

PHYSICAL SELF-CONCEPT IN PRIMARY EDUCATION. A PROPOSAL FOR A MEASUREMENT TOOL

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ABSTRACT

This research has two main goals: (a) setting up a valid and reliable tool under the form of a questionnaire to measure physical self-concept; and (b) checking the factor structure of that questionnaire "Physical Self on Primary Students" (PSPS) through a factor analysis. Accordingly, we drew up a tool consisting of 20 items that was delivered to 330 students during an initial pilot stage, and to 692 students during a second stage, all of them being 5th and 6th primary grade students. The results reveal the existence of a four dimensional mode, since the indexes found in the confirmatory factorial analysis show a reasonably suitable adjustment of the model. Thus, the GFI index provides values of .827 and .773 for the AGFI. At the same time, the χ^2 provides a value of 1043.64 ($P = .000$) with 104 degrees of freedom. The value of the IFC is .862, close to the subjective cut-off point to consider it a model of fair representation of the observed data. PSP-PS showed as a valid and reliable tool, easy to apply to primary students. It could contribute to detect, prevent and/or intervene in students with low self-esteem.

Key words: physical self-concept, questionnaire, primary school

EL AUTOCONCEPTO FÍSICO EN ALUMNOS DE EDUCACIÓN PRIMARIA: PROPUESTA DE UN INSTRUMENTO PARA SU MEDICIÓN

RESUMEN

Esta investigación tiene dos objetivos principales: (a) establecer una herramienta válida y confiable bajo la forma de un cuestionario para medir el autoconcepto físico; y (b) verificar la estructura de factores de este cuestionario "Autoconcepto Físico en Alumnos de Ed. Primaria" (AFAP) a través de un análisis factorial. Se elaboró una herramienta que constaba de 20 ítems que se entregó a 330 estudiantes durante un estudio piloto inicial y a 692 estudiantes en una segunda etapa, todos ellos de 5º y 6º de primaria. Los resultados revelan la existencia de un modelo de cuatro dimensiones, ya que los índices encontrados en el análisis factorial confirmatorio muestran un ajuste razonablemente adecuado del modelo, proporcionando un índice GFI con valores de .827 y para el AGFI .773. Al mismo tiempo, el χ^2 proporciona un valor de 1043.64 ($P = .000$) con 104 grados de libertad. El valor de la CFI es .862, cercano al punto de corte subjetivo que permite considerarlo un modelo de representación justa de los datos observados. El AFAP se mostró como una herramienta válida y fiable, fácil de aplicar a los estudiantes de primaria. Podría contribuir a detectar, prevenir y / o intervenir en estudiantes con baja autoestima.

Palabras clave: autoconcepto físico, cuestionario, educación primaria

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INTRODUCTION

In 1980s, the field of psychology first focused its attention on the physical domain of the self-concept and its conforming dimensions (Fox, 1997), recognising it as a main component of children and teenagers' self-esteem (Harter, 1998). Fox & Corbin (1989) specifically studied the content of the physical self-concept and developed a multidimensional and hierarchical model, consisting of three levels: apex level, domain level and subdomain level. The self-esteem is found in the apex level; the domain level includes the physical self-assessment, between the apex and subdomain levels; and the subdomain level comprises sports competence, attractive body, physical condition and physical strength (Atienza, Balaguer, Moreno, & Fox, 2004).

The physical self-concept is strongly linked to time and effort spent by people practising sports and physical activities (Biddle & Mutrie, 2001; Marsh, 2002). It is a key indicator of the time dedicated by children and teenagers to physical activity during their free time (Marhs, Trautwein, Lüdtkke, Köller, & Baumert, 2006). Moreover, it is considered a highly important psychological variable, which correlates exercise behaviour and physical activity and serves as a precedent for this behaviour (Sonstroem, 1998), as well as a main contributor to the global self-esteem perceptions in hierarchical and multidimensional self-esteem models (Fox, 2000). This important psychological structure is defined as an individual's self-concept in areas related to physical features, including strength, stamina, sports skill and physical appearance (Fox & Corbin, 1989).

The sports competence means the students' perceptions of sports and their athletic ability, their ability to learn new sports and acquire motor skills, and their level of confidence in the sports environment. The physical condition refers to the students' perceptions of their level of physical condition, stamina, ability to maintain exercise and their level of confidence in the physical condition and exercise settings. The attractive body comprises the students' feelings about the attractiveness of their bodies and the level of confidence in their own appearance. The physical strength means the students' perceptions of their strength, muscle development, and confidence in situations involving strength-demanding tasks.

