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Psicothema, vol. 25, núm. 2, 2013, pp. 252-257
Universidad de Oviedo
Oviedo, España

Available in: <http://www.redalyc.org/articulo.oa?id=72726347016>



Psicothema,
ISSN (Printed Version): 0214-9915
psicothema@cop.es
Universidad de Oviedo
España

The MOOD Questionnaire: Adaptation and validation of the Spanish version

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Abstract

Background: The aim of this study was to analyze the psychometric properties of the Spanish version of the MOOD Questionnaire in child population. This instrument was developed to cover the existing gap in the evaluation of mood in children. **Method:** The MOOD was administered to 1489 children (mean age= 9.11 years old). **Results:** The psychometric properties of the Mood questionnaire are adequate. Moreover, the questionnaire was associated with somatic complaints and emotional awareness. **Conclusions:** According to the results of the study, the use of this diagnostic tool with Spanish children seems justified.

Keywords: mood, childhood, emotional awareness, somatic complaints, validation.

Resumen

El Cuestionario de Estados de Ánimo: adaptación y validación de la versión española. **Antecedentes:** en este estudio se analizan las propiedades psicométricas del Cuestionario de Estados de Ánimo (MOOD) en población infantil española. Este instrumento fue desarrollado para cubrir el vacío existente en la evaluación de los estados de ánimo en niños. **Método:** el MOOD fue administrado a una muestra de 1.489 niños (edad media= 9,11 años). **Resultados:** las propiedades psicométricas del cuestionario resultaron adecuadas, observándose la relación de los estados de ánimo con la competencia emocional y las quejas somáticas. **Conclusiones:** en base a los resultados obtenidos, el uso de esta herramienta diagnóstica con niños españoles parece justificado.

Palabras clave: estados de ánimo, infancia, competencia emocional, quejas somáticas, validación.

The study of human emotions is complex, controversial and inherently important. Unlike emotions that are directly related to an event or a specific situation, moods are defined as diffuse affective states that appear without any specific reason (Frijda, 1991; Scherer, 2005). However, moods play an important role in our daily lives, affected by several personal and social variables and essential for personal and social adjustment, physical health, socializing or problem solving (Bisquerra, 2009, 2012; Fredrickson, 2001; Fredrickson & Joiner, 2002; Rieffe, Meerum Terwogt, & Bosch, 2004).

Yet, research into moods has generally focused on the negative moods (fear, anger and sadness), as they are considered an alarm, capable of generating problems if systematically obviated. Vázquez, Hervás, Rahona, & Gómez (2009) inform that positive mood studies are less frequent, perhaps due to the difficulties in detecting and studying these emotions.

However, there is an increasing amount of empirical research centred on demonstrating the effect of experiencing positive moods upon variables such as health, psychological well-being, resilience,

etc. (Fredrickson, 2000, 2001, 2003; Martínez & Fernández, 1994; Ryff & Singer, 2003; Vázquez et al., 2009; Vecina, 2006). Happiness considered as a positive mood, helps growth, well-being and promotes health (Martínez & Fernández, 1994; Ryff & Singer, 2003), whereas negative moods are linked with somatic complaints and anxiety and depression symptoms (Fernández, Iglesias, & Barraca, 2007; Jellesma, Rieffe, Meerum Terwogt, & Westenberg, 2009, 2011; Lagerstee, Garnefski, Jellesma, Verhulst, & Utens, 2010; López, Alcántara, Fernández, Castro, & López, 2010; Mestre, Guil, & Gil-Olarte, 2004; Salguero, Fernández-Berrocal, Ruiz-Aranda, Castillo, & Palomera, 2011). In fact, different studies have pointed to the relationship between moods and emotional awareness (Meerum Terwogt, Rieffe, Miers, Jellesma, & Tolland, 2006; Rieffe, Oosterveld, & Meerum Terwogt, 2006; Rieffe et al., 2008; Rieffe, Villanueva, Adrián, & Górriz, 2009; Van der Veek, Nobel, & Derkx, 2012), understanding the latter as how aware we are of emotional functioning (Lahaye, Mikolajczak, Rieffe, Villanueva et al., 2011), evaluated through the Emotion Awareness Questionnaire (EAQ; Rieffe et al., 2007). In fact, moods have been considered as a modulating variable of the effect that emotional awareness has on different areas of child development, as previously described (somatic complaints, anxiety, depression), on social competence (Mavroveli, Petrides, Rieffe, & Bakker, 2007) or on academic and social adjustment (Mestre, Guil, Lopes, Salovey, & Gil, 2006; Petrides, Frederickson, & Furnham, 2004).

