Psychometric properties of the Somatic Complaints Scale in Spanish children and adults

Ana Belén Górriz Plumed[1], Vicente Javier Prado-Gascó[2], Lidón Villanueva Badenes[1] and Remedios González Barrón[3]
[1] Universitat Jaume I de Castellón, [2] Universidad Europea de Valencia, and [3] Universidad de Valencia

Abstract

Background: The aim of this study was to analyse the psychometric properties of the Somatic Complaints List (SCL) in Spanish child and adult populations. This instrument assesses the frequency with which people experience and feel pain such as stomach ache and headache, among others. It has been validated in different countries and languages (Dutch, English, and Persian), showing adequate psychometric properties. Nevertheless, it has never been validated in a Spanish context. **Method:** For the adaptation and validation, we used two different samples: 1423 children, age ranging from 8 to 12 years old, selected from 12 primary and secondary schools at 7 locations in the Valencian Community, Spain (age = 9.11 years, SD = 1.27; 52.4% female); and 940 adults, age ranging from 18 to 56 years old (age = 32.3 years, SD = 11.62; 64% female). **Results:** The Spanish adaptation of the SLC showed adequate levels of reliability and validity. **Conclusions:** The empirical evidence seems sufficient to justify using this diagnostic tool with Spanish children and adults.

Keywords: Somatic complaints, mood, validation, Spanish.

Resumen

Propiedades psicométricas de la Escala de Quejas Somáticas en niños y adultos españoles. **Antecedentes:** el objetivo de este estudio fue analizar las propiedades psicométricas de la escala de quejas somáticas (SCL) en una población infantil y adulta española. Este instrumento evalúa la frecuencia con que las personas experimentan y sienten dolor, como dolor de estómago y dolores de cabeza, entre otros. Se ha validado en diferentes países con diferentes idiomas (holandés, inglés y persa), que muestran propiedades psicométricas adecuadas. Sin embargo, nunca ha sido validado en contexto español. **Método:** en la adaptación y validación utilizamos dos muestras diferentes: una muestra de 1.423 niños, entre 8 y 12 años, seleccionados de 12 escuelas primarias y secundarias en 7 localidades de la Comunidad Valenciana, España (edad = 9,11 años, SD = 1,27; 52,4% mujeres). Además, una muestra de 940 participantes de 18 a 56 años de edad (edad = 32,3 años, SD = 11,62; 64% mujeres). **Resultados:** los resultados obtenidos muestran niveles adecuados de fiabilidad y validez de la adaptación de la SCL en el contexto español. **Conclusiones:** la evidencia empírica obtenida parece suficiente para justificar el uso de esta herramienta de diagnóstico con los niños y los adultos españoles.

Palabras clave: quejas somáticas, estados de ánimo, validación, español.

It is not unusual for children or adolescents to experience physical complaints, such as headache, stomach ache or backache; epidemiological studies show that between 5% and 30% of children aged from 8 to 16 years report pains of this type on a weekly basis (Petersen, Brulin, & Bergström, 2006; Rieffe, Meerum-Terwogt, & Bosch, 2004), with stomach pain being the most common, closely followed by headache (Dufton, Dunn, & Compas, 2009; Serra, Claustre, & Bonilla, 2013; Zolog et al., 2011). In European epidemiological experience (Ospina & Harstall, 2002), chronic pain, in its various forms, occurs in 19% of adults (Kroenke, 2006).

Physical or somatic complaints are subjective perceptions of physical complaints without apparent organic cause, but they have a profound effect on people's health and functioning (Arnold et al., 2009; Barkmann, Braehler, Schulte, & Richterich, 2011; Nickel,

Hardt, Kappis, Schwab, & Egle, 2010; Ordóñez, Maganto, & González, 2014; Perquin et al., 2000; Roth-Isigkeit, Thyen, Raspe, Stöven, & Schmucker, 2004; Van der Veek, Nobel, & Derkx, 2012; Villanueva, Prado-Gascó, González, & Montoya, 2014).

Physical symptoms, that is, somatic complaints, are associated with depressive symptoms and anxiety. In fact, the mere presence of these physical symptoms can mean that the individual has a high risk of developing depression. Studies have found that the emergence of somatic complaints can hinder the diagnosis of depression and, therefore, quality of life, and can increase the consumption of healthcare resources (Artiles & López-Chamón, 2009; Casquero, 2010; Duddu, Husain, & Dickens, 2008; García-Campayo, Alda, & Pascual, 2003; García-Campayo, Caballero, Pérez, & López, 2012; Simon, Vonkorff, Piccinelli, Fullerton, & Ornell, 1999). However, seeking medical aid is not always the solution, as the physical symptoms do not always have a clear organic cause. These symptoms are often better explained as having a psychosomatic origin (López, Alcántara, Fernández, Castro, & López, 2010).

It is therefore interesting to analyse the connection between somatic problems and other variables, such as emotional

awareness or negative emotional states (Jellesma, Rieffe, Meerum Terwogt, & Kneepkens, 2006; Jellesma, Rieffe, Meerum Terwogt, & Westenberg, 2011; Lahaye, Luminet, Van Broeck, Bodart, & Mikolajczak, 2010; Mavroveli, Petrides, Rieffe, & Bakker, 2007; Ordóñez et al., 2014; Rieffe et al., 2004, 2009; Rieffe, Villanueva, Adrián, & Górriz, 2009; van der Veek, Nobel, & Derkx, 2012; Villanueva et al., 2014; Weiss et al., 2013).

Some studies have established a direct relationship between somatic complaints and negative moods in children, adolescents (Rieffe et al., 2008, 2010), and adults (Charles & Almeida, 2006; Kapfhammer, 2006; Koh, Kim, Kim, Park, & Han, 2008). The presence of negative moods (anger, sadness, and fear) can be associated with high levels of stress that can produce somatic complaints.

