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The Multidimensional Structure of Physical Self-Concept

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The present study aims to analyze the dimensionality of physical self-concept through confirmatory factor analysis of the AFI questionnaire (Esnaola, 2005; Esnaola & Goñi, 2006) and to compare two models: a) a quadri-dimensional model in which physical self-concept is made up of the sub-domains *ability*, *condition*, *attractiveness* and *strength,* and, b) a three-factor model in which the items corresponding to *ability* and *condition* are grouped together as one factor. The sample consists of 1,259 participants ranging in age from 12 to 84 years old (700 women and 556 men) who were divided into four groups as a function of age: 627 adolescents (12-18 years old), 272 young people (19-30 years old), 248 middle-aged adults (31-49 years old) and 112 people over 55, all living in the Basque Autonomous Region of Spain. The results indicate that the quadri-dimensional model of physical self-concept fits the data better than the three-dimensional model (which showed poor goodness of fit) for the study's total sample, as well as within the male and female sub-samples. Furthermore, the four-factor model was found to be stable throughout adolescence, youth and middle-age, but not for the group of adults over 55.
Keywords: physical self-concept, self-perception, dimensionality.

Este estudio trata de analizar la dimensionalidad del autoconcepto físico mediante el análisis factorial confirmatorio del cuestionario AFI (Esnaola, 2005; Esnaola y Goñi, 2006) comparando dos modelos: a) un modelo cuatridimensional en el que el autoconcepto físico se compone de los subdominios de *habilidad, condición, atractivo* y *fuerza*; y, b) un modelo de tres factores en el que los ítems de *habilidad* y *condición* se agrupan en un factor. La muestra está compuesta por 1259 participantes entre los 12 y 84 años (700 mujeres y 556 varones) divididos en cuatro grupos en función de su edad: 627 adolescentes (12-18 años), 272 jóvenes (19-30 años), 248 adultos (31-49 años) y 112 personas mayores de 55 años de la Comunidad Autónoma del País Vasco. Los resultados indican que el modelo cuatridimensional del autoconcepto físico se ajusta mejor que el modelo de tres factores (que no se ajusta bien) a los datos de la muestra total del estudio, así como en las submuestras masculina y femenina. Por otro lado, el modelo de cuatro factores se muestra estable en la adolescencia, juventud y edad adulta, pero no así en el grupo de personas mayores de 55 años.
Palabras clave: autoconcepto físico, autopercepción, dimensionalidad.

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Ever since the 1990's and to this day, the field of Psychology has paid considerable attention to the notion of *physical self-concept* (Fox, 1997; Goñi, 2008). This is a direct result of the widely accepted, hierarchical and multidimensional view of self-concept that began in the 70's, and particularly, what Shavelson, Hubner and Stanton (1976) proposed. Physical self-concept, those authors believe, is one of the main domains of overall self-concept, together with the academic, personal and social domains. According to an early outline of this concept, it includes at least two sub-domains: *physical ability* and *physical appearance* (Marsh & Shavelson, 1985). Nowadays, there is general agreement that physical self-perceptions include many more than those two sub-domains and several new models have been created (Esnaola, Goñi, & Madariaga, 2008; Infante & Goñi, 2009); they are described below.

Two such models stand out in particular. The first, by Marsh, Richards, Johnson, Roche and Redmayne (1994), was the basis for creating the Physical Self-Description Questionnaire (P-SDQ), which consists of nine components: *strength, body fat, physical activity, endurance, sports competence, coordination, health, appearance* and *flexibility*. The other, on which Fox and Corbin's (1989) Physical Self-Perception Profile (PSPP) is based, conceives of four sub-domains of physical self-concept: *sport competence*, *attractive body, strength* and *physical condition*. With an affinity for the second model, the Cuestionario de Autoconcepto Físico (CAF, Physical Self-concept Questionnaire in Spanish) by Goñi, Ruiz de Azúa and Rodríguez (2006) and the Autokontzeptu Fisikoaren Itaunketa (AFI, Physical Self-concept Questionnaire in Euskera, Basque language) by Esnaola (2005) and Esnaola and Goñi (2006) were developed.

