede ser por falta de suerte	Doubts about the concept of bad result.	A veces pierdo porque no he tenido suerte.
Mi rendimiento en el deporte depende de cosas externas a mí.	Doubts with the concept external things.	Puede irme mal en una competición por cosas que no son mi culpa.
Tengo más probabilidades de ganar cuando llevo un amuleto.	Doubts about the concept of amulet.	Tengo más probabilidades de ganar cuando llevo algo que me da suerte.
Algunos deportistas nacen con suerte.	Lack of relationship with the competition.	A algunos deportistas les va bien porque tienen suerte.
Cuando tengo un mal resultado, normalmente es porque me he esforzado poco.	Doubts with double denial.	Cuando me esfuerzo mucho, tengo un buen resultado
Puedo cambiar el resultado de las competiciones si trabajo duro.	Lack of relationship with ability.	Puedo cambiar el resultado de las competiciones si doy lo mejor de mí.
Puedo dar lo mejor de mí en las competiciones.	There is a lack of consequence in the statement.	Si lo hago lo mejor que sé, tengo un buen resultado.
Tengo que esforzarme para mejorar mi rendimiento deportivo.	There is a lack of consequence in the statement.	Cuando me esfuerzo, las cosas en mi deporte salen bien.
Mejorar mi rendimiento deportivo es mi responsabilidad.	Doubts with the concept sports performance.	Que las cosas salgan bien en mi deporte, depende de mí.
Confío en mí mismo para rendir bien en una competición.	Difficulties with the performance concept.	Creo que soy capaz de hacer una buena competición.

Data analysis

The analysis techniques used have been: a) item by item descriptive analysis; b) reliability analysis of the subscales using Cronbach's alpha; c) confirmatory factor analysis; and d) correlation between the subscales with the SAS-2 scale (Ramis et al, 2010). The various confirmatory factor analysis were performed using the statistical package EQS 6.2 for Windows (Bentler and Wu, 2005).

In the confirmatory factor analysis two models were tested: M1) the items are indicators of a single factor of control locus without distinguishing between subscales; M2) the items are indicators of 2 first-order factors (internal and external locus) correlated with each other. Confirmatory models have been calculated using maximum likelihood with robust Satorra-Bentler corrections (Bentler, 1995). In order to evaluate its usefulness, we used IFC, RMSEA and the χ^2 test together with its degrees of freedom (Hoyle and Panter, 1995; Hu and Bentler, 1995, 1999; Marsh, Balla, and Hau, 1996; Kaplan, 2000).

For the treatment of missing data, it was used, since they constituted a percentage less than 5% of the total (Graham, 2009), the simple imputation replacing these by the average score of each person in that subscale.

RESULTS

First, in the exploratory phase, the first version of the questionnaire was administered. In addition to the qualitative analysis presented, descriptive data and exploratory factor analysis showed inadequate data. A principal axis factorization was performed with an oblimin rotation, assuming the relation between the factors. In spite of the impossibility of adding sums of squares of saturations to obtain a total variance, the explained variance of each factor was clearly insufficient (F1: 13.889; F2: 5.820) and the rotated matrix did not present the expected results, where two of the items did not reach the saturation limit of .300. Finally, internal consistency levels were also not adequate with α of .331 and .553.

In the second phase, after the modifications made to the items after the qualitative and quantitative results, item analysis and revision of the descriptive statistics were performed. Due to the low contribution to the reliability and low saturations of items 11 ("I'm more likely to win when I'm lucky") and 12 ("Things are going well in my sport, it's up to me"), Decides to eliminate them from the Spanish version of the scale, maintaining 5 items per dimension. The descriptive data of the 10 final items are presented in Table 3. The internal consistency of the internal dimension is $\alpha = .791$, while the external dimension has a somewhat lower internal consistency of $\alpha = .656$.

Table 3. Descriptive results and item analysis of the scale

Locus	Item	M	DT	Assymetry	Curtosis	I.H.	α if eliminated
Internal	2	6.22	1.255	-2.017	4.502	.543	.760
	4	6.34	1.281	-2.656	7.377	.579	.749
	6	6.05	1.236	-1.636	2.977	.631	.731
	8	6.18	1.255	-2.106	4.773	.649	.725
	10	6.19	1.232	-2.176	5.637	.449	.788
External	1	2.79	1.913	.762	-.606	.352	.630
	3	2.65	1.710	.920	.095	.433	.595
	5	3.58	2.067	.187	-1.267	.371	.624
	7	2.71	1.865	1.059	.131	.317	.645
	9	3.65	1.950	.120	-1.139	.590	.512

Confirmatory analysis has tested the two models described. The model that presents a clearly better fit is the M2 (2 factors) with a CFI = .970 and the RMSEA = .06, while the one-dimensional model presents CFI = .863 and RMSEA = .13, which behave as adjustment indices inadequate. The saturations of the two-dimensional model are between .502 and .818. The internal and external factors have an inverse correlation of $r = -.259$ ($p < .000$). The IFC (Composite Reliability Index) offers a value of .852 and the AVE (Average Variance Extracted) is .549, both values considered to be good.