In this regard, most of the studies indicate four subdomains: sports competence, physical condition, attractive body and strength (Asci, Asci, & Zorba, 1999; Hagger, Biddle, Chow, Stambulova, & Kavussanu, 2003). Several other researches reduce the structure to three factors: attractive body, strength and a third factor including the sports competence and physical condition subdomains (Atienza, et al., 2004, Biddle, Page, Ashford, Jennings, Brooke, & Fox, 1993). The basic structure proposed by the Fox & Corbin's model (1989) is

arguable, but several researches lead to consider the suitability of reviewing this model.

According to Esnaola and Revuelta (2009), by the end of 1980s and beginning of 1990s several tools were created to measure the physical self-concept, such as: the Self-Description Questionnaire (P-SDQ) by Marsh, Richards, Johnson, Roche, and Redmayne (1994); the Physical Self-Concept Scale (PSC) by Richards (1988); the Physical Self-Perception Profile (PSPP) by Fox and Corbin (1989); the Children Physical Self-Perception Profile (C-PSPP) and the Children and Youth Physical Self-Perception Profile (CY-PSPP) by Whitehead (1995); the Physical Self-Description Questionnaire (PSDQ) by Bracken, (1992); the AF5 by García and Musitu (2001); and the Physical Self-Concept (PSC) by Goñi, Ruiz de Azúa, and Rodríguez (2006). All these tools agree on including the physical ability and appearance dimensions. However, each of them also has further dimensions, such as competence, coordination or strength.

The tool P-SDQ proposed by Marsh, *et al.*, (1994) consists, therefore, of a nine-components structure: strength, body fat, physical activity, endurance, sports competence, coordination, health, physical appearance and flexibility.

Nonetheless, the most relevant measurement tool for the physical self-concept in the last years, that is, the Physical Self-Perception Profile (PSPP), shows a different and smaller structure including athletic competence, physical condition, attractive body and strength. Data obtained from several researches confirm the suitability of this model with North American college students, British teenagers, North American adult women and Spanish teenagers as participants in the studies (Goñi & Ruiz de Azúa, 2009). According to Whitehead (1995), in studies with 12-13 years old students, the factor analysis does not reflect this hypothesized four-factor model, since it saturated the items of several factors. This led him to adapt the model to child and youth populations (CY-PSPP), by keeping three original subscales (physical condition, attractive body and strength) and adding the subscale "sports competence", which was proposed by Harter (1982) and is similar to the corresponding item of the PSPP scale, already validated. Moreover, the C-PSPP included a global physical self-concept scale (Whitehead & Corbin, 1991) and a global self-esteem scale (Harter, 1982).

The exploratory factor analysis supported the concurrent validity of the C-PSPP. Further researches on the C-PSPP have shown mixed results. In particular, Biddle, *et al.*, (1993) developed a study with British children and teenagers to examine the psychometric properties of the C-PSPP. The exploratory factor analysis indicated six factors within the C-PSPP, instead of the hypothesized four-factor structure.

This is the line followed by Goñi, *et al.*, (2006) in their researches to develop the Self-Concept Questionnaire (PSQ) according to a four-factor structure model. However, with 10-14 years old students, the results of the factor analysis show that the items related to attractive body keep independent, while other variables usually get saturated in two or three factors. On the contrary, with 14-17 years old participants, the data accurately fit to the hypothesised four-dimensional structure.

This four-dimensional model is argued by several studies, whose data indicate the existence of a three-dimensional model that would more accurately explain the physical self-concept structure (Atienza, *et al.*, 2004), since it gathers in one factor all the items regarding physical condition and ability dimensions (Esnaola, Infante, & Zulaika, 2011).

Given these findings, that with samples of children under the age of 14 the dimensional structure of the physical self-concept does not match the theoretical models leading to this structure (Goñi & Ruiz de Azúa, 2009), the tools to be used (questionnaires) must be adapted to the target population of each study.