This relationship has been confirmed in preadolescent and adolescent populations where emotional awareness, an inability to differentiate between emotions, a greater awareness of body symptoms, a lack of willingness to attend to one's own emotions, and an increase in the attention paid to others' emotions all predicted a higher frequency of somatic complaints (Jellesma, Rieffe, & Meerum Terwogt, 2008; Jellesma, Rieffe, Meerum Terwogt, & Westenberg, 2009; Ordóñez et al., 2014; Rieffe, Meerum Terwogt, & Jellesma, 2008; Rieffe et al., 2007; Van der Veek et al., 2012; Van der Veek, Derkx, de Haan, Benninga, & Boer, 2012).

Studies of adults have also shown that qualities of emotional awareness can predict somatic symptoms (Freudenthaler, Neubauer, & Haller, 2008; Kotsou, Nelis, Grégoire, & Mikolajczak, 2011; Martins, Ramalho, & Morin, 2010; Nelis, Quoidbach, Hansenne, & Mikolajczak, 2011).

The Somatic Complaint List (SCL) has its origins in the shortcomings observed in the Children's Somatization Inventory (CSI) (Jellesma, Rieffe, & Meerum Terwogt, 2007; Rieffe et al., 2007; Rieffe, Oosterveld, & Meerum Terwogt, 2006; Walker & Greene, 1989). Because many types of complaints were unusual in children (for example, constipation, stomach ache), Jellesma et al. (2007) considered it necessary to draw up a short questionnaire specifically for this age range. The SCL they produced is a self-report measure designed for children aged 8 years and over, and it consists of 11 items that are coded on a three-point Likert-type scale (*never*, *sometimes*, and *often*) and scored as a single factor. The SCL was first constructed and validated in its English and Dutch versions (Jellesma et al., 2007; Rieffe et al., 2006, 2007) and more recently, has also been adapted and validated in Persian (Rieffe et al., 2010). This instrument is characterized by its simplicity and speed of completion; it also effectively evaluates the frequency of self-reported somatic complaints. It has not yet been validated by confirmatory factor analysis (CFA) or in adult populations, and it has not been adapted to or validated in Spanish.

Given the impact of somatic complaints on people's health and functioning, especially as regards their interactions with others, and the scarcity of studies in children or studies that included both children and adults, we decided to validate an instrument in our context. It was also important to include other constructs, such as emotional awareness and moods, in the instrument because these elements are common explanatory factors for somatic complaints that extend beyond other, more physical, elements.

The goals of our study were to adapt and validate the SCL in a population of Spanish children and adults from the Valencian Community, to analyse the link between SCL and emotions (MOOD and EAQ), and to observe the effect of gender and age on SCL. Providing a diagnostic tool for somatic complaints that is in Spanish, is fast and short, and can be applied from 8 years of age to adulthood is novel.

Methods

Participants

We used two different samples for adaptation and validation.

Sample 1: Children

A sample of 1423 children from a middle-class socio-economic background, aged 8 to 12 years, was selected by convenience sampling from 12 primary and secondary schools at 7 locations in the Valencian Community, Spain (M_{age} = 9.11 years, SD = 1.27; 52.4% female). Eight questionnaires were discarded as the instructions were misunderstood, leading to erroneous answers.

Sample 2: Adults

Using convenience sampling, 940 participants from the Valencian Community, Spain, aged 18 to 56 years (M_{age} = 32.3 years, SD = 11.62; 64% female) were identified. Their civil status included 29.4% single, 44.1% married; 6.2% separated or divorced, 19.2% were living with a partner and 0.7% has other status. Regarding their socio-economic background, 14% were lower-class, 67.3% were middle-class, and 18.7% were upper-class.

Instruments

The Somatic Complaint List (*SCL*) (Rieffe et al., 2006; Rieffe et al., 2007) is an adapted version of the original scale consisting of 11 items grouped in a single factor and it identifies the frequency with which people experience and feel pain, such as stomach ache, headache, and so on. It has a three-point response scale (1 = *never*, 2 = *sometimes*, 3 = *often*), and a higher score indicates a greater presence of somatic complaints. Previous studies have proven this list to be valid and very reliable (α = .83) (Jellesma et al., 2007; Rieffe et al., 2009).

The Emotion Awareness Questionnaire (*EAQ*) (Rieffe et al., 2008) is an adapted version of the original scale (Prado-Gascó, Ordóñez, Montoya, Villanueva, & González, 2012) that comprised 28 items, grouped into six key emotional awareness factors: Differentiating emotions, Verbal sharing of emotions, Acting out emotions, Bodily awareness of emotions, Attending to others' emotions, and Analysing one's own emotions. The factors were rated using the three-point Likert-type scale (1 = *never*, 2 = *sometimes*, 3 = *often*), and in all cases, a high score meant a greater presence of that ability. All of the scales had shown adequate psychometric properties in previous studies (Camodeca & Rieffe, 2013; Rieffe et al., 2009), which was also confirmed in the present study.

The Mood Questionnaire (*MOOD*) (Rieffe et al., 2004) was adapted by the research team (Górriz, Prado-Gascó, Villanueva, Ordóñez, & González, 2013) and consisted of four mood scales: Happiness, Anger, Sadness, and Fear. Participants were instructed to answer each item on a three-point response scale (1 = *never*, 2 = *sometimes*, 3 = *often*). In all dimensions, higher scores indicate a greater presence of that mood state. In earlier studies (Rieffe et al., 2009), as well as in the validation in the Spanish context (Górriz et al., 2013), the scales displayed adequate psychometric properties.