It is important to consider that the PSPP is the instrument most widely used to measure this construct. Many studies have been dedicated to analyzing its psychometric properties and have largely confirmed the hypothesized factor structure of physical self-concept consisting of four sub-domains (Asci, Asci, & Zorba, 1999; Hagger, Biddle, Chow, Stambulova, & Kavussanu, 2003; McAuley, Mihalko, & Bane, 1997; Page, Ashford, Fox, & Biddle, 1993; Sonstroem, Speliotis, & Fava, 1992). Then again, overlap between items from the scales of *physical self-evaluation* and *attractive body* has often been detected (Sonstroem et al., 1992) when performing a factor analysis including items from the specific scales as well as the physical self-evaluation scale. One way to avoid this inconvenience is to follow the recommendation of Fox and Corbin (1989) and exclude responses to items on the general scale from the factor rotation, assuming there is a mediating variable between the physical sub-domains and *self-esteem*.

Factor analyses of participants' responses to the 24 items on the PSPP, which comprise its four sub-scales, corroborate the quadri-dimensional structure here proposed in adolescent (Hagger et al., 2003), college-age (Asci et al., 1999; Page et al., 1993) and middle-aged samples (McAuley et al., 1997; Sonstroem et al., 1992). This has allowed us to conclude that the four sub-scales of the PSPP measure different aspects of physical self-perception at these different ages. It is important to highlight, however, that rather frequently studies have detected a tendency for the dimensions *physical condition* and *sport competence* to overlap such that their data fit the model with three sub-domains better. In this model, though the dimensions *strength* and *attractive body* respond well to factor differentiation, there is less empirical evidence to support the continued defense that perceptions of *physical condition* and *sport competence* constitute independent factors. This has occurred in studies of adolescents, men and women (Atienza, Balaguer, Moreno, & Fox, 2004; Moreno, 1997), adults (Fonseca & Fox, 2002; Van de Vliet et al., 2002), and people over 60 (McAuley et al., 2005).

Along that vein, the pioneering study by Chase (1991) confirmed that the PSPP does not exhibit good fit to the physical self-perceptions of adults, so that author created the Physical Self-Perception Profile for Adults (PSPP-A). It was initially proposed to include nine dimensions: *appearance, health/disease, functional capacity, active living, sports, health/wellness,* and *fitness/conditioning*. Testing this initial model led to the exclusion of the *health/wellness* component on the basis that it does not explicitly correspond to physical self-concept. Confirmatory factor analyses ultimately yielded four different sub-domains: *sport competence, appearance, health/disease,* and *functional capacity*. Shaw, Ebbeck and Snow (2000), in a sample of Caucasian women between 50 and 75 years old, validated this classification.

This bears a certain similarity to the version for children, the Children's Physical Self-Perception Profile (C-PSPP). Some authors assert that its factor structure for adolescents includes four factors (Hagger, Ashford, & Stambulova, 1997; Welk, Corbin, & Lewis, 1995; Whitehead, 1995), while the findings of another study (Biddle et al., 1993) of British children 12-15 years old, for example, only partially support a four-part structure. In that study, the authors obtained more than four factors and the scales of *sport competence* and *physical condition* overlapped into a single factor.

The CAF (Cuestionario de Autoconcepto Físico/ Physical Self-concept Questionnaire) by Goñi et al. (2006), originally created in Spanish, denotes certain influences from the PSPP, while in other ways clearly departing from it. When applied to subjects 14-23 years of age, exploratory factor analyses indicated the tetra-dimensional structure showed goodness of fit to the data and the four components were found to be *ability, condition, attractiveness* and *strength*. On the other hand, when it

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was later applied (Goñi, 2008) to people 23-80 years old, this structure was only confirmed for participants 23-34 years of age. For the rest, the results of factor analysis did not corroborate the four-part structure of the theoretical model of physical self-concept that initially inspired the CAF's construction.