Since the tools used in these studies were adapted to students aged over 12 years old, the aim of this study, based on the above data, was creating and validating a multidimensional tool to assess the physical self-concept of Spanish speaking students in their last primary education grades, so it could be possible to establish which of the two structural models (four- or three-dimensional) best fits to a population consisting of students in these primary grades (11-12 years old). Specifically, this research pursues two aims:

1. Building a measurement questionnaire for the physical self-concept and analysing its reliability.
2. Checking the factor structure of the physical self-concept in primary students "*Physical Self on Primary Students*" (PSPS) through an exploratory factor analysis and then through a confirmatory factor analysis.

METHOD

Participants

The participants in the study were selected through a deliberate nonprobability sampling, so the subjects were chosen only if they met the features required for this research (Buendía, Colás, & Hernández, 1998). Two criteria were applied to the selection of schools: first, the interest for cooperation showed by the faculty of the selected courses; and second, the participation of the school in previous research projects. We chose the above-mentioned grades according to two reasons: first, these students have enough reading skills to allow a quick and collective delivery of the questionnaire, not

interfering with their classes; and second, these grades means the beginning of a transition (i.e., puberty), and physical changes are not so obvious at these ages (object of study) as in further stages.

It was also taken into account the number of participants needed to fulfil the statistics about the reliability and validity of the questionnaire. Following Morales (2011), there is no one ultimate criterion or rule about the number of subjects, so in this case we considered basic two main criteria: first, the ratio between subjects and variables (items), and second, the recommended minimum of subjects in absolute terms. Hence, one criterion to be considered was having, at least, twice the number of subjects than variables, and a sample size of 100 subjects as minimum (Kline, 1994), regardless of the reduced number of variables. A safe approach is securing 200 subjects as a minimum and 5 subjects per item.

In the initial pilot stage, 330 participants took part in the delivery of the pilot questionnaire, 256 of them were 5th primary grade students (74.2%) and 79 were 6th grade children (25.8%). Regarding sex, 159 were boys (48.2%) and 171 were girls (51.8%). These participants were not part of the sample when delivering the final questionnaire.

In the final stage, when delivering the final PSPS questionnaire, there were 692 participants, 328 men (47.5%) and 363 women (52.5%), distributed as follows: 434 were 5th primary grade students (62.7%) and 258 were 6th grade ones (37.3%).

Tool and process

The researching process aimed to create the questionnaire was structured in several stages (see Figure 1), following the guidelines by Carretero-Dios & Pérez (2005) and Morales (2011) about creation of scales and questionnaires.

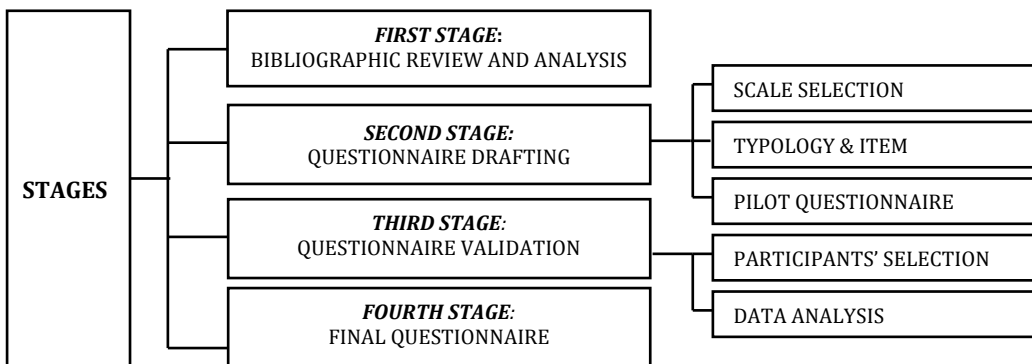


FIGURE 1: Stages of the researching process.

Once the construct of physical self-concept was clarified, a research and collection of the measurement tools used in the above-mentioned studies were carried out in the initial stage (Harter, 1985; Fox & Corbin, 1989; Musitu, García, & Gutiérrez, 1997; Granda, Canto, Ramírez, Barbero, & Alemany (1998); Granda, Alemany, & Canto, 2000; Gutiérrez, Moreno, & Sicilia, 1999; Goñi, Ruiz de Azúa, & Liberal, 2004; Moreno & Cervelló, 2005; Moreno, Moreno, & Cervelló, 2007; Moreno, Cervelló, Vera, & Ruiz, 2007; Hellín, 2007; Dieppa, Machargo, Luján & Guillén, 2008).

In the second stage an initial database of 100 items was collected. The matching items of all the questionnaires were analyzed and classified according to their dimensions.