Regarding the evidence of external validity, it has been verified through the correlations between the scales of control locus with the SAS-2 scores, an instrument of competitive infant anxiety. The internal control locus does not present correlations with somatic anxiety ($r = -0.50$, $p = .475$), nor with worry ($r = -0.38$, $p = .584$) or deconcentration ($r = -0.31$; $p = .655$), while the external control locus did present significant correlations with worry ($r = .186$; $p = .008$), but not with somatic anxiety ($r = -.130$, $p = .062$) or with deconcentration ($R = -.101$, $p = .149$).

DISCUSSION

The objective of the present study was to adapt and validate the CSLCS scale to Spanish, following the criteria established by Hambleton (2004) along the lines proposed by other adaptations in children's sports (Ramis et al, 2010). The results demonstrate that the Spanish version of the scale has adequate psychometric qualities to be used in research and applied practice in the measurement of the locus of control construct, with two factors: internal and external locus of control.

Adapting the scale has combined the qualitative and quantitative process. Firstly, after the translation of the items, it was considered a priority to consult the understanding of the questions to athletes between 8 and 16 years, through a broad cognitive process of data collection and interviews. In this way, some of the items proposed in the first place were modified or replaced to collect the specific characteristics of the Spanish sample of minor athletes. For example, in the English-speaking sample, the first item referred to the importance of equipment as an important aspect of the external control locus; however, after the cognitive interview process, the young Spanish athletes in this sample did

not consider this aspect as significant, and yet they emphasized the importance of the coach as a determining figure of the environment in the external control locus.

Regarding the original scale, the adaptation to Spanish carried out proposes the elimination of items 11 and 12 given its low contribution to reliability and low saturations. These results can be explained by the literature on the subject. Bleak and Frederick (1998) carried out an extensive study in which they showed that superstitious behaviors (such as carrying amulets, behavior referred to in CSLCS in Item 11) were not perceived by athletes as related to the result of the Competition and, therefore, with the locus of control; at least for the western population (Burger and Lynn, 2005). It seems that these superstitious behaviors are maintained by their direct and/or indirect protective effect against anxiety (Bleak & Frederick, 1998; Foster and Weigand, 2006; Lobmeyer and Wasserman, 1986; Schippers and Van Lange, 2006). Thus, the children participating in the study responded systematically to this item, providing little variability in their responses by dismissing their importance.

Regarding item 12, "Que las cosas vayan bien en mi deporte depende de mi", Rotter (1966) proposed a defensive factor to errors of the external locus of control in children, that is, in evaluating what they interpreted as failures children had an influence on actor-observer bias (Jones and Nisbett, 1971) with external causal attributions to failure and internal to success. It is possible that the formulation of this item was excessively broad for children, allowing each of them to focus their response on sport in general and not on a particular sporting outcome, thus making it possible for the actor-observer bias to influence their answers subtracting their reliability, by evaluating a perception possibly biased by their latest competitive results.

The relationship between control and external locus and anxiety is consistent with those found in previous research, since the external control locus of the subjects involved increased anxiety, evaluated in both the general population (Carden, Bryant and Moss, 2004; Watson, 1967), as well as in sportspeople (Arnaud and Codou, 2012; Polman, Rowcliffe, Borkoles, and Levy, 2007; Wong and Bridges, 1995). Specifically, the external control locus was found to correlate with concern, but not with somatic anxiety or deconcentration; this result is consistent with those obtained previously by Arnaud, Codou and Palazzolo (2012), Betts (1982) or Ntoumanis and Jones (1998), although these for adult population. Given this correlation, it is possible to state that the CSLCS shows sufficient evidence of external validity.

This paper presents some limitations that should be taken into account in the future. In the first place, the two samples used differ in size and in the representation of the different sports disciplines, being the second largest sample in the age range and most representative in terms of sports. Second, this paper presents evidence of external validity with a construct (precompetitive anxiety) that could have been completed with some measure of self-efficacy (Chase, 2001) or perception of support for autonomy (Lorenzo, 2016). These aspects, along with the evaluation of test-retest reliability, are possible lines of

the future. In the same way, in the future, the questionnaire should be validated in its conceptual structure through the use of structural equation models.

Regarding applicability, the Spanish validation of the CSLCS can facilitate future investigations regarding the influence of the child control locus in the sports context on sports performance, handling of coping strategies, the occurrence of injuries, etc.; relationships whose characteristics are known for adult but not for child sports. In addition, their use in the applied context will facilitate the design of interventions that help children to use a more adjusted to reality locus of control and, therefore, a more effective one. .

CONCLUSIONS

This paper presents the psychometric results of the adaptation to Spanish of the Children's Sport Locus of Control Scale (CSLCS) scale of Tsai and Hsieh (2015). The adaptation presents good adjustment indexes in its two-factor version, adequate internal consistency and evidence of external validity with the anxiety variable. Therefore, the Locus Control Scale for Children's Sport is a short instrument with sufficient evidence of validity and reliability to be used in sports contexts from 8 years of age to evaluate the locus of control.

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