Also related to Fox and Corbin's (1989) model as well as the CAF, the AFI (Autokontzeptu Fisikoaren Itaunketa/ Physical Self-concept Questionnaire) was created in Euskera (Esnaola, 2005; Esnaola & Goñi, 2006) to assess physical self-concept. Exploratory factor analysis identified four factors, supporting the hypothesized quadri-dimensional structure when looking at the total sample with all ages together (12 – 84 years old). Nevertheless, when the sample was divided into men and women, the women's results suggested a three-factor structure due to the fact that the items from *physical ability* and *physical condition* overlapped into a single factor.

In light of the results of previous research that has tested the tetra-dimensional model of physical self-concept through a variety of instruments (PSPP, CAF, AFI) and through confirmatory analysis, it is apparent that the four-part model has not been sufficiently, empirically corroborated. Some authors have suggested (Atienza et al., 2004; Fonseca & Fox, 2002; McAuley et al., 2005; Moreno, 1997; Van de Vliet et al., 2002) it would be convenient to group the sub-domains *physical ability* and *physical condition* into a single factor, which would leave us with a structure of physical self-concept comprised of three sub-domains.

The purpose of the present study is to establish through confirmatory factor analysis which of the two models (originally proposed, tetra-dimensional model or the corrected model with three factors that integrates *ability* and *condition* into one factor) has the best goodness of fit to the data.

Methods

Participants

This study's sample is comprised of 1,256 participants between 12 and 84 years of age (700 women and 556 men) from the Basque Autonomous Region of Spain; all are middle-class. We employed a stratified random sampling technique, dividing them into four age groups: adolescence (12-18 years old), youth (19-30), middle-age (31-49) and people over 55 years of age. These were the ages chosen to determine participants' inclusion in each group, but we recognize these cut-off ages are questionable; we will go on to explain this further in the conclusions section of this paper. In the adolescent group, 12 to 18 years old (n = 627), questionnaires were administered in three public schools (one in Fuenterrabia and two in Irún) and three private schools (two in Vitoria and one in San Sebastián) within Spain's Secondary Education system. The young portion of the sample, between 19 and 30 years old (n = 272), are mostly students at the University of Basque Country (from the Education program and the departments of Philosophy and Pedagogical Sciences, Psychology, Business, Computer Science, Law and Physical Education). As for the middle-aged sample, defined as 31-49 years old (n = 248), and the one for people over 55 (n = 112), we found participants by getting in contact with civic centers and organizations offering athletic clubs and classes, crafts, etc. The distribution of participants is displayed in Table 1.

Instruments

Autokontzeptu Fisikoaren Itaunketa (AFI; Esnaola, 2005; Esnaola & Goñi, 2006). This questionnaire, in Basque language, was recently created to measure physical self-concept based on Fox's (1988) quadri-dimensional

Table 1
Participants

		Adolescence	Youth	Middle Age	> 55 Years Old	TOTAL
N		627 (49.8%)	272 (21.6%)	248 (19.7%)	112 (8.9%)	1.259
Age	Range	12.1-18.5	19.4-30.7	31.3-49.7	55.1-86.2	12.1-84.2
	M	15.33	22.50	39.88	67.13	26.32
	S.D.	1.78	2.40	3.75	7.45	16.07
Sex	Women	327 (26%)	151 (12%)	152 (12.1%)	72 (5.7%)	702 (55.8%)
	Men	300 (23.8%)	121 (9.8%)	96 (7.6%)	40 (3.2%)	557 (44.2%)

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Table 2
Sample items from the AFI

		False	Almost Always False	Sometimes True/ False	Almost Always True	True
1	I do not possess the qualities needed to play sports					
2	I can run and exercise for a long time without getting tired					
3	I feel insecure about my physical appearance					
4	I am strong					
5	In general, I feel physically well					
6	I feel unhappy with myself					

model, which posits that physical self-concept has the following four sub-domains: *sport competence, physical condition, attractiveness* and *strength*. The AFI includes a total of 30 items, 5 for each of its 6 component scales: *physical ability* (sport competence, to Fox), *physical condition, attractiveness, strength, general physical self-concept* and *general self-concept*. Clearly, in addition to the four scales that measure the sub-domains of physical self-concept, two higher-order scales were added: *general physical self-concept* (although some questionnaires leave this out, assuming that the mean score of the subscales offers its own measure of general physical self-concept) and a scale of *general self-concept*; this provides us with a complementary measure of this construct, which may be very informative. The response format is a five-level Likert scale where 1 signifies *False* and 5 *True* such that the greater the score, the higher the level of self-concept. Scores on each scale range from 5 to 25 points. As for the questionnaire's psychometric properties, note that Cronbach's alpha was used to measure internal consistency, yielding satisfactory results ranging from .73 for the *general physical self-concept* scale for male participants, to .83 for the *strength* scale, also for male participants. Table 2 displays some examples of items on the AFI.