Subsequently, 20 of the items collected in the database that included all the dimensions were chosen to design a questionnaire, which was not too long given the age of the sample.

Moreover, the language used in the questionnaire was adapted for primary school students; comparisons were used since the perception of relatives, friends and teachers play an important role in the self-concept in this stage: "my physical appearance is better than the physical appearance of my friends" (item 16) or "I am stronger than most people of my age" (item 12).

The students had to choose between four options according to their level of conformity with each one of the items of the questionnaire: from "I strongly disagree" (1) to "I strongly agree" (4), corresponding the highest punctuation of a positive self-concept with the positive items, and the opposite case with the negative items.

Once the questionnaire was developed, it was given to a group of students that was not part of the final sample in order to detect possible mistakes or difficulties.

Finally, it was designed a questionnaire which included the identification details and 20 items; all of them were positive statements except the items 13, 14, 18 and 20, which were negative statements.

In the third stage (see *results*) the questionnaire validity was determined through two phases: an initial stage or pilot study and a second phase in which the validity of the PSPS was analysed. In the pilot study the data were analyzed through an exploratory factor analysis, and the Physical Self-concept Questionnaire (PSQ), elaborated by Goñi, *et al.* (2004), was used as well. This questionnaire consists of 36 items which establish a convergent validity, though we only used 24 of these items related to the four dimensions of the Physical Self-concept: physical ability (5 items), physical condition (6 items), strength (7 items) and attractiveness (6 items).

In the second phase the validity of the PSPS questionnaire was determined in the final stage through a confirmatory factorial analysis.

Design and data analysis

The design is a correlational ex post facto study (León & Montero, 1998), since the study variables were not intentionally manipulated.

We used a statistical software SPSS, version 2.. Cronbach's alpha was applied to assess reliability. The questionnaire validity was determined analysing the data through an exploratory factor analysis and the correlations between total scores of the PSPS and PSQ.

A confirmatory factorial analysis was carried out to study the intern structure as it provides an appropriate statistical framework to evaluate the validity and the reliability of the items. The 16 items were gathered in a previous theoretic structure according to four dimensions: motor competence, motor ability, attractive body and physical condition. For this purpose, a multivariate regression analysis was carried out using LISREL 9.1. by means of the analysis of the covariance matrix of the observed variables.

RESULTS

Initial stage of the tool analysis (pilot study)

The analysis of the items is based on the mean, the standard deviation, the asymmetry, the kurtosis and the item-total correlation (Table 1) showed in this section. We also measured the reliability of the pilot questionnaire PSPS through the Cronbach's coefficient alpha of internal consistency ($\alpha = .836$ and corrected Cronbach's alpha = .841).

TABLE 1
Descriptive Values of Items in the PSPS Questionnaire.

#	Items	Mean	TD	Asymmetry	Kurtosis	Item-total correl.
1	I am one of the best in my Physical Education class	2.80	1.08	-.465	-1.014	.577
2	I learn new skills quickly	3.56	.662	-1.628	2.807	.502
3	I feel good doing sports	3.56	.587	-2.594	7.584	.343
4	I feel safe learning new skills	3.55	.668	-1.573	2.562	.349
5	I try hard to be the best in class	3.17	.804	-.840	.367	.442
6	The teacher considers me one of the best in my class	2.86	.969	-.475	-.740	.486
7	My friends think I am one of the best in my class	2.59	1.05	-.111	-1.193	.594
8	I am happy with my weight and height	3.29	.952	-1.190	.305	.430
9	My friends say I am good in sports	3.06	1.00	-.785	-.506	.479
10	All my classmates want me in their teams	2.87	1.08	-.555	-.986	.453
11	I have a good figure	3.24	.904	-1.111	.440	.442
12	My physical appearance is better than my friends'	2.55	.996	-.152	-1.021	.463
13	I am clumsy in Physical Education tasks	2.97	1.24	-.650	-1.288	.219
14	I am lazy when doing exercises	2.75	1.35	-.335	-1.731	.219
15	I am physically strong	2.93	1.02	-.727	-.566	.374
16	I am stronger than most people of my age	2.65	1.02	-.133	-1.089	.379
17	I have really good flexibility	2.77	1.04	-.343	-1.089	.406
18	I do not like Physical Education activities	2.98	1.28	-.677	-1.335	.247
19	I am skilful in sports	3.07	1.11	-.921	-.570	.328
20	I am usually the last choice when making teams	2.82	1.17	-.424	-1.339	.229

The indices of homogeneity, measured through the item-total correlation, vary between .30 and .6. When reanalysing the 16-item questionnaire, both the indices of homogeneity and the Cronbach's alpha had improved ($\alpha = .848$ y $\alpha_{corrected} = .851$). To check that the tool really measures the physical self-concept, we applied the criterion validity, using a correlation with another tool. In this study, we correlated the total score of the PSPSP with the PSQ by Goñi, *et al.*, (2004). This correlation was $r_{xy} = .541$, significant at level 0.01.