Procedure

After obtaining both the parents' and the schools' consents, the child questionnaires were administered over approximately 50 minutes, anonymously and voluntarily, during school hours in 12 primary and secondary schools. The effect of the question order in the questionnaires was controlled. As for the adult population, data were collected from college students (Universitat Jaume I of Castellón, Universitat of Valencia) and adults from the Parents' Associations of the 12 selected primary and secondary schools.

The SCL was adapted according to the international methodological standards recommended by the International Test Commission (ITC) for adapting an instrument to a foreign language (Hambleton, 2005; Muñiz, Elosua, & Hamleton, 2013).

First, the original questionnaire was translated into Spanish and then back-translated into English by Spanish and English native-speakers, respectively. Researchers participated only in the final version of the instrument. The instrument was next applied to two pilot samples, 230 children and 205 adults, to test the phrasing of the items and to obtain evidence for reliability and validity. The final version of the questionnaire was applied to two populations, 1423 children and 940 adults, from each of which a sub-sample of 400 subjects was chosen at random so as not to contaminate the rest of the data (cross-validity) and used to obtain empirical evidence for the validity of the model (Satorra, 2002). Finally, the models were re-specified, and the final model was applied to the whole sample.

Data analysis

The statistical analysis was conducted using SPSS 20.0, EQS 6.1 and SBDIFF. First, descriptive statistics for every item were calculated, followed by the analysis of empirical evidence for the reliability and validity of the scale on each population, and with a multi-group analysis using structural equation models (SEM). Then, the factorial invariance was tested. Later, the link with MOOD and EAQ was examined. Finally, the influence of gender and age on the SCL construct was analysed.

Results

Analysis of items and reliability

The 11 items that make up the SCL were submitted to analysis. Table 1 shows the final wording of the items and, for each item, its mean, the standard deviation, the item-total correlation, and Cronbach's alpha if the element is deleted in both child and adult populations.

In general, all of the items seem to make an adequate contribution to the scale as a whole. The reliability of the scales (α = .81, .80 < α <.82 in children and α = .80, .78 < α <.82 in adults), which were examined by Cronbach's alpha index, are similar to the original scale (α = .83, Jellesma et al., 2007; Rieffe et al., 2009) and do not appear to improve on removing any of the items, although deleting items 1 and 10 would not diminish the reliability in the child population.

Validity analysis

After analysing the reliability of the scale, the next step was to study its validity. First, the adequacy of the data was analysed by the Kaiser-Meyer-Olkin test [KMO] (.87 for children; and .85 for adults) and Bartlett's test of Sphericity (p<.001 in both samples). Then, mean component analyses were used to calculate an exploratory factor analysis (EFA), with eigenvalues greater than 1 criterion. This criterion was confirmed by both the analysis of the scree test and by a parallel analysis (PA, Lloret-Segura, Ferreres-Traver, Hernández-Baeza, & Tomás-Marco, 2014). To perform the PA 51, random samples were created with the same characteristics as the original sample, both in size and in variables. We conducted a principal components analysis in each sample and then calculated the average value for each of the eigenvalues. We then compared these eigenvalues with those obtained in the real sample (Hayton, Allen, & Scarpello, 2004), and as suggested by the literature, we only kept those factors that had larger eigenvalues in the real sample. The resulting model consisted of a single factor, as in the

---

Table 1
Item analysis: Mean ($\bar{\chi}$), standard deviation (SD), item-total correlation (r_{jx}) and Cronbach's alpha if item deleted ($\alpha.$-x) in children and adults

Items	Children (n = 1489; α = .81) (.80 < α <.82)				Adults (n = 940; α = .80) (.78 < α <.82)			
	$\bar{\chi}$	SD	r_{jx}	$\alpha.$-x	$\bar{\chi}$	SD	r_{jx}	$\alpha.$-x
1. I feel tired	1.92	.56	.31	.81	2.09	.37	.41	.78
2. I have stomach ache	1.54	.65	.52	.79	1.68	.63	.47	.78
3. I feel healthy and well*	1.50	.61	.56	.79	1.70	.63	.49	.78
4. I feel pain	1.36	.58	.51	.79	1.63	.63	.57	.76
5. I feel weak	1.37	.58	.57	.79	1.40	.56	.56	.77
6. I feel dizzy	1.55	.64	.55	.79	1.84	.66	.38	.79
7. I have headache	1.28	.52	.55	.79	1.22	.47	.48	.78
8. I feel like vomiting	1.17	.45	.43	.80	1.14	.39	.42	.78
9. I feel I am going to faint	1.30	.56	.44	.80	1.24	.33	.39	.79
10. I feel well*	1.29	.54	.34	.81	1.37	.39	.47	.78
11. I have a pain in my chest	1.24	.50	.42	.80	1.31	.35	.46	.78

* Inverted items

original structure (Jellesma et al., 2007; Rieffe et al., 2009), which accounted for 35.10% of the child sample and 34.28% of the adult sample variance.

Several confirmatory factor analyses (CFA) were then calculated. With the aim of increasing the robustness of the results, regardless of the subjects considered (cross-validation) (Satorra, 2002), a sub-sample of 400 subjects was extracted from each population and used to test the factor model. After re-specifying that model, testing was conducted on each whole population, and finally, a multi-group analysis of adults and children, which included equal factor variance as a constraint, was conducted. Later, the factorial invariance was tested. In all cases, ML (maximum-likelihood) estimation was used with the Satorra-Bentler robust correction (Bentler, 1995; Satorra, 2002) to control for possible non-normality of the data.