Procedure

The authors of this study administered questionnaires collectively after speaking with the directors of the various centers and groups and asking for their collaboration. Those directors sought parental permission for all minors who wished to participate and were in no case denied it. Above all, before participants completed their questionnaires, we emphasized the confidentiality of their results and that participation in the study is voluntary. Subsequently, the characteristics of the study were explained to them so as to clear up any doubt they may have had. Participants did not, however, know the study's goal (single blind) so as to avoid insincere responses and to reduce the social desirability effect as much as possible. As questionnaires were collected, we made sure they had been completed properly.

Statistical Analyses

Confirmatory factor analysis was performed using a maximum likelihood estimation program called LISREL 8.3 (Jöreskog & Sörbon, 1993) and methods to estimate parameters by maximum likelihood. This method of estimation is often used in factor analysis and structural equation modeling and assumes the multivariate data set is normally distributed. Also relevant is the fact that Tomás and Oliver (2004) have suggested items that measure self-esteem are usually found to be asymmetrical and negative in samples of the general population. With respect to our data, the scales did not meet the assumptions of univariate and multivariate normal distribution. However, using this method of estimation (ML) is usually not objectionable even when the data do not meet these assumptions. The results of simulation studies have shown that the method of maximum likelihood estimation is reasonably robust in the context of structural equation modeling even in the absence of multivariate normal distribution (Browne, 1984; Hu, Bentler, & Kano, 1992; West, Fintch, & Curran, 1995); for that reason, we decided to use it here.

We assessed the validity of two models: a) one corresponding to the original model hypothesizing four factors and, b) another comprised of three factors in which the items from the sub-domains *physical ability* and *physical condition* are grouped together. These models were compared in terms of the total sample as well as the sub-samples determined by age and sex. The two higher-order scales (general physical self-concept and general self-concept) were not taken into account because the objective in this case was specifically to analyze the dimensionality of physical self-concept.

The matrix of covariances was used as the input for data analysis. Each model's goodness of fit was evaluated through a combination of absolute and relative indices of goodness of fit. Many indices can be used, but none alone is sufficient to determine whether or not a model fits the data. The combination most often used in this day and age is the following: χ^2, RMSEA, ECVI, SRMR, GFI and CFI; this set

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Table 3
Indexes of Goodness of Fit as a Function of Age

Model		χ^2/df	GFI	IFI	CFI	RMSEA	SRMR	ECVI
M_3 (total sample)		1,879.04/167= 11.25	.87	.96	.96	.090	.057	1.56
M_4 (total sample)		1,273.11/164= 7.76	.91	.97	.97	.073	.054	1.09
$\Delta M_4 - M_3$		605.93/3						
	Adolescence	558.25 (31.63%)	.91				.057	
	Youth	423.82 (24.01%)	.86				.062	
	Middle Age	414.58 (23.49%)	.85				.064	
	> 55 Years Old	368.52 (20.88%)	.75				.086	
M_4	General	1,837.68/656		.97	.97	.076		1.76
	Adolescence	558.82 (31.51%)	.91				.056	
	Youth	423.82 (23.90%)	.86				.062	
M_4	Middle Age	414.58 (23.38%)	.85				.064	
	> 55 Years Old	375.99 (21.20%)	.74				.088	
Equal Weights	General	1,853.86/661		.97	.97	.076		1.77
$\Delta M_4 - M_{4\text{equal weights}}$		16.18 / 5						

Note. χ^2/df = ratio between chi-squared and degrees of freedom; GFI = Goodness of Fit Index; IFI = Incremental Fit Index; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Square Residual; ECVI = Expected Cross-validation Index.

should be adequate to reach a decision about the model's goodness of fit (Boomsna, 2000; McDonald & Ho, 2002).