Moreover, Pearson product-moment correlations were used to know the convergent validity between the total score and the PSPS and the PSQ by Goñi (Table 2); the correlation was significant at the .01 level. The divergent validity of the tool was determined through the correlation between the total scale score and the subscales of the PSPS with the PSQ and its different dimensions; all these tests were significant at the .01 level.

TABLE 2
Correlation of the total score and the subscales between the PSQ (Goñi et al., 2004) and PSPS questionnaires.

		PSQ	PSQ P. ability	PSQ PC	PSQ A	PSQ Strength	PSQ AFG	PSQ AG	PSPS Compt.	PSPS PH	PSPS AB	PSPS Cond.	PSPS
PSQ	Pearson correlation	1	.851(**)	.803(**)	.863(**)	.595(**)	.844(**)	.778(**)	.390(**)	.255(**)	.323(**)	.548(**)	.517(**)
	Sig. (bilateral)		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
PSQ P. ability	Pearson correlation		1	.708(**)	.687(**)	.408(**)	.709(**)	.564(**)	.362(**)	.239(**)	.289(**)	.594(**)	.488(**)
	Sig. (bilateral)			.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
PSQ P. Condition	Pearson correlation			1	.639(**)	.554(**)	.566(**)	.510(**)	.404(**)	.374(**)	.366(**)	.520(**)	.557(**)
	Sig. (bilateral)				.000	.000	.000	.000	.000	.000	.000	.000	.000
PSQ Attractiveness	Pearson correlation				1	.394(**)	.749(**)	.676(**)	.263(**)	.225(**)	.357(**)	.513(**)	.447(**)
	Sig. (bilateral)					.000	.000	.000	.000	.000	.000	.000	.000
PSQ Strength	Pearson correlation					1	.281(**)	.328(**)	.412(**)	.254(**)	.185(**)	.297(**)	.452(**)
	Sig. (bilateral)						.000	.000	.000	.000	.003	.000	.000
PSQ AFG	Pearson correlation						1	.717(**)	.190(**)	.253(**)	.269(**)	.439(**)	.344(**)
	Sig. (bilateral)							.000	.003	.000	.000	.000	.000
PSQ AG	Pearson correlation							1	.264(**)	.222(**)	.195(**)	.330(**)	.339(**)
	Sig. (bilateral)								.000	.000	.002	.000	.000
PSPS Competence	Pearson correlation								1	.386(**)	.476(**)	.355(**)	.880(**)
	Sig. (bilateral)									.000	.000	.000	.000
PSPS P. Ability	Pearson correlation									1	.388(**)	.304(**)	.583(**)
	Sig. (bilateral)										.000	.000	.000
PSPS Attractive body	Pearson correlation										1	.332(**)	.714(**)
	Sig. (bilateral)											.000	.000
PSPS Condition	Pearson correlation											1	.647(**)
	Sig. (bilateral)												.000
PSPS	Pearson correlation												1
	Sig. (bilateral)												

Finally, we developed an exploratory factor analysis (EFA) aiming to know how the items gather in factors. Nevertheless, with the purpose of securing that they fit a factor analysis model, the data were subjected to the Kaiser, Meyer and Olkin's test ($KMO = .835$) and the Barlett's test of sphericity ($c^2 = 1361.41$; $gl = 120$; $p = .00$); the results allow the use of a factor analysis as the appropriate technique to explain the information of this matrix. According to the exploratory factor analysis, there are four clearly defined factors or dimensions, which explain 58.51% of the total variance (an acceptable proportion).

The item communality is above .30 ($h^2 = .40$) in every case. In the PSPS, the item communalities vary between "I try hard to be the best of my class" (.403) and "I am happy with my weight and height" (.714); the item "I have really good flexibility" (.381) had the lowest factorial weight, above .30 though, so we decided not to delete it.

