

# Adaptation into Spanish of the Warwick–Edinburgh Mental Well-being Scale (WEMWBS) and preliminary validation in a student sample

María Andrée López · Andrea Gabilondo · Miquel Codony ·  
Carlos García-Forero · Gemma Vilagut · Pere Castellví ·  
Montse Ferrer · Jordi Alonso

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## Abstract

**Purpose** There is growing interest in the assessment of positive mental health as a global indicator of societal wealth. We aimed to adapt the Warwick–Edinburgh Mental Well-being scale (WEMWBS) into Spanish and to perform a preliminary evaluation of its metric properties.

**Methods** Forward and back-translations and cognitive debriefing were carried out. University students ( $n = 148$ ) were recruited to evaluate the final Spanish version, following the UK original study. Distribution of WEMWBS responses, internal consistency, test–retest reliability, construct validity, and factor structure were assessed.

**Results** Only 4 (out of 14) items of the initial Spanish version were not rated as conceptually and linguistically equivalent to the original and were modified. The final

version was clear and comprehensible. Global score's Cronbach's alpha (0.90), item-total score correlations (0.44–0.76), and test–retest ICC (0.84) were all satisfactory. Moderate to high correlations ( $r = 0.45$ –0.70) were observed between the WEMWBS and validity scales. Preliminary confirmatory factor analyses did not support the hypothesis of a single factor.

**Conclusions** A conceptually equivalent Spanish version of the WEMWBS was obtained with high internal consistency, good test–retest reliability, and similar construct validity as the original instrument. Further validity and factorial studies are necessary in larger and more heterogeneous samples.

**Keywords** Positive mental health · Mental well-being · Positive affect · Subjective well-being · Assessment scales · Quality of life

## Abbreviations

CFA	Confirmatory factor analysis
EFA	Exploratory factor analysis
EQ-5D VAS	EuroQol Health Status Visual Analogue Scale
GLS	Global Life Satisfaction Scale
PANAS-PA/NA	Positive and negative affect scales
SWLS	Satisfaction with Life Scale
WEMWBS	Warwick-Edinburgh Mental Well-being Scale
WHO-5	WHO Well-being Index

## Introduction

Mental well-being and its potential to improve quality of life and prevent illness [1, 2] has aroused the interest of

M. A. López · A. Gabilondo · J. Alonso (✉)  
Department of Experimental and Health Sciences,  
Pompeu Fabra University (UPF), Barcelona, Spain  
e-mail: jalonso@imim.es

M. A. López · C. García-Forero · G. Vilagut · P. Castellví ·  
M. Ferrer · J. Alonso  
Health Services Research Unit, IMIM-Hospital del Mar  
Medical Research Institute, Carrer del Doctor Aiguader, 88,  
Edifici PRBB, 08003 Barcelona, Spain

A. Gabilondo  
Outpatient Public Mental Health Network in Gipuzkoa  
(Osakidetza), Sancho El Sabio 35, 20010 Donostia-San  
Sebastian, Spain

M. Codony  
Program of Substance Abuse and Prevention and Promotion  
in Mental Health, Catalan Department of Health (GENCAT),  
Roc Boronat 81-95, 08005 Barcelona, Spain

C. García-Forero · G. Vilagut · M. Ferrer · J. Alonso  
Centro de Investigación Biomédica en Red de Epidemiología  
y Salud Pública (CIBERESP), España, Spain

research in Europe [3–5]. According to World Health Organization (WHO), mental health is more than the absence of a mental disorder and includes a state of well-being in which people can cope with the normal stresses of life and realize their own abilities to be involved in productive activities and fulfilling relationships [6, 7]. Research has shown that higher levels of mental well-being (or positive mental health) are linked to important health outcomes such as lower risks for mental and physical disorders, of disability, and use of health services [8, 9]. These findings have called the interest of both policy-makers and the scientific community to increase the knowledge base about its measurement and application.