Results

Table 3 displays the indices used to analyze the models' goodness of fit.

As Table 3 depicts, an analysis of the total sample yielded results indicating acceptable indices for the four-factor model, but not for the three-factor model. RMSEA was .073 (between .05-.08 is considered acceptable) and GFI, IFI and CFI were all over .90, which is also considered acceptable. However, the best index of fit for CFA (confirmatory factor analysis) models is χ^2/df and that did not yield an adequate index given that it clearly exceeds the values considered acceptable (2.00-3.00 or less). That being said, this index is rarely used as the only, or conclusive test of a model's goodness of fit because its value is influenced by sample size. In light of this and considering the rest of the indices, we are able to report that the four-factor model presented acceptable indices.

Next, to determine whether or not the differences between the two models were significant, we calculated the difference between each model's value of chi-squared and each model's degrees of freedom. The differential (a chi-squared of 605.93 and 3 *df*) between the four-factor and the three-factor models was found to be statistically significant. In other words, when looking at the total sample's results, the four-factor model fits the data significantly better than the three-factor one. In addition, other tests and comparisons of indices of fit, though they were not found to be of statistical significance, do indicate the existence of important differences. Cheung and Rensvold (2002) proposed that when comparing two models, the Bentler Comparative Fit Index (CFI) can be used to test the significance of change. They recommend that any change greater than .01 be considered important and comparable to a statistically significant difference. In this case, the increase was, $CFI_{M3 - M4} = .01$. Another index we can employ to compare the two models is RMSEA. The 90 % confidence interval of RMSEA for the four-factor model is .070 - .077. The three-factor model's RMSEA, on the other hand, falls outside that interval, indicating statistically significant differences between the two models.

After confirming that the four-factor model fits the data better than the three-factor model, we proceeded to do a configural analysis to establish whether or not the four-factor model is stable across different age groups: adolescence, youth, middle age, and people over 55 years old. The model, on the whole, shows good indices of fit: RMSEA = .076, CFI = .97, IFI = .97. As for the age groups, with age, GFI values decreased and SRMR values increased. In other words, it seems that the four-factor model best fits the adolescent group, and its fit worsens as participants' age increases. Nevertheless, this result may be influenced by the sample size of each age sub-group, which also decreases as age increases.

The next step was to perform a configural-metric analysis in which we forced equality between each factor's item weight and the interrelatedness between factors. This paper will also present a comparison between the configural invariance and the configural-metric invariance below.

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Table 3 conveys that the results follow the same pattern as the configural analysis in that results worsen as the groups' age increases. The difference between the configural invariance and the configural-metric invariance was found to be statistically significant. Therefore, there is "no invariance," or rather the model does not fit all the groups in the same way. There are significant differences between the factors' weights and their interrelatedness. By observing each age group's value of chi-squared, we are able to confirm that the model fit the adolescent group best given that it contributed more to chi-squared than the other groups.

Similarly, it is important to note that while some fit indices are not very sensitive to sample size (e.g., RMSEA, IFI), others such as the absolute fit index, GFI (Jöreskog & Sörbom, 1981), improve as sample size increases. In the case of the present study, GFI ranges from .75 for the group of people over 55 (n = 112) to .91 for the adolescent sample (n = 627); its value increases with n. This is due to the fact that when it is calculated (GFI = 1 c2M / c2N or the difference between 1.00 and the ratio between the chi-squared values of the default and null models), sample size has an impact, to which several different authors have attested (Bollen, 1990; Fan, Thompson & Wang, 1999; Kline, 2005; Marsh, Balla, & McDonald, 1988; Schumacker & Lomax, 2004). GFI's dependence on n has led some authors (Bollen, 1990; Kenny, 2009) to recommend using indices that are independent of sample size. The same pattern occurs when using the SRMR (Standardized Root Mean Square Residual) index. In this study, it ranged from .086 for the sample of people over 55 to .057 for the adolescent group. This index tends to decrease (consequently improving the model's fit to the data) as sample size increases and to increase the model's number of parameters.