Received: July 16, 2012 • Accepted: January 18, 2013

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Despite its importance, Rieffe, Meerum, Terwogt, & Bosch (2002) acknowledged the inexistence of a questionnaire to evaluate moods in children as compared with the great quantity of scales addressing adolescent or adults. The Mood Questionnaire (MOOD), created in order to fill the existing gap in the evaluation of children's moods, consists of a self-report measure for children of 8 and over, designed to evaluate four moods: happiness, anger, sadness and fear. The scale has been validated in Dutch, English and Persian populations (Rieffe et al., 2002, 2004, 2010) reporting adequate psychometric properties with alpha of around .70 and .85, as well as alpha values of .60 and .81 for the different dimensions. This questionnaire is easy to use with a low implementation cost, providing an effective evaluation of the frequency of different moods. However, to date it has never been adapted and validated in the Spanish context.

The aim of the study was to adapt and validate the Mood Questionnaire in Spanish children aged 8 to 14 years. This study is particularly interesting given the impact that moods have on the health and functioning of individuals, to the limited literature on children's samples, as well as the need for tools to evaluate moods in children.

Method

Participants

A sample of 1,489 children, ranging from 8 to 14 years old, selected from 12 primary and secondary schools at 7 locations in the Valencian Community using convenience sampling (*M* age= 9.11 years, *SD*= 1.27, 52.1% female) participated in this study. The children's socio-economic background was middle-class. Eight questionnaires were discarded as they presented errors due to mistakes arising from misunderstanding the instructions.

Instrument

MOOD: The adaptation of the MOOD questionnaire (Rieffe et al., 2004) (see Table 1). This evaluates the frequency of the different moods (Fear, Sadness, Happiness and Anger) over the previous four weeks. This questionnaire consists of 20 items with a three-point response scale: *Never*, *Sometimes* and *Often*. The internal consistency of the scales is acceptable ($\alpha > .77$) in previous studies (Rieffe et al., 2006).

Somatic Complaints List (SCL; Rieffe et al., 2006, 2007): The scale was developed with the aim of identifying the frequency with which children experience and feel pain. It consists of 11 items with a three-point response scale (1= *never*, 2= *sometimes*, 3= *often*) that has been shown to be highly reliable in both previous studies ($\alpha > .84$) (Rieffe et al., 2006, 2007) and the current study (Fit index of the Spanish adaptation using ML and S-B robust correction: $p < .001$, $\chi^2(14) = 158.80$, S-B $\chi^2(14) = 105.38$, NFI= .95, CFI= .94, IFI= .94, RMSEA= .07).

Emotional Awareness Questionnaire (EAQ; Rieffe et al., 2008b): The adapted version of the original scale (Prado-Gascó, Ordóñez, Montoya, Villanueva, & González, 2012) was made up of 28 items, grouped into six key factors of emotion awareness, namely: 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 to be answered using a three-point Likert-type scale (1= *never*, 2= *sometimes*, 3= *often*). All the scales had shown adequate psychometric properties in previous studies (Camodeca & Rieffe,

2012; Rieffe et al., 2009), which was also confirmed in the case of this study (Fit index Spanish version using ML and S-B robust correction: $p < .001$, $\chi^2(378) = 5709.25$, S-B $\chi^2(335) = 805.7900$, NFI= .92, CFI= .91, IFI= .91, RMSEA= .03).