Table 3 shows the factors, items and variable-factor correlations and reliability, as well as the explanation of those factors. The factor loadings were used to determine the dimensions, since they are the medium to explain the function of every variable defining each factor. Following Kline (1994), we considered the value .30, and from this criterion, we used the quantitative information (number of items defining the tool and factorial saturation) and the qualitative information (item formulation and content) to explain and value the factors that discover the internal structure of the tool. Moreover, to consider a factor well defined, it must include at least three variables in their highest weights (Kim & Mueller, 1978; Costello & Osborne, 2005; Morales, 2011).

TABLE 3
Factors, Items and Weights Obtained in the Exploratory Factor Analysis of the PSPS.

FACTOR & FACTORIAL WEIGHT	ITEM #	ITEMS	WEIGH T	CRONBACH' S ALPHA
MOTOR COMPETENCE: Students' perception of their motor qualities, taking into account the positive opinions of people significant for them.				
FACTOR 1 2.47%	7	My friends think I am one of the best	.795	.821
	6	The teacher considers me one of the best	.685	
	16	My physical appearance is better than my friends'	.655	
	9	My friends tell me I am good in sports	.642	
	12	I am stronger than most people in my age	.633	
	10	All my schoolmates want me for their teams	.596	
	5	I try hard to be the best in class	.458	
MOTOR ABILITY: Students' perception of their skills to acquire sports abilities, self-confidence and willingness towards physical activity.				
FACTOR 2 13.13%	4	I feel safe learning new skills	.778	.676
	3	I feel good doings sports	.770	
	2	I learn new skills quickly	.655	
ATTRACTIVE BODY: Positive opinions about one's physical appearance and satisfaction with one's own body image.				
FACTOR 3 12.16%	8	I am happy with my weight and height	.823	.646
	11	I have a good figure	.795	
	17	I have really good flexibility	.443	
PHYSICAL CONDITION: Students' perception of their sports ability and their strength				
FACTOR 4 12.08%	19	I am skilful in sports	.798	.731
	15	I am physically strong	.796	
	1	I am one of the best in my Physical Education class	.674	

The Cronbach's alpha reliability indices of the first and four factors are appropriate (above .70); factors 2 and 3 show the lowest indices (above .65), with values that can be considered satisfactory according to Castillo and Balaguer (2001). The results of analysing the item-factor correlations indicate that each of them are above .45, so it was considered unnecessary to delete any further item of the questionnaire.

Later, the interfactorial correlations were analysed, as well as the correlations between each factor and the total; the results were significant in every case ($p = .000$). According to the data, the highest correlation is between factor 1 "Motor Competence" and total score $r_{F1, Tt} = .887$, and the lowest is between factor 2 "Physical Ability" and total score $r_{F2, Tt} = .607$ (see Table 4).

TABLE 4
Descriptive Statistics and Matrix of Bivariate Correlations of Subscales.

FACTORS	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	PSPS
FACTOR 1	1	.415**	.479**	.533**	.887**
		.000	.000	.000	.000
FACTOR 2	--	1	.379**	.380**	.607**
			.000	.000	.000
FACTOR 3	--	--	--	.591**	.706**
				.000	.000
FACTOR 4	--	--	--	1	.767**
					.000

** $p < .001$ F1: Motor competence; F2: Physical ability; F3: Attractive body; F4: Physical condition.

Final stage of the tool analysis

After analyzing the questionnaire of the pilot sample, the final version of the questionnaire (PSPS-2) with 16 elements was delivered to 692 students of 5th and 6th primary grade: 328 boys (47.4%) and 363 girls (52.5%). The Cronbach's alpha of the questionnaire is .858, and the item-total correlation ranges between .331 and .616.

A confirmatory factor analysis was carried out to determine the factorial validity using *a priori* model of the structure of the questionnaire applied in the pilot sample based on both theoretical reasons and in the exploratory factorial. Therefore, a four-factor model with ascriptions of items based on the pilot study came up. This structure is *a priori*, which means that the model results are confirmatory.

The results show reasonably suitable indexes of adjustment of the proposed model. Thus, the GFI index provides values of .827 and .773 for the AGFI. At the same time, the χ^2 provides a value of 1043.64 ($P = .000$) with 104 degrees of freedom. The value of the IFC is .862, close to the subjective cut-off point to consider it a model of fair representation of the observed data. Finally,

the RMSEA evaluates it as a good-fitting model, and the value of its index is .114. According to all these indexes (Figure 2), we conclude that the proposed model presents a reasonable approximation to the data.