Based on the significance of the χ^2 statistic (< .01), an adequate model fit cannot be ensured in any of the cases. However, given that this statistic is very susceptible to the sample size, other goodness-of-fit indices were applied, such as the Comparative Fit Index (CFI), the Incremental and the McDonald's Fit Indices (IFI and MFI, respectively), values above .90 being indicators of good fit (MacCallum & Austin, 2000), and the Root Mean-Square Error of Approximation (RMSEA), in which an adequate fit would score equal to or below .08. Table 2 presents a summary showing these indicators. To achieve a good model fit, several re-specifications had to be carried out, and in the final model, items 1, 3, 7 were deleted as suggested by the Wald Test and the low R^2 values of these 3 items.

The results obtained seem to justify the internal validity of the instrument if the 3 items are removed in both populations.

To analyse the factorial invariance, changes in model fit with the inclusion of constrains were tested by a significance test on the difference between Satorra-Bentler scaled chi square statistics using SBDIFF (Crawford & Henry, 2003; Satorra & Bentler, 2001). The results on S-B Scaled Difference = 53, 8249, df = 6; (p<.001) allow us to assume equal form invariance but not equal factor loadings invariance.

Furthermore, to increase the empirical evidence for the construct validity, the convergent validity of the scale was calculated on the basis of the results obtained in the CFA, and the items that make up the SCL scale were significantly and strongly correlated with the latent variable they assumed to measure; in all cases, the t values were above 3.291 (Hair, Black, Babin, Anderson, & Tatham, 2006; Vila, Küster, Aldás, & Aldás, 2000), and they failed to improve when new loads were included.

Thus, as suggested in the literature (Jellesma et al., 2007; Jellesma, Rieffe, Meerum Terwogt, & Westenberg, 2009; Lagerstee, Garnefski, Jellesma, Verhulst, & Utens, 2010; López et al., 2010; Meerum-Terwogt, Rieffe, Miers, Jellesma, & Tolland, 2006; Rieffe et al., 2004, Rieffe et al., 2006; Rieffe et al., 2009; Rieffe et al., 2010), the criterion or nomological validity of the instrument was determined by testing the relation between this construct and others. To do so, Spearman correlations were performed among the dimensions of the SCL, MOOD, EAQ, and age, both for the sample as a whole and by analysing the influence of gender on those relationships (Table 3).

In general and in both populations, the correlations observed between SCL and all of the MOOD dimensions (sadness, fear, and anger) were positive and significant (p<.01), except for Happiness, where the correlation was negative.

With regard to the correlations with the EAQ questionnaire, somatic complaints were negatively and significantly correlated (p<.01) with all the dimensions of both the children and adults.

Considering the two populations, adults tended toward higher correlations than those of children in all dimensions, except for Anger and Attending to others' emotions, where higher correlations were found for children than adults.

Prediction of SCL with EAQ and MOOD

Later, the prediction of somatic complaints was analysed by the emotional component both in children and adults. Table 4 shows hierarchical regression analyses with somatic complaints (SCL) as criterion variables and Emotional Awareness (EAQ) and Moods

---

Table 2
Goodness-of-fit indices of the SCL questionnaire

Model	χ^2 (df)	S-B χ^2 (df)	CFI	IFI	MFI	RMSEA (95% CI)	Cronbach's α	α confidence interval 95%
Child sample n = 400	143.73 (44)	99.51 (44)	.88	.88	.91	.06 (.047 - .081)	.80	(.77 < α <.83)
Re-specified (item 1,3,7) Child Sample	59.98 (20)	38.93 (20)	.93	.93	.97	.06 (.028 - .081)	.77	(.73 < α <.80)
Re-specified (item 1,3,7) Child Total n = 1489	155.04 (20)	102.76 (20)	.94	.94	.97	.05 (.043 - .063)	.78	(.76 < α <.80)
Adult sample n = 400	331.51 (44)	238.06 (44)	.72	.72	.79	.11 (.092 - .118)	.81	(.78 < α <.84)
Re-specified (item 1,3,7) Adult Sample	99.64 (20)	72.53 (20)	.89	.89	.94	.08 (.061 - .101)	.78	(.75 < α <.81)
Re-specified (item 1,3,7) Adult Total n = 940	150.88 (20)	117.60 (20)	.90	.90	.95	.07 (.060 - .085)	.76	(.74 < α <.78)
Multi-group Equal Form	307.57 (41)	221.48 (41)	.92	.92	.96	.06 (.053 - .068)	–	
Multi-group Equal Loading	384.95 (47)	275.96 (47)	.90	.90	.95	.06 (.056 - .071)	–	

* p<.001; ** χ^2/df; S-B χ^2/df: adequate ≤ 5; *** CFI, IFI, MFI ≥ .90; **** RMSEA ≤ .80

(MOOD) as predictor variables. As a first step, all of the subscales of Emotional Awareness were included and subsequently the variables of Mood States.

The children's EAQ dimensions: Differentiate emotions (β = $-.12$, $p<.001$), Analysing one's own emotions (β = $-.05$, $p<.05$) and bodily awareness (β = $-.08$, $p<.001$) predicted 15% of variance in somatic complaints ($F = 44.53$). With the addition of moods, the model improved significantly with R^2 increased by .21, increasing the total variance explained to 36% ($F = 81.87$). Specifically, all moods are significant predictors of somatic complaints with Happiness seeming to do so inversely (β = $-.15$, $p<.001$), while the other mood states, Anger (β = $.08$, $p<.001$); Sadness (β =.20, $p<.001$) and Fear (β = .15, $p<.001$) seem to do so positively.

Meanwhile, the adults' EAQ dimensions: Analysing one's own emotions (β = $-.08$, $p<.05$), not hiding emotions (β = $-.05$, $p<.05$) and bodily awareness (β = $-.15$, $p<.001$) predicted 23% of the variance ($F = 47.63$). Including moods in the model increased R^2 by .14, increasing the total variance explained to 37% ($F = 56.22$). Unlike children, only two adult moods were predictors of SCL, namely, fear (β = .26, $p<.001$) and sadness (β = .18, $p<.001$).