Procedure

The questionnaires were administered after obtaining both the parents' and the school's consent and were anonymous and voluntary. They were administered in the school by the teachers-tutors who controlled the effect of the order of the questionnaires, which lasted approximately 50 minutes.

The international methodological standards recommended by the International Test Commission (ITC) when adapting an instrument to a foreign language (Hambleton, 1994, 1996, 2005; Muñiz & Hambleton, 2000) were followed in the case of the adaptation of the MOOD scale to Spanish and are as described below:

Translation and back translation of the original questionnaire into Spanish by two native interpreters, individually. Researchers participated only in the final edition of the instrument.

A pilot sample of 720 children from 9 to 14 years old from primary and secondary public schools (9-12 years: 352, 13-14 years: 368) was used to evaluate the language forms and ensure a proper understanding of the scale. The final questionnaire was administered to the selected population. A random subsample ($n = 600$ children) was selected to test the reliability of the model without contaminating the other data (Satorra, 2002). The model was tested on the final population.

Data analysis

Statistical analysis was conducted using the SPSS 20.0 and EQS 6.1. Interjudge agreement was analysed with the DELTA 4.1

Table 1
Cuestionario de Estados de Ánimo
(Spanish version of the MOOD questionnaire; Rieffe et al., 2004)

		Nunca	A veces	A menudo
1	Me siento asustado			
2	Me siento feliz			
3	Me siento contento			
4	Me siento enfadado			
5	Me siento triste			
6	Me siento satisfecho			
7	Me siento malhumorado			
8	Me siento desgraciado			
9	Me siento animado			
10	Me siento furioso			
11	Me siento infeliz			
12	Me siento aterrizado			
13	Me siento agradecido			
14	Me siento cabreado			
15	Me siento nervioso			
16	Me siento deprimido			
17	Siento miedo			
18	Me siento alegre			
19	Me siento ansioso			
20	Me siento tranquilo			

software. First, descriptive statistics of every item were calculated followed by the analysis of the reliability and validity of the scale. Finally, the correlations between the different dimensions were calculated.

Results

Item analysis

The 16 items of the MOOD scale were analyzed. The final items, means, standard deviations, item-total correlations and Cronbach's alphas without the item are shown in Table 2. The item number in the original version of the scale is displayed in parentheses.

Essentially, the contribution of every item to the scale seems to be satisfactory. The elimination of any item does not improve the reliability of the scale (.85).

Reliability analysis

To examine scale reliability, its internal consistency was calculated using Cronbach's alpha. However, as this index does not contemplate the influence upon the other construct reliability, both the composite reliability coefficient (CRC) and the average variance extracted (AVE) (Fornell & Larcker, 1981) were calculated. Although the minimum CRC value considered to be adequate is .70 (Nunnally, 1978), and values above .50 are recommended for the AVE (Bagozzi & Yi, 1988; Hair, Black, Babin, Anderson, & Tatham, 2006), some articles have considered values above .40 as

adequate (Aldás, 2000). The MOOD scale adaptation obtained a total alpha value of .85, whilst the different dimensions presented alpha values of between .69 and .78 (sadness $\alpha = .69$; fear $\alpha = .69$; anger $\alpha = .78$ and happiness $\alpha = .76$). Moreover, excepting sadness, the four dimensions presented acceptable CRC and AVE values (Table 2) (Aldás, 2000; Fornell & Larcker, 1981; Vila, Küster, & Aldás, 2000).

Validity analysis

Factorial validity, convergent and discriminant validity and construct and criterion validity of the scale were studied.

An exploratory factorial analysis (EFA) and three confirmatory analyses were conducted in order to study the factorial validity. In the first place, the adequacy of the sample was evaluated using the Kaiser-Meyer-Olkin test (KMO = .884) and Barlett's sphericity test ($p < .01$). Here, using mean component analyses, an EFA was calculated with Varimax rotation, with a selection criteria of eigenvalues higher than 1. The obtained model consists of four factors that explain 57.62% of the variance, which accurately replicates the authors' proposal, except for items 5 and 13, which saturate in more than one dimension.