In 2005, considering mental health a national health priority, the UK commissioned the development and validation of a scale that could assess the most relevant dimensions of mental well-being in the general population, the Warwick–Edinburgh Mental Well-being Scale (WEMWBS) [10]. In 2010, the WEMWBS was chosen to assess the mental well-being of the general population in Catalonia (Spain) as part of its National Health Survey. Following recommendations on cross-cultural psychiatric research, a process of cultural adaptation and validation of the questionnaire was started [11–13].

We aimed to adapt the original version of WEMWBS into Spanish and to validate in a student sample. In order to better test the equivalence of the adapted and original versions, we followed the procedure of the original scale validation [14] as close as possible.

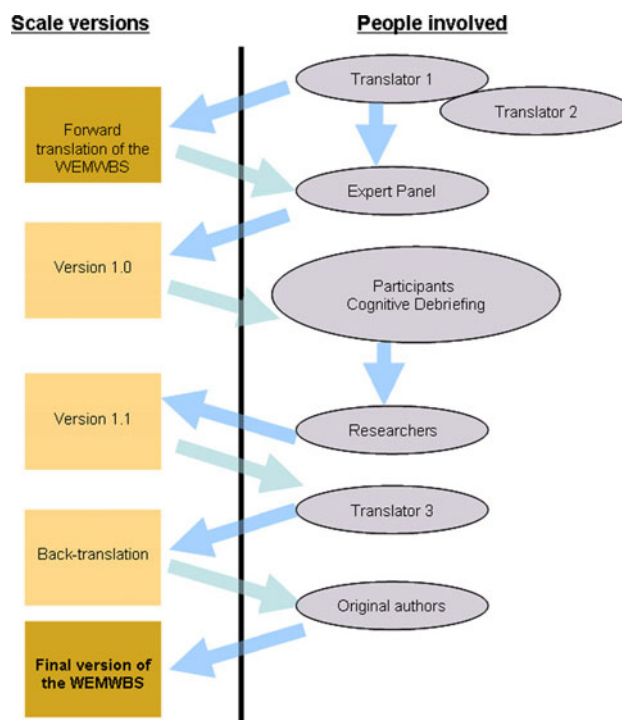
## Methods

### The WEMWBS

It measures positive aspects of mental health in the prior 2 weeks. It is an ordinal scale comprising 14 positively phrased items covering both hedonic and eudaimonic aspects. Each item is responded on a 5-point Likert-type scale from ‘None of the time’ to ‘All of the time’, and a global score is obtained adding all the items (range 14–70, higher scores indicating higher levels of mental well-being). The WEMWBS was developed in the UK and it showed good validity, test–retest reliability (0.83), and internal consistency (0.91). Confirmatory factor analysis (CFA) supported a single factor hypothesis with low social desirability bias [11, 12].

### Adaptation into Spanish

We used a well-known method for the adaptation of the scale consisting of forward and back-translations followed by cognitive debriefing (Fig. 1) [12, 16]. Two independent



**Fig. 1** Figure process of the adaptation of the WEMWBS into Spanish

forward translations into Spanish were produced by translators whose mother tongue is Spanish and who are experts in mental health. Each item was reviewed by an expert panel composed of five mental health and cross-cultural adaptation experts whose native language is Spanish and the translators of the scale. The items were reviewed for clarity and cultural equivalence and the panel rated them as: A (conceptually and linguistically equivalent to original item), B (functionally equivalent, but with semantic differences), or C (equivalence is dubious). For each item, the panel agreed a final translation (Spanish version 1.0) based on the adequacy of the item, the score given to the item (A, B, or C), and the expected comprehension of the phrasing of the item. Cognitive debriefing of this version was carried out in a convenience sample of 5 subjects who also responded about clarity and appropriateness of the questionnaire. The session was recorded to allow three researchers to independently examine participants’ feedback and to jointly develop the Spanish version 1.1. A bilingual translator back-translated it to English and the back-translation was assessed by the original UK authors.

### Preliminary validation of the Spanish version of the WEMWBS

We replicated the validation process of the original questionnaire by first assessing a sample of university students.