In cases where the metric invariance cannot be accepted, it is possible to evaluate each observed variable (item) successively to determine the cause of lack of fit. That was our next step, a detailed study of the items (each item's differential functioning) that would allow us to extract information about the origin of the non-invariance. We proceeded to sequentially study the equivalent model, eliminating one item at a time.

Our analysis of items' differential functioning has revealed that eliminating item 11 ("I am not happy with my physical capacity") reduces the value of chi-squared by 9.21 points for one degree of freedom (therefore significant). Thus, it may be said that this item's factor weight shows "no invariance" or differential functioning. Our analysis of the other items did not yield statistically significant differences.

On another note, because the results of the exploratory factor analysis (Esnaola, 2005; Esnaola & Goñi, 2006) would have been different in the male and female samples, we decided to perform a confirmatory factor analysis taking the variable sex into account. At first, the objective was to do a confirmatory factor analysis taking the two variables, sex and age, into consideration together, but since the sample size (n for the sub-samples) would have been insufficient, we decided to instead do the CFA dividing the total sample as a function of sex (n = 700 women and n = 556 men). The results are displayed in Table 4.

The three-factor model's results are not satisfactory for both the female and male samples given that RMSEA is in both cases greater than the acceptable .08. Nevertheless, the four-factor model does offer acceptable indices of fit: RMSEA = .077, CFI = .97, IFI = .97. As for sex, the SRMR index falls within the margins (.05 - .08) of acceptability, .056 for the male sample and .076 for the female sample. GFI is .89 for both samples, which is close to the .90 considered acceptable. However, χ^2/df does not yield an adequate index; it was found to exceed the scores considered acceptable (2.00-3.00 or less).

To determine whether or not the differences between the two models are significant, we calculate the difference in chi-squared and degrees of freedom between the two models. The difference (a chi-squared of 57.09 and 4 *df*) between the four-factor model and the three-factor model was found to be of statistical significance. In other words, the four-factor model fits both the male and female sub-samples significantly better than the three-factor model. Also, the increase in CFI_{M3-M4} = .02 is significant. Another index we can use to compare the two models is the RMSEA index. The RMSEA's 90 percent confidence interval for the four-factor model was between .073 and .08. The RMSEA of the three-factor model fell outside that interval, so the indices confirm there are statistically significant differences between the two models.

In the case of the four-factor model, there is a statistically significant difference between the configural invariance and the configural-metric invariance. That is, there is "no invariance;" the model does not exhibit the same fit for the two groups. Also, there are significant differences in terms of factor weight and the interrelatedness between factors. Next, observing each group's chi-squared values, we confirmed that the model fits the female group better because it contributes more to chi-squared than the male group.

Similar to our previous analysis as a function of age, next we proceeded to sequentially study the equivalent model, each time eliminating one item, allowing us to extract information about the origin of the non-invariance. An analysis of the items' differential functioning suggests that eliminating item 11 ("I am not happy with my physical capacity") reduces chi-squared by 12.67 points for one degree of freedom (therefore significant). Thus, we may conclude that in this item's factor weight, there is "no invariance" or differential functioning. Our analysis of the rest of the items did not yield statistically significant differences.

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Discussion

The objective of the present research study was to analyze the dimensionality of physical self-concept through confirmatory factor analysis, comparing a four-factor model comprised of *ability, condition, attractiveness* and *strength* to a three-factor model in which the items corresponding to *ability* and *condition* are grouped together into a single factor. This objective arose from an earlier analysis when Esnaola (2005) and Esnaola and Goñi (2006) observed that in a female sample, exploratory factor analysis of the AFI identified three factors such that items from the scales of *physical ability* and *physical condition* were lumped into one factor. Also, some prior studies conducted with samples of different age groups (Atienza et al., 2004; Fonseca & Fox, 2002; McAuley et al., 2005; Moreno, 1997; Van de Vliet et al., 2002) have suggested that the three-factor model is more adequate than the quadri-dimensional one originally proposed by Fox and Corbin (1989).