To increase the robustness of the EFA results, thus ensuring the factorial validity of the instrument regardless of the sample, the model was tested three times: with a pilot sample, a random subsample of the total sample and with every participant (final population). This procedure was possible because there were over 200 individuals in each of the different samples (Bentler, 2007).

Maximum likelihood (ML) estimation with Satorra-Bentler's robust correction was used in every analysis (Bentler, 1995), as it is the most robust method of estimation with non-normal data.

As regards significance of $\chi^2 (< .01)$, in no case can an adequate fit be ensured. Nevertheless, as this statistic is closely related to sample size, other indicators were analysed, such as the ratio between χ^2 and its degrees of freedom (values below five considered acceptable) (Byrne, 1989; Carmines & McIver, 1981); goodness-of-fit indexes like the normed fit index (NFI), the comparative fit index (CFI) and the incremental fit index (IFI) (values over .90 indicate an adequate fit) (Maccallum & Austin, 2000); and the root mean-square error of approximation (RMSEA), where values under .08 are indicators of an adequate fit and optimal values are those under .05 (Browne & Cudeck, 1993). Table 3 displays a summary with these indicators.

The results obtained justify the factorial validity of the instrument. In order to increase the empirical evidence of construct validity, convergent and discriminant validity of the scale were calculated. Convergent validity appeared to be adequate, showing a significant, strong correlation between the items of the scale and the latent variables that they were supposed to measure, with t-values over 3.291 in every case (Vila et al., 2000) and loadings for every factor of over .70 on average (Hair et al., 2006), which did not improve when new loadings were included.

On the other hand, discriminant validity was evaluated by means of the average variance extracted test (AVE) (Fornell & Larcker, 1981; Netemeyer, Johnston, & Burton, 1990). To determine the existence of discriminant validity, the AVE square root must be higher than the correlation among the pairs of factors or dimensions considered (Fornell & Larcker, 1981; Netemeyer et al., 1990; Vila et al., 2000). The results, displayed in Table 5, suggest acceptable discriminant validity.

Table 2

Item analysis and dimension reliability: Sample size, mean, standard deviation, item-total correlation (r_{jt}), Cronbach's Alpha without the item ($\alpha-x$), Cronbach's Alpha of the dimensions (α), composite reliability coefficients (CRC) and average variance extracted (AVE)

Items	M	SD	r_{jt}	$\alpha-x$
Fear $\alpha = .69$; CRC = .72; AVE = .40				
1. I feel frightened (1)	1.47	0.56	.411	.840
11. I feel terrified (12)	1.30	0.53	.494	.835
15. I am afraid (17)	1.44	0.61	.496	.835
13. I feel nervous (15)	1.86	0.64	.369	.843
Happiness $\alpha = .76$; CRC = .78; AVE = .47				
2. I feel happy (2)	1.18	0.40	.371	.841
3. I feel glad (3)	1.22	0.43	.362	.842
8. I feel cheered (9)	1.33	0.53	.280	.846
16. I feel joyful (18)	1.23	0.48	.369	.841
Anger $\alpha = .78$; CRC = .78; AVE = .47				
9. I feel furious (10)	1.45	0.60	.577	.830
4. I feel angry (4)	1.69	0.56	.482	.836
6. I feel annoyed (7)	1.43	0.58	.560	.831
12. I feel pissed (14)	1.48	0.61	.543	.832
Sadness $\alpha = .69$; CRC = .70; AVE = .37				
5. I feel sad (5)	1.60	0.60	.518	.834
7. I feel miserable (8)	1.20	0.48	.438	.838
10. I feel unhappy (11)	1.25	0.52	.533	.833
14. I feel depressed (16)	1.37	0.58	.587	.830

Note: * In parentheses the item number from the original questionnaire.
 ** Acceptable CRC ≥ 0.70 ; *** Acceptable AVE ≥ 0.40 .