The valuation of the factor loadings for each of the items on their respective factors after an analytical review of the factorial structure proposed are shown in Figure 2. In relation to standardized factor loadings on the first factor, all items are well explained from the hypothesised construct; the saturation ranges between .494 and .787, being the item 14 the one with the lowest saturation. The second factor reveals moderate factor loadings, ranging from .324 in the item 3 to .454 in the item 2. The factor loadings in the factor 3 are more elevated than in the factor 2, which ranges from .414 to .679. Finally, the factor 4 presents factor loadings above .5.

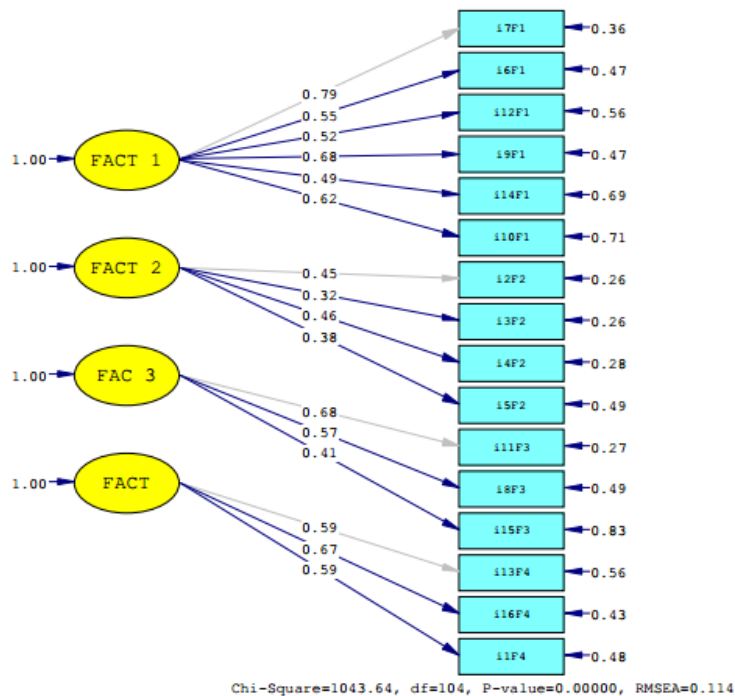


FIGURE 2: Confirmatory factorial analysis of the PSPS.

Meanwhile, Table 5 provides the estimated correlation between the four factors of the scale. The correlation between all these factors with each other is statistically significant ($p < .001$). The values of the correlations range from .350 to .888. The highest correlation is obtained between the factor 1 (Motor Competence) and the total score of questionnaire. This relationship has been statistically significant ($p < .001$) and provides a high score.

TABLE 5
Correlation between the PSPS-2 factors.

		F1	F2	F3	F4	AFAP
F1	Correlación de Pearson	1	.361(**)	.486(**)	.512(**)	.888(**)
	Sig. (bilateral)		.000	.000	.000	.000
F2	Correlación de Pearson	.361(**)	1	.419(**)	.350(**)	.605(**)
	Sig. (bilateral)	.000		.000	.000	.000
F3	Correlación de Pearson	.486(**)	.419(**)	1	.387(**)	.714(**)
	Sig. (bilateral)	.000	.000		.000	.000
F4	Correlación de Pearson	.512(**)	.350(**)	.387(**)	1	.739(**)
	Sig. (bilateral)	.000	.000	.000		.000
AFAP	Correlación de Pearson	.888(**)	.605(**)	.714(**)	.739(**)	1
	Sig. (bilateral)	.000	.000	.000	.000	

** Correlation is significant at a ,01 level (bilateral)

The internal consistency of all the factors was calculated with the alpha coefficient. The factor with the highest intern consistency was the Motor Competence with an alpha coefficient of .801. The other factors range between .698 of the Physical Condition (factor 4) to .605 of Attractiveness, which is the one with presents the lowest intern consistency.

The correlations of each factor with their respective items were analysed to complete the information. The values of the Motor Competence factor range between .418 and .501. At the same time, the values of the Attractiveness (factor 3), range between .290 and .481, being the item 5 the one with the lowest correlation.