That being said, our results suggest that when viewing the sample as a whole, the four-factor model has statistically significantly better fit than the three-factor model (which did not fit adequately), which coincides with the findings of other studies (Asci et al., 1999; Hagger et al., 2003; McAuley et al., 1997; Page et al., 1993; Sonstroem et al., 1992). However, when both configural and configural-metric analyses were applied to determine whether or not the four-factor model is stable across the different age groups analyzed, the results indicate that the model fits best during adolescence, youth and middle-age and not as well for people over 55. Please note, however, that this result could be influenced by differences in the relative sample size of each group.

These results emphasize the idea posited by Chase (1991) that Fox and Corbin's (1989) quadri-dimensional model is not generalizable to older people, which suggests that physical self-concept may have a different internal structure. For that reason, it seems that the future of research on this construct may lay in this direction, analyzing how physical self-perceptions are structured and specifically, what aspects/facets could sufficiently explain the nature of these self-perceptions during middle age and old age.

On another note, our analysis as a function of sex has suggested that the three-factor model does not fit adequately. The four-factor model, on the other hand, did obtain moderately satisfactory results according to the majority of indices with the exception of chi-squared/degrees of freedom; those results fell above the acceptable

Table 4
Indexes of Goodness of Fit as a Function of Sex

	Sex	χ^2/df	GFI	IFI	CFI	RMSEA	SRMR	ECVI
M_3	Men	856.41 (47.02%)	.85	.95	.95	.092	.060	1.82
	Women	964.80 (52.98%)	.86	.95	.95	.092	.066	1.82
M_3 Equal Weights	Men	862.11 (47.12%)	.85	.95	.95	.091	.060	1.82
	Women	967.47 (52.88%)	.86	.95	.95	.091	.067	1.82
M_3		2,114.51/334						
$\Delta M_3 - M_{3\text{equal weights}}$		8.61/7						
M_4	Men	605.47 (44.06%)	.89	.97	.97	.077	.056	1.38
	Women	768.73 (53.94%)	.89	.97	.97	.077	.076	1.38
M_4	Men	614.87 (44.25%)	.89	.97	.97	.076	.059	1.38
M_4 Equal Weights	Women	774.59 (55.75%)	.89	.97	.97	.076	.076	1.38
M_4		1,544.42/330						
$\Delta M_4 - M_{4\text{equal weights}}$		20.8 / 8						

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limit. In light of this, it seems that the four-factor model is more adequate than the three-factor model. This result was shared by several previous studies (Asci et al., 1999; Hagger et al., 2003; McAuley et al., 1997; Page et al., 1993; Sonstroem et al., 1992) but also contradicts the findings of others (Atienza et al., 2004; Fonseca & Fox, 2002; McAuley et al., 2005; Moreno, 1997; Van de Vliet et al., 2002).

One of the limitations or weaknesses of the present study were the values used to divide the age groups, which may have been questionable. The end of youth and the transition into adulthood is not marked by an event as clear and universal as puberty, which marks the beginning of adolescence. The beginning of life as an adult occurs through a less perceptible and more extensive process than the onset of adolescence. Until recently, it was indicated by marriage, moving out of one's parents' house, and creating one's own home and family (Fierro, 2002). In recent years, however, the panorama has changed (extensive unemployment, later emancipation, etc.) in ways that have extended this process. With this in mind, we decided to label the sample comprised of participants 19-30 years old as "young" knowing that decision was dubious. In addition, middle age is not confined to a rigorous, chronological classification either, but we labeled participants 31-49 years old as such, mature or middle-aged. Last, the final sample included participants over 55 years old even though the beginning of old age is widely recognized as being 65 years old.

Another limitation may be the differences in sample size of the sub-samples created as a function of age. The adolescent sub-sample was acceptable in size, but the young and middle-age samples were small and the sample of people over 55 was insufficient given Batista-Foguet, Coenders, and Alonso's (2004) recommendation that sample sizes exceed 20. It follows that when conducting future research, researchers should compare their results as a function of age using representative and/or proportionally equal samples.

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