Influence of gender and age

Lastly, the effects of age and gender on the differences in SCL were analysed. First, the gender-specific mean scores for children and adults were compared by the Mann–Whitney U test. Second, the correlation between the different constructs considered previously, also including age, were analysed according to gender.

The gender-specific differences were statistically significant for both children ($U = 2.36$; Girls: $M = 1.36$; Boys: $M = 1.32$; $p<.05$; effect size with Cohen's d =.11) and adults ($U = 5.94$; Women: $M = 1.46$; Men: $M = 1.34$; $p<.001$; effect size with Cohen's d =.46). In

Table 3
Correlations of the SCL questionnaire with other variables

	SCL	MOOD				EAQ						AGE
		S	F	A	H	DIF.	VS	NH	BA	AO	OE	
Children	Total	.48**	.43**	.39**	-.27**	-.27**	-.27**	-.17**	-.22**	-.17**	-.10**	-.13**
	Boys	.51**	.40**	.39**	-.24**	-.24**	-.28**	-.16**	-.17**	-.18**	-.12**	-.12**
	Girls	.48**	.46**	.40**	-.30**	-.31**	-.24**	-.17**	-.25**	-.16**	-.08*	-.13**
Adults	Total	.54**	.51**	.35**	-.29**	-.36**	-.28**	-.22**	-.35**	-.06	-.16**	-.29**
	Men	.51**	.54**	.34**	-.30**	-.40**	-.27**	-.19**	-.34**	-.20**	-.19**	-.17**
	Women	.48**	.45**	.33**	-.30**	-.34**	-.30**	-.25**	-.29**	-.10*	-.20**	-.27**

* $p<.05$; ** $p<.01$

SCL: Somatic complaints. MOOD: S: Sadness; F: Fear; A: Anger; H: Happiness. EAQ: Dif: Differentiating emotions; VS: Verbal sharing of emotions; NH: Not hiding emotions; BA: Bodily awareness; AO: Attending to others' emotions; OE: Analysing one's own emotions

Table 4
Prediction of SCL by Emotions (EAQ & MOOD) in children and adults

		SCL children		SCL adults	
Predictors		ΔR^2	β	ΔR^2	β
Step 1		.15***		.23***	
EAQ	Dif.		-.13***		-.05
	VS		-.04		-.06
	OE		-.06*		-.08**
	AO		-.03		.06
	NH		-.01		-.07*
	BA		-.12***		-.21***
Step 2		.21***		.14***	
MOOD	H		-.15***		-.01
	A		.10***		.03
	S		.23***		.20***
	F		.18***		.28***
Total R²adj		.36***		.37***	
n		1423		940	

* $p<.05$; ** $p< .01$; *** $p<.001$

EAQ: Dif: Differentiating emotions; VS: Verbal sharing of emotions; NH: Not hiding emotions; BA: Bodily awareness; AO: Attending to others' emotions; OE: Analysing one's own emotions; MOOD: S: Sadness; F: Fear; A: Anger; H: Happiness

general, women presented more somatic complaints than men, and these differences seem to be greater in adults than in children.

Lastly, regarding age, significant low negative correlations ($p<.01$) were observed with somatic complaints (-.13 on children and -.29 on adults). However, while no gender-specific differences in the correlations were seen in children (Boys: -.12; Girls: -.13), there were greater gender-specific differences in adults (Men: -.17; Women: -.27), with women showing stronger correlations than men.

Discussion

The aim of this study was to validate the SLC (Rieffe et al., 2006, 2007) in two different populations (children and adults) in the Valencian Community by taking into account the effect that somatic complaints have on people's health (Arnold et al., 2009; Barkmann et al., 2011; Duddu et al., 2008; García-Campayo et al., 2012; Jellesma et al., 2006; Nickel et al., 2010; Ordóñez et al., 2014; Perquin et al., 2000; Rieffe et al., 2009; Roth-Isigkeit et al., 2004; Van der Vek et al., 2012; Villanueva et al., 2014), as well as the frequency with which they appear in children between 8 and 16 years of age (Petersen et al., 2006; Rieffe et al., 2004) and adults (Ospina & Harstall, 2002; Kroenke, 2006).

Analysis of the items on the SCL scale shows that they all appear to make an adequate contribution to the scale as a whole, as they

present a relatively high correlation with the entire questionnaire. Reliability did not seem to improve on removing any of the items, although eliminating items 1 and 10 did not cause it to decrease in the case of the children population.

The next step was to study validity, which was performed by analysing the factorial, convergent, and criterion validity. The result of the EFA was a single-factor model that accounted for 35.10% of the variance in children and 34.28% in adults and appears to replicate the structure proposed by the authors almost perfectly (Jellesma et al., 2007; Rieffe et al., 2007; Rieffe et al., 2006). As regards CFA, to achieve good model fit items 1, 3 and 7 were eliminated from the final model based on the Wald Test and their low R^2 in the standardized solution.

The convergent validity of the questionnaire was analysed to increase the empirical evidence on the construct validity, the results showing (among other things) that the items of the scales are significantly and strongly correlated with the latent variable that they were assumed to measure. Hence, the adaptation seems to have adequate convergent validity in both children and adults.