We aimed to recruit at least 150 university students, based on a well accepted minimum of 10 individuals per questionnaire item [17]. Pompeu Fabra University (UPF) professors donated time of their lectures and participating students filled out the Spanish WEMWBS, other instruments and information on age, sex, and mother tongue. Consenting students were contacted again a week later to complete a web-based questionnaire including the Spanish WEMWBS and 4 additional scales. There were no ethical implications in our study; none of the scales used are for diagnostic purposes. The data was kept confidential at all times.

We used CFA to test the structural validity of the WEMWBS. Firstly, we tested the hypothesis of one-factor model of the WEMWBS suggested for the original questionnaire [11, 12]. In a second step, we conducted EFA to test for factor solutions with 2–14 dimensions accounting for inter-item covariance in the sample. Analyses were conducted using diagonally weighted least squares estimates with mean and variance correction of  $p$  values and standard errors (wlsmv). Items were treated as categorical. Model fit was tested considering different fit indices, the values sought for a small sample included  $RMSEA \leq 0.08$ ,  $CFI \geq 0.95$ , and  $TLI \geq 0.95$  [13]. For the EFA, in addition to fit indexes, we considered the solution as basically unidimensional if the ratio of the first to the second was over 4 and the ratio between the next three eigenvalues were close to 1 [14].

Internal consistency reliability was computed using Guttman's lambda 2 [15] and model-based internal consistency approach with the procedure described by Bentler [16]. Lambda 2 has the advantage of being more robust than Cronbach's Alpha to departures from unidimensionality. The model-based procedure has the advantage of estimating reliability according to test specification, regardless of dimensionality or extraneous model assumptions, and its can be interpreted similarly to Cronbach's Alpha. One-week test-retest reliability was assessed with the Intraclass Correlation Coefficient (ICC) two-way random model, testing for absolute agreement between the first and second administration of the scale. Values over 0.7 were considered satisfactory for all coefficients 0.70 [17, 18]. To assess whether the scale presented any floor/ceiling effects, the distribution of responses from complete responders was analyzed.

Due to the absence of a gold-standard measure for mental well-being and according to the methods used in the original validation study [14], 6 questionnaires were used to assess construct validity. These were hypothesized to measure 4 concepts closely linked to mental well-being and its theoretical dimensions such as: positive and negative affect (covered by PANAS-PA, PANAS-NA, WHO Well-being Index [WHO-5]), life satisfaction (Satisfaction with

life scale [SWLS]), Global Life Satisfaction Scale (GLS), and overall health (EuroQol Health Status Visual Analogue Scale [EQ-5D-VAS]). According to effect size conventions for proportions of explained variance [19], hypotheses about the relationship of these scales and the WEMWBS were moderate ( $0.45 \leq r_{xy} < 0.70$ ) and positive correlation PANAS-PA, WHO-5 and EQ-5D VAS, low ( $r_{xy} < 0.45$ ) and positive with SWLS and GLS, and moderate and negative with PANAS-NA according to the recommendations from the creators of the original scale and statistical guidelines on correlations [18]. Spearman correlations were computed, due to the ordinal nature of the scales.

Analyses were conducted using *Mplus* software, version 6.2 [20].

## Results

For version 1.0, the expert panel rated 10 items as A (conceptually and linguistically equivalent to original item), 3 items as B (functionally equivalent, but with semantic differences), and only 1 item as C (dubious equivalence). Examples of B and C items are shown in Table 1. Cognitive debriefing participants regarded all items and response options of the scale as comprehensible and appropriate.

Five hundred graduate students (Economy, Health and Life Sciences, and several Master's degrees) were invited to participate via e-mail, and 148 (29.6 %) fully completed the first evaluation. Fifty-two of them (35.2 %) also completed the 1-week retest administration. The low participation rate in the first evaluation was due to low attendance to class. Mean age of participants was 22.25 years, 75 % of whom were females.