DISCUSSION

This article aimed to analyse the psychometric qualities of the PSPS as a measurement tool for the physical self-concept in a sample with primary education students from the Autonomous City of Melilla. After the corresponding analyses, the results show that both the internal consistency and the factor structure of the PSPS-2 questionnaire are highly acceptable and guarantee the appropriateness of the PSPS-2 as a measurement tool for the physical self-concept in 5th and 6th primary grade students. Moreover, it is to be expected that the psychometric features improve as the number of subjects fulfilling the questionnaire increases (Goñi, *et al.*, 2004). Nevertheless, the validation of this questionnaire is a slow and progressive process, so the tool must be applied to other samples in different environments (Tomás & Oliver, 2004).

The reliability level shown by the questionnaire is highly acceptable, as well as the level shown by the factors conforming it; the first and fourth factors are appropriate (above .70), while factors 2 and 3 show the lowest rates

above .60), within the acceptable limits though, according to Castillo and Balaguer (2001).

An analysis of the PSPS results makes clear that the reliability increases when deleting items 13, 14, 18 and 20, since their item-total correlations are below .30; all of them were formulated as inverse sentences. It confirms the idea that questionnaires delivered to primary education children should be formulated using short, clear and positive questions, aiming to avoid wrong interpretations that negatively affect the understanding and reliability of the questionnaire.

According to the exploratory factor analysis, all 16 items making up the final questionnaire coincide on four factors: motor competence, motor skill, attractive body and physical condition. These factors match, among others, the four factors found by Bracken (1992) (physical competence, physical appearance, physical fitness and health). Marsh, *et al.*, (1994) also analyse nine subscales: strength, body fat, physical activity, endurance, sports competence (skill), co-ordination, health, appearance and flexibility. Moreover, Fox (1997) considered four dimensions that constitute the physical self-concept: physical ability, physical fitness, attractiveness and strength. Along the same lines, the researches by Goñi *et al.*, (2004) found four dimensions in the Physical Self-Concept Questionnaire (PSQ): ability, condition, attractiveness and strength.

The “motor competence” factor refers to the set of knowledge, proceedings, attitudes and feelings participating in all subject’s interactions in his/her environment and with other people, and allowing the students to successfully overcome any motor problem not only during Physical Education classes, but also in their everyday life (Ruiz, 1995). The score showed by this factor is higher in boys than girls.

The “physical condition” is one’s psychophysical performance ability in a given moment. It shows itself as the strength, speed, endurance and flexibility skills, and it gets influence from the energetic process of the body and the specific psychic features of the purpose assigned to this condition (Martín, Carl, & Lennertz, 2001)

Regarding the “motor ability” factor, it is defined as one’s acquired skill to perform a given task. It is the ability to solve a specific motor problem, to conceive and give an efficient and economic answer, aiming to a precise target. This is the result of a learning process, usually a long one, which depends on the subject’s own resources, that is, one’s abilities to translate personal skills into answers (Durand, 1988:123).

The “attractive body” factor corresponds to one’s own physical appearance perception, as well as the satisfaction generated by one’s appearance when compared with others’ (Fernández, Grandmontagne, & Fernández, 2012).

The factor structure of the PSPS-2 partly meets the four-factor structure model by Fox and Corbin (1989). They detect four dimensions: sports competence, physical attractiveness, strength and physical condition. The PSQ (Goñi, *et al.*, 2004), adapted to preadolescents and adolescents (12-16 years-old), also shows the same factor structure proposed by the above-mentioned authors.

The analysis of the factors composing the PSPS confirms moreover that factor 1, "motor competence", measures the students' perception of their motor qualities, taking into account the opinion of those people important to them. These results meet the idea by Goñi and Fernández (2009) arguing the relevance of the recognition of others for the self-concept development during early stages, until reaching 10-12 years old.

Following the analysis of the correlation between the PSPS and the PSQ, the data confirm that the results of both questionnaires show a significant correlation ($r_{xy} = .616$; $p = .000$), thus denoting a suitable concurrent validity.

In conclusion, and given those results, the PSPS-2 have the following advantages: first, it is easy to deliver by Physical Education primary teachers, given the reduced number of items, but also the clear and simple formulation of sentences. Second, the PSPS-2 helps these teachers to avoid/intervene from the beginning of the year, since preadolescence is a crucial time for an appropriate development of the self-concept, which is based on previous perceptions (González & Tourón, 1992) and is related to the intent of being physically active (Moreno, Moreno, & Cervelló, 2013).

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