Criterion validity appears to replicate the results observed in other studies (Charles & Almeida, 2006; Freudenthaler et al., 2008; Jellesma et al., 2006, 2009; Kapfhammer, 2006; Koh et al., 2008; Kotsou et al., 2011; Lagerstee et al., 2010; Lahaye et al., 2010; López et al., 2010; Martins et al., 2010; Mavroveli et al., 2007; Meerum Terwogt et al., 2006; Nelis et al., 2011; Ordóñez et al., 2014; Rieffe et al., 2004, 2006, 2007, 2009, 2010; van der Veek et al., 2012; Villanueva et al., 2014; Weiss et al., 2013), by which somatic complaints are related to other constructs such as moods (MOOD), emotion awareness (EAQ), and age.

In analysing the meaning of this relation, somatic complaints were significantly and positively correlated with negative moods (Sadness, Fear, and Anger) and, for the children and adults, negatively and significantly correlated with EAQ dimensions. In general, the correlations were higher in adults than children, except for Anger and Attending to others' emotions, where the correlations were higher in children.

The best predictive values of the SCL in children were Differentiate emotions; Analyzing one's own emotions; Bodily awareness; and all moods (R^2=.36; F = 81.87), confirming published results (Rieffe et al., 2008, 2009; Ordóñez et al., 2014; van der Veek et al., 2012). Similarly, in adults, the best predictors were Analyzing one's own emotions, Not hiding emotions, and Bodily awareness; regarding mood, just Fear and Sadness (R^2=.37; F = 56.22), also confirming the predictive relation observed in other studies (Charles & Almeida, 2006; Freudenthaler et al., 2008; Kapfhammer, 2006; Koh et al., 2008; Kotsou et al., 2011; Martins et al., 2010; Nelis et al., 2011).

Although all moods were significant predictors of somatic complaints in children, only fear and sadness were predictors of SCL in adults. As has been suggested in previous studies (Jellesma et al., 2011; Lahaye et al., 2010; Rieffe et al., 2008, 2010), the appearance of these moods may trigger high levels of stress, giving rise to physical complaints. Similarly, a higher score on emotional awareness seems to involve a lower frequency of such complaints.

Finally, an analysis was performed to determine the differences in somatic complaints depending on age and gender. In this case, women have the greatest number of somatic complaints in both child and adult populations; in addition, a negative and significant correlation was found between age and SCL, with older people tending to have fewer somatic complaints.

Our results show that the SCL has adequate reliability and validity for use as a diagnostic tool in samples of Spanish children and adults and confirms previous validations carried out in other countries (Jellesma et al., 2007; Rieffe et al., 2010). Nevertheless, as the sampling was not probabilistic and the subjects were exclusively from the Valencian Community, the results should be generalized with caution. It would be interesting to extend this study to other populations in Spain, as well as in other Spanish speaking countries. It would also be interesting to analyse the relations between somatic complaints and moods, emotional awareness, maladjustment and other associated constructs in greater depth.

Acknowledgements

References

Arnold, I., De Waal, M., Eekhof, J., Assendelft, W., Spinhoven, P., & Van Hemert, A. (2009). Medically unexplained physical symptoms in primary care: A controlled study on the effectiveness of cognitive-behavioral treatment by the family physician. *Psychosomatics, 50*, 515-524.

Artiles, R., & López-Chamón, S. (2009). Síntomas somáticos en la depresión [Somatic symptoms in depression]. *SEMERGEN, 35*(1), 39-42.

Barkmann, C., Braehler, E., Shulte, M., & Richterich, A. (2011). Chronic somatic complaints in adolescents: Prevalence, predictive validity of the parent reports, and associations with social class, health status, and psychosocial distress. *Social Psychiatry and Psychiatric Epidemiology, 46*, 1003-1011.

Bentler, P.M. (1995). *EQS structural equations program manual*. Encino, CA: Multivariate Software.

Camodeca, M., & Rieffe, C. (2013). Validation of the Italian emotion awareness questionnaire for children and adolescents. *European Journal of Developmental Psychology, 10*(3), 402-409.

Casquero, R. (2010). Introducción, epidemiología y prevalencia [Introduction, epidemiology and prevalence]. In J.M. Rodríguez (Ed.), *Guía de Buena Práctica clínica en depresión y ansiedad generalizada con presencia de síntomas físicos* [Guide to Good Clinical Practice in depression and generalized anxiety presence of physical symptoms]. Madrid: IM&C.

Charles, S., & Almeida, D. (2006). Daily reports of symptoms and negative affect: Not all symptoms are the same. *Psychology and Health, 21*, 1-17.

Crawford, J.R., & Henry, J.D. (2003). The Depression Anxiety Stress Scales: Normative data and latent structure in a large non-clinical sample. *British Journal of Clinical Psychology, 42*, 111-131.

Duddu, V., Husain, N., & Dickens, C. (2008). Medically unexplained presentations and quality of life: A study of a predominantly South Asian primary care population in England. *Journal of Psychosomatic Research, 65*, 311-317.

Dufton, L., Dunn, M., & Compas, B. (2009). Anxiety and somatic complaints in children with recurrent abdominal pain and anxiety disorders. *Journal of Pediatric Psychology, 34*, 176-186.

Freudenthaler, H., Neubauer, A., & Haller, U. (2008). Emotional intelligence: Instruction effects and sex differences in emotional management abilities. *Journal of Individual Differences, 29*, 105-115.

García-Campayo, J., Alda, M., & Pascual, A. (2003). Relación entre síntomas somáticos y depresión [Relationship between somatic symptoms and depression]. In I. Gilabert (Ed.), *Nuevas perspectivas en la depresión* [New perspectives on depression] (pp. 191-211). Madrid: Aula Médica Ediciones.

García-Campayo, J., Caballero, F., Pérez, M., & López, V. (2012). Pain related factors in newly diagnosed generalized anxiety disorder patients. *Actas Españolas de Psiquiatría, 40*, 177-186.