Taken into account the sample size, goodness of fit results for a one-factor confirmatory model ( $\chi^2 = 162.76$   $df = 77$ ,  $p < 0.001$ ;  $CFI = 0.94$ ,  $TLI = 0.97$ ;  $RMSEA = 0.092$ ) suggested that a unidimensional structure could not be entirely adequate [21]. In the EFA, the ratio of the first eigenvalue (7.12) to the second was equal to 6.14, and the ratio between the next three eigenvalues was stabilized around 1.20. While EFA results suggested that a structure with two highly correlated dimensions ( $r = 0.70$ ) would yield minor gains in fit ( $\chi^2 = 115.62$   $df = 64$ ,  $p < 0.001$ ;  $CFI = 0.98$ ,  $TLI = 0.97$ ;  $RMSEA = 0.073$ ), limitations in sample size and item skewness advice for extreme caution when interpreting this result.

Mean WEMWBS baseline score was 53.5. For the overall score, neither floor effect nor ceiling effect was observed. Only a ceiling effect was found for some individual items (the highest 47.4 %). Internal consistency for a total score as measured by Guttman's Lambda 2 was

**Table 1** Two examples of cultural equivalence ratings and final version of selected items of the Spanish version of the WEMWBS

Cultural equivalence*	Original Item	Back-translation	Problems encountered in CD <sup>a</sup> , expert panel of by the original authors	Final decision	Final version
B	<i>I've been able to make up my own mind about things</i>	I have been able to make my own decisions	The original authors commented on the back-translation. They were concerned about it being translated to 'make own decisions' since in English one can make up one's own mind about different things without putting too much weight as making a decision.	The item was not changed. In Spanish 'making one's own decision' would be an equivalent of 'making up one's mind about things'	<i>He sido capaz de tomar mis propias decisiones</i>
C	<i>I've been feeling confident</i>	I have felt secure (confident)	The original authors commented on the problem of translating 'confident' to 'secure' (seguro/a in Spanish) which in Spanish could mean two things: safe or confident	The adjective 'seguro' was followed by a parenthesis specifying its meaning: (con confianza)	<i>Me he sentido seguro/a (con confianza)</i>

<sup>a</sup> Cognitive Debriefing

\*B = Functionally equivalent, but with semantic differences, C = The equivalence is dubious, as rated by the expert panel

0.92. Full model-based internal consistency for the unidimensional model was very high (0.92). The two-factor model yielded only a marginal improvement in reliability (0.94).

Internal consistency for a total score as measured by Guttman's Lambda 2, was 0.92. Full model-based internal consistency for the unidimensional model was very high (0.92). The two-factor model yielded only a marginal improvement in reliability (0.94). Corrected item-to-total correlations ranged from 0.44 to 0.76 (Table 2). Score test-retest reliability using the original scoring algorithm and measured with the ICC was 0.84 ( $p < 0.001$ ).

As shown in Table 3, scales measuring well-being, positive affect, life satisfaction, and overall health had positive high correlations with the WEMWBS. Negative correlations were observed between two negative affect scales and the WEMWBS. Results were consistent with a priori hypotheses and were similar to those obtained in the original validation study of the UK, with the exception of the SWLS, which correlation was lower in our study ( $R = 0.57$ ;  $p < 0.01$  compared to 0.73;  $p < 0.01$ , UK study).

## Discussion

In this study, we developed the Spanish version of the WEMWBS and we conducted a preliminary validation analyses using students sample. We followed methods similar to the ones of the original scale, to increase comparability. The Spanish WEMWBS has shown to be comprehensible and to provide reliable and consistent results. It has also proved to measure a construct similar to well-being, satisfaction with life and overall health, important components of mental well-being.

CFA results suggest that the Spanish version of the WEMWBS is most likely unidimensional, although it does not perfectly fit the one-factor model proposed by the original authors. Even though EFA goodness of fit points at marginal gains when using a solution with two dimensions, eigenvalues point at an essentially unidimensional extraction. However, the small sample size impeded cross validation, and the highly skewed item distributions [22, 23] advice for great care when interpreting EFA analyses. Results concerning the questionnaire structure must be considered preliminary.