Table 3
Goodness-of-Fit Indexes for the Mood Questionnaire

Model	χ^2 (df)	S-B χ^2 (df)	S-B χ^2/df	NFI	CFI	IFI	RMSEA	RMSEA interval	Cronbach α
Pilot n= 793	223.443 (98)	175.863 (98)	1.80	.931	.968	.968	.032	.024-.039	.83
Sample n= 600	250.112 (98)	183.818 (98)	1.88	.901	.951	.951	.038	.033-.043	.84
Final population n= 1489	379.624 (98)	286.943 (98)	2.93	.936	.957	.957	.036	.031-.041	.85

Note: ** χ^2/df ; S-B χ^2/df : adequate ≤ 5 ; *** NFI, CFI, IFI $\geq .90$; **** RMSEA $\leq .80$; * $p < .001$

Construct validity was analysed by studying three expert assessments. Agreement between judges was evaluated by means of two sets of statistics: the Kappa index (Kappa= .83 - .92; $p < .001$, 95%) and the Cohen Delta index ($\delta = .56 - .61$; $p < .001$, 95%). The results suggest a close agreement (Landis & Koch, 1977; Martín & Femia, 2004, 2005, 2008). The different judges categorized every item into its corresponding dimension, except for item 10 “I feel unhappy” which, although belonging to the sadness dimension, was categorized inside happiness dimension by one judge.

Following the analyses and as suggested by the literature, the relations of the construct with other constructs were examined in order to determine the criterion/nomological validity of this instrument (Rieffe et al., 2004, 2006, 2007, 2009, 2010; Jellesma et al., 2006, 2009, 2011; Meerum Terwogt et al., 2006; Lagerstee et al., 2010; López et al., 2010). Hence, Spearman correlation coefficients were calculated for the MOOD, EAQ, SCL and age dimensions (Table 4).

Moreover, a model was tested using structural equations modelling (SEM) by means of the ML method with S-B robust correction, where the four MOOD scale dimensions were predictors of SCL. The fit indexes obtained for the model were: χ^2/df (1397.35/314= 4.45); SB- χ^2/df (1077.95/314= 3.43); RMSEA= .041; CFI= .900; IFI= .901. This suggests an adequate fit of the model (Figure 1).

Table 4
Correlations between the MOOD Questionnaire and other variables

	MOOD dimensions				
	Sadness	Fear	Anger	Happiness	
EAQ	Dif.	-.26**	-.26**	-.19**	.09**
	C.V.	-.26**	-.24**	-.21**	.14**
	N.E.	-.17**	-.12**	-.17**	.07*
	C.C.	.13**	.21**	.14**	.04
	O.	-.19**	-.09**	-.14**	.22**
	P.	-.05*	-.01	-.07**	.23**
SCL	.49**	.44**	.42**	-.28**	
Age	-.12**	-.09**	.03	.12**	

Note: Emotion Awareness Questionnaire (EAQ): Dif: Differentiating emotions; C.V.: Verbal sharing of emotions; N. E.: Acting out emotions; C.C.: Bodily awareness of emotions; O: Attending to Others' Emotions; P: Analyzing one's own emotions; SCL: Somatic complaints.
* $p < .05$; ** $p < .01$

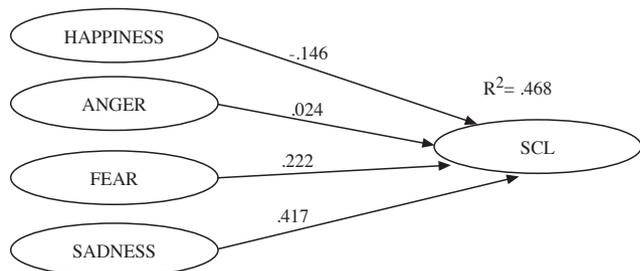
Correlations

The next step in the validation of the scale was the analysis of the Spearman correlations between the instrument dimensions (Table 5) using the total sample or final population.