Górriz, A., Prado-Gascó, V., Villanueva, L., Ordóñez, A., & González Barrón, R. (2013). The MOOD questionnaire: Adaptation and validation of the Spanish version. *Psicothema, 25*, 252-257.

Hair, J., Black, W., Babin, B., Anderson, R., & Tatham, R. (2006). *Multivariate data analysis* (6th edition). Upper Saddle River, New Jersey. Prentice-Hall.

Hambleton, R.K. (2005). Issues, designs and technical guidelines for adapting tests into multiple languages and cultures. In R.K. Hambleton, P.F. Merenda & S.D. Spielberger (Eds.), *Adapting educational and psychological tests for cross-cultural assessment* (pp. 3-38). New Jersey: Lawrence Erlbaum Associates.

Hayton, J.C., Allen, D.G., & Scarpello, V. (2004). Factor retention decisions in exploratory factor analysis: A tutorial on parallel analysis. *Organizational Research Methods, 7*, 191-205.

Jellesma, F., Rieffe, C., Meerum Terwogt, M., & Westenberg, M. (2009). Do I feel sadness, fear or both? Comparing self-reported alexithymia and emotional task-performance in children with many or few somatic complaints. *Psychology and Health, 24*, 881-893.

Jellesma, F., Rieffe, C., & Meerum Terwogt, M. (2008). My peers, my friend, and I: Peer Interactions and somatic complaints in boys and girls. *Social Science & Medicine, 66*, 2195-2205.

Jellesma, F., Rieffe, C., & Meerum Terwogt, M. (2007). The somatic complaint list: Validation of a self-report questionnaire assessing somatic complaints in children. *Journal of Psychosomatic Research, 63*, 399-401.

Jellesma, F., Rieffe, C., Meerum Terwogt, M., & Kneepkens, C. (2006). Somatic complaints and health care use in children: Mood, emotion awareness and sense of coherence. *Social Science & Medicine, 63*, 2640-2648.

Jellesma, F., Rieffe, C., Meerum Terwogt, M., & Westenberg, P. (2011). Children's sense of coherence and trait emotional intelligence: A longitudinal study exploring the development of somatic complaints. *Psychology & Health, 26*, 307-320.

Kapfhammer, H. (2006). Somatic symptoms in depression. *Dialogues in Clinical Neuroscience, 8*, 227-239.

Koh, K., Kim, D., Kim, S., Park, J., & Han, M. (2008). The relation between anger management style, mood and somatic symptoms in anxiety disorders and somatoform disorders. *Psychiatry Research, 160*, 372-379.

Kotsou, I., Nelis, D., Grégoire, J., & Mikolajczak, M. (2011). Emotional plasticity: Conditions and effects of improving emotional competence in adulthood. *The Journal of Applied Psychology, 96*, 827-839.

Kroenke, K. (2006). Review of Biopsychosocial medicine: An integrated approach to understanding illness. *Journal of Psychosomatic Research, 60*(4), 433-435.

Lagerstee, J., Garnefski, N., Jellesma, F., Verhulst, F., & Utens, E. (2010). Cognitive coping and childhood anxiety disorders. *European Child & Adolescent Psychiatry, 19*, 143-150.

Lahaye, M., Luminet, O., Van Broeck, N., Bodart, E., & Mikolajczak, M. (2010). Psychometric properties of the emotion awareness questionnaire for children in a French-speaking population. *Journal of Personality Assessment, 92*, 317-326.

López, C., Alcántara, M., Fernández, V., Castro, M., & López, J. (2010). Características y prevalencia de los problemas de ansiedad, depresión y quejas somáticas en una muestra clínica infantil de 8 a 12 años mediante el CBCL (Child Behavior Checklist) [Characteristics and prevalence of anxiety disorders, depression and somatic complaints in a child clinical sample of 8-12 years by the CBCL (Child Behavior Checklist)]. *Anales de Psicología, 26*, 325-334.

Lloret-Segura, S., Ferreres-Traver, A., Hernández-Baeza, A., & Tomás-Marco, I. (2014). El análisis factorial exploratorio de los ítems: una guía práctica, revisada y actualizada [Exploratory Item Factor Analysis: A practical guide revised and updated]. *Anales de Psicología, 30*, 1151-1169.

MacCallum, R.C., & Austin, J.T. (2000). Applications of structural equation modeling in psychological research. *Annual Review of Psychology, 51*, 201-226.

Martins, A., Ramalho, N., & Morin, E. (2010). A comprehensive meta-analysis of the relationship between emotional intelligence and Health. *Personality and Individual Differences, 49*, 554-564.

Mavroveli, S., Petrides, K., Rieffe, C., & Bakker, F. (2007). Trait emotional intelligence, psychological well-being and peer-rated social competence in adolescence. *British Journal of Developmental Psychology, 25*(2), 263-275.

Meerum-Terwogt, M., Rieffe, C., Miers, A.C., Jellesma, F.C., & Tolland, A. (2006). Emotions and self-esteem as indicators of somatic complaints in children. *Infant and Child Development, 15*(6), 581-592.

Muñiz, J., Elosua, P., & Hambleton, R.K. (2013). Directrices para la traducción y adaptación de los tests: segunda edición [International Test Commission Guidelines for test translation and adaptation: Second edition]. *Psicothema, 25*, 151-157.

Nélis, D., Quoidbach, J., Hansenne, M., & Mikolajczak, M. (2011). Measuring individual differences in emotion regulation: The Emotion Regulation Profile-Revised (ERP-R). *Psychologica Belgica, 51*, 49-91.

Nickel, R., Hardt, J., Kappis, B., Schwab, R., & Egle, U. (2010). Determinants of quality of life in patients with somatoform disorders with pain as main symptom - the case for differentiating subgroups. *Zeitschrift für Psychosomatische Medizin und Psychotherapie, 56*, 3-22.