Regardless of the final questionnaire factor solution, it can be said that the Spanish and the UK scales behave similarly in terms of reliability and validity of the global score. Reliability estimates of the Spanish scale were quite satisfactory with high internal consistency regardless of the questionnaire structure of choice (Cronbach's alpha of 0.89 for UK and internal consistencies over 0.90 for Spain). Individual items also showed similar homogeneity, as indicated by corrected item-total correlations (range = 0.52–0.80 and 0.44–0.76, respectively). Also correlations between the WEMWBS and other scales demonstrate that the Spanish version measures concepts related to positive (rather than negative) feelings, a fundamental part of mental well-being. We nevertheless found some differences: the Spanish student sample showed a considerable ceiling effect, and the factor structure has two or more dimensions. Likely, these discrepancies are due to differences in sample size (the UK study had a sample more than twice as big as the Spanish student sample).

Although the adaptation into Spanish of the WEMWBS was considered appropriate, our validation study has several limitations. First of all, a gold-standard measure of mental well-being does not exist. Second, the high

**Table 2** Percentage of floor and ceiling responses per item and item-total score correlation (N = 148)

Item	Floor N (%)	Ceiling N (%)	Missing N (%)	Item-total score correlation
1. Optimistic about future	2 (1.3)	30 (19.7)	1 (0.7)	0.55
2. Useful	0 (0)	22 (14.5)	0 (0)	0.63
3. Relaxed	3 (2)	11 (7.2)	0 (0)	0.54
4. Interested in other people	0 (0)	43 (28.5)	1 (0.7)	0.44
5. Energy to spare	4 (2.6)	11 (7.2)	0 (0)	0.59
6. Dealing with problems well	1 (0.7)	19 (12.5)	0 (0)	0.61
7. Thinking clearly	1 (0.7)	33 (21.7)	0 (0)	0.67
8. Good about myself	1 (0.7)	28 (18.4)	1 (0.7)	0.76
9. Close to other people	1 (0.7)	26 (17.1)	0 (0)	0.67
10. Confident	2 (1.3)	25 (16.4)	1 (0.7)	0.72
11. Able to make up my own mind	0 (0)	64 (42.1)	1 (0.7)	0.51
12. Feeling loved	0 (0)	72 (47.4)	0 (0)	0.47
13. Interested in new things	0 (0)	38 (25.0)	0 (0)	0.47
14. Cheerful	0 (0)	29 (19.1)	0 (0)	0.70
Global score*	0 (0)	0 (0)	4 (2.63)	

\*Cronbach's alpha = 0.90

**Table 3** Correlations between the WEMWBS scale and other construct-related scales and compared to the UK original study [14]

Hypothesized correlation	Scale	Concept measured	Our study		UK study	
			N	Spearman correlations* (baseline)	N	Correlations*
Highest	WHO-5	Well-being	143	0.70	79	0.77
	PANAS-PA last week	Positive affect	142	0.68	63	0.71
High	PANAS-PA general	Positive affect	112	0.52		
	EQ5D-VAS	General health	148	0.45	72	0.43
Negative moderate	PANAS-NA last week	Negative affect	144	-0.59	63	-0.54
	PANAS-NA general	Negative affect	115	-0.25		
Lower	SWLS	Life satisfaction	147	0.57	79	0.73
	GLS	Life satisfaction	146	0.52	77	0.53

\* All correlations were significant at  $p < 0.01$  level

percentage of female participants (75 %) is a limitation of the external validity of our study. Validation studies with a general population sample and a greater sample size should be conducted and compared to the validation with the student sample. Third, we could not administer the Short Depression-Happiness Scale (SDHS), the Scale of Psychological Well-Being (SPWB), and the Emotional Intelligence Scale (EIS) questionnaires, also used in the original validation, because of the unavailability of validated Spanish versions. Finally, further assessment of the scale should include responsiveness to assess whether the scale adequately monitors changes in mental well-being, robustness of the single construct, and the possibility to make a shorter scale like in the original version [23].

In conclusion, the Spanish version of the WEMWBS has been obtained and its preliminary validity has been

established. The WEMWBS seems to be a very promising instrument for monitoring well-being of the Spanish population. Nevertheless, the instrument needs to be further tested in larger and more diverse populations. In particular, the factor structure of the questionnaire and its responsiveness deserve further investigation.

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**Conflict of interest** Authors declare no conflict of interest.

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