There were statistically significant correlations among all dimensions ($p < .01$). Moderately high and positive correlations were found between Sadness, Fear and Anger, whereas Happiness presented low and negative correlations with the other dimensions.

Discussion

The importance of this research lies primarily in the adaptation of the Mood Questionnaire (MOOD; Rieffe et al., 2004) to the Spanish context. The highlights of this self-report questionnaire are the fact that it has been specifically elaborated for the child population, its recent creation and its proven validity in other countries (Rieffe et al., 2002, 2004, 2010).



$\chi^2/df = 1397.35/314 = 4.45$; SB- $\chi^2/df = 1077.95/314 = 3.43$, RMSEA= .041, CFI= .900, IFI= .901
* $p < .001$

Figure 1. MOOD, as predictor of the Somatic Complaints List (SCL)

Table 5 Spearman correlations for Mood dimensions and AVE values in the total sample				
	1	2	3	4
1. Sadness	(.82)			
2. Fear	.529	(.77)		
3. Anger	.553	.460	(.76)	
4. Happiness	-.281	-.126	-.183	(.87)

Note: ** AVE Square root on the diagonal
* All correlations significant ($p < .01$)

Essentially, the results obtained are satisfactory, supporting the Spanish validation. The descriptive analysis of the items shows an adequate contribution to the overall scale and a relatively high correlation with the total scale, with no improvements in reliability when any item is eliminated.

The validity of the scale was then studied, leading to a model with four factors or dimensions that explain 57.62% of the variance, show high correlations with each other and seem to accurately reproduce the structure proposed by the authors (Rieffe et al., 2002, 2004).

In general, convergent and discriminant validity are satisfactory. As far as the criterion validity is concerned, there is an observed link between moods and somatic complaints—of which they are also good predictors—, emotional awareness and age, as was also seen in other studies (Jellesma et al., 2006, 2011; Meerum Terwogt et al., 2006; Rieffe et al., 2006, 2007, 2008, 2009, 2010).

As previously noted, scientific literature has pointed out the importance of positive and negative moods, showing them to be essential for variables such as personal and social adjustment, physical health, resilience, socializing, etc. (Bisquerra, 2009, 2012; Fredrickson, 2001; Fredrickson & Joiner, 2002; Jellesma et al., 2009, 2011; Lagerstee et al., 2010; López et al., 2010; Rieffe et al., 2004; Ryff & Singer, 2003; Salguero et al., 2011; Vecina, 2006; Vázquez et al., 2009). Thus, research into mood states is important in order to gain greater insight into moods during childhood, their relations with the previous variables and how this is going to influence adolescence and adult life. Furthermore, recent studies have considered moods

as modulators of the effect that other variables, such as emotional awareness, have on somatic complaints, anxiety, depression, social competence or even academic and social adjustment (Mavroveli et al., 2007; Meerum Terwogt et al., 2006; Mestre et al., 2006; Petrides et al., 2004; Rieffe et al., 2006, 2008, 2009; van der Veek et al., 2012). Hence, the adaptation of the MOOD questionnaire to the Spanish context possesses enough empirical support to be considered a valid, useful instrument for the evaluation of moods in a Spanish child population, showing information about the frequency with which children display a particular mood and offering the possibility of planning an intervention.

There are nevertheless a few limitations to the study and it would be interesting to extend the research to other populations nationwide, as well as to study the temporal stability of the data in the actual population from a longitudinal perspective.

Finally, it is necessary to highlight the novel dimension of this study as it is the first piece of psychometric research into the MOOD questionnaire in a Spanish context and, what is more, it has obtained promising results. Therefore, the MOOD questionnaire can be considered as a useful, practical tool with which to evaluate moods in childhood.

Acknowledgements

This research has received funding from the Spanish Ministry of Science and Innovation, projects PSI2010-18742 and EDU2010-21791.

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