Ordóñez, A., Maganto, C., & González, R. (2015). Quejas somáticas, conciencia emocional e inadaptación en población escolar [Somatic complaints, emotional awareness and maladjustment in school population]. *Anales de Pediatría, 82*, 308-315.

Ospina, M., & Harstall, C. (2002). *Prevalence of Chronic Pain: An Overview* (Report No. 28). Edmmonton, Alberta, Alberta Heritage Foundation for Medical Research, Health Technology Assessment.

Perquin, C.W., Hazebroek-Kampschreur, A.A., Hunfeld, J.A., Bohnen, A.M., van Suijlekom-Smit, L.W., Passchier, J., & van der Wouden, J.C. (2000). Pain in children and adolescents: A common experience. *Pain, 87*, 51-58.

Petersen, S., Brulin, C., & Bergström, E. (2006). Recurrent pain symptoms in young schoolchildren are often multiple. *Pain, 121*, 145-150.

Prado-Gascó, V., Ordóñez, A., Montoya, I., Villanueva, L., & González, R. (2012). The adaptation and validation of the EAQ to the Spanish context using SEM. *The 8th International Test Commission Conference*. Amsterdam, 3-5 July 2012.

Rieffe, C., Meerum-Terwogt, M., & Bosch, J. (2004). Emotional awareness and somatic complaints in children. *European Journal of Psychology, 1*, 31-47.

Rieffe, C., Oosterveld, P., Meerum Terwogt, M., Novin, S., Nasiri, H., & Latifian, M. (2010). Relationship between alexithymia, mood and internalizing symptoms in children and young adolescents: Evidence from an Iranian sample. *Personality and Individual Differences, 48*, 425-430.

Rieffe, C., Oosterveld, P., & Terwogt, M.M. (2006). An alexithymia questionnaire for children: Factorial and concurrent validation results. *Personality and Individual Differences, 40*, 123-133.

Rieffe, C., Meerum Terwogt, M., & Jellesma, F.C. (2008). Emotional competence and health in children. In Denollet, J., Nyklicek, I., & Vingerhoets, A. (Eds.), *Emotion regulation: Conceptual and clinical issues* (pp. 184-201) New York: Springer.

Rieffe, C., Meerum Terwogt, M., Petrides, K., Cowan, R., Miers, A.C., & Tolland, A. (2007). Psychometric properties of the emotion awareness questionnaire for children. *Personality and Individual Differences, 43*, 95-105.

Rieffe, C., Villanueva, L., Adrián, J.E., & Górriz, A.B. (2009). Quejas somáticas, estados de ánimo y conciencia emocional en adolescentes [Somatic complaints, mood and emotional awareness in adolescent]. *Psicothema, 21*, 459-464.

Roth-Isigkeit, A., Thyen, U., Raspe, H., Stöven, H., & Schmucker, P. (2004). Reports of pain among German children and adolescents: An epidemiological study. *Acta Paediatrica, 93*, 258-263.

Satorra, A. (2002). Asymptotic robustness in multiple group linear-latent variable models. *Econometric Theory, 18*, 297-312.

Satorra, A., & Bentler, P.M. (2001). A scaled difference chi-square test statistic for moment structure analysis. *Psychometrika, 66,* 507-514.

Serra, R., Claustre, M., & Bonillo, A. (2013). Síntomas somáticos funcionales en una muestra española: psicopatología y estilos educativos [Functional somatic symptoms in a Spanish sample: Psychopathology and parenting styles]. *Anales de Pediatría, 79*, 101-107.

Simon, G., Vonkorff, M., Piccinelli, M., Fullerton, C., & Ornell, J. (1999). An international study of the relation between somatic symptoms and depression. *The New England Journal of Medicine, 341*, 329-335.

van der Veek, S., Nobel, R., & Derkx, H. (2012). The relationship between emotion awareness and somatic complaints in children and adolescents: Investigating the mediating role of anxiety and depression. *Psychology & Health, 27*, 1359-1374.

van der Veek, S., Derkx, H. de Haan, E., Benninga, M., & Boer, F. (2012). Emotion awareness and coping in children with functional abdominal pain: A controlled study. *Social Science and Medicine, 74,* 112-119.

Vila, N., Küster, I., Aldás, J., & Aldás, J. (2000). Desarrollo y validación de escalas de medida en marketing [Development and validation of measurement scales in marketing]. *Quaderns de Treball, 104*.

Villanueva, L., Prado-Gascó, V., González, R., & Montoya, I. (2014). Conciencia emocional, estados de ánimo e indicadores de ajuste individual y social en niños de 8 a 12 años [Emotional awareness, moods and indicators of individual and social adjustment in children of 8-12 years]. *Anales de Psicología, 30*, 772-780.

Walker, L.S., & Greene, J.W. (1989). Children with recurrent abdominal pain and their parents: More somatic complaints, anxiety, and depression than other patient families? *Journal of Pediatric Psychology, 14*, 231-243.

Weiss, K., Hahn, A., Wallace, D., Biggs, B., Bruce, B., & Harrison, T. (2013). Acceptance of pain: Associations with depression, catastrophizing, and functional disability among children and adolescents in an interdisciplinary chronic pain rehabilitation program. *Journal of Pediatric Psychology, 38*, 756-765.

Zolog, T., Claustre, M., Bonillo, A., Canals-Sans, J., Hernández-Martínez, C., Romero-Acosta, K., & Domenech-Llaberia, E. (2011). Somatic complaints and symptoms of anxiety and depression in a school-based simple of preadolescents and early adolescents. Functional impairment and implications for treatment. *Journal of Evidence- Based Psychotherapies, 11*, 191-208.