

## Spanish adaptation of the Patient Health Engagement scale (S.PHE-s) in patients with chronic diseases

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### Abstract

**Background:** The Patient Health Engagement scale is an instrument based on evidence about the experiences and preferences of patients with chronic diseases regarding their engagement with the treatment they receive. **Aims:** The main goal of this study was to adapt the Patient Health Engagement scale to the Spanish population (S.PHE-s) following the guidelines for cross-cultural adaptations. **Methods:** The sample comprised 413 patients with different chronic diseases. **Results:** The confirmatory factor analysis showed a one factor model corresponding to the structure proposed by the original authors. The factor structure was invariant by gender. Furthermore, a Rasch Model showed that the S.PHE-s was unidimensional. In addition, every polychoric correlation coefficient was higher than .60. The Ordinal Alpha of the S.PHE-s was .85. Finally, the S.PHE-s was found to be positively related to life satisfaction, positive affect, and treatment adherence and negatively correlated to negative affect, depression, and anxiety. **Conclusions:** In light of these results, it may be concluded that the S.PHE-s has good psychometric properties and it may be used by the Spanish-speaking scientific community to measure patient engagement.

**Keywords:** Chronic disease, confirmatory factor analysis, cross-cultural adaptation, patient engagement, Patient Health Engagement scale.

### Resumen

**Adaptación española de la escala Patient Health Engagement (S.PHE-s) en pacientes con enfermedades crónicas. Antecedentes:** la escala Patient Health Engagement es un instrumento construido en base a la experiencia y preferencias de pacientes con enfermedades crónicas en lo que respecta a su compromiso con el tratamiento que reciben. **Objetivos:** el objetivo del presente estudio fue adaptar al castellano la escala Patient Health Engagement (S.PHE-s) siguiendo las directrices de las adaptaciones transculturales. **Método:** la muestra estuvo compuesta de 413 pacientes con diferentes enfermedades crónicas. **Resultados:** el análisis factorial confirmatorio mostró un modelo unifactorial que correspondía a la estructura propuesta por los autores originales. La estructura factorial era invariante por género. Además, el modelo Rasch realizado puso de manifiesto la unidimensionalidad de la escala. Además, los coeficientes de correlación policóricas eran superiores a .60. El Alpha Ordinal de la escala fue de .85. Finalmente, se encontró que la S.PHE-s estaba positivamente relacionada con la satisfacción con la vida, el afecto positivo y la adherencia al tratamiento, y negativamente con el afecto negativo, la depresión y la ansiedad. **Conclusiones:** a la luz de estos resultados se puede concluir que la S.PHE-s tiene unas propiedades psicométricas adecuadas y que puede ser usada por la comunidad científica hispanohablante para medir el compromiso de los pacientes.

**Palabras clave:** adaptación transcultural, análisis factorial confirmatorio, compromiso de los pacientes, enfermedad crónica, escala Patient Health Engagement.

The diffusion of chronic diseases in the Western population is estimated to cause 59% of global mortality (31.7 million deaths) (Lim et al., 2010). In Spain, the country where this study was conducted, cardiovascular and circulatory diseases, and neoplasms are the leading causes of mortality (Haro et al., 2014). Several chronic diseases are linked by common lifestyle determinants such as diet, physical activity, and tobacco consumption and generally by the low awareness of citizens about health risks and their low commitment to preventive behaviors (Lim et al., 2010).

To tackle these healthcare's challenges, the majority of Western countries suggest patients' having an active role in their own healthcare as being a possible solution (Menichetti, Libreri, Lozza, & Graffigna, 2016). In the last few decades, the term "patient engagement" has shown a huge trend of improvement within the literature and has been increasingly adopted by scholars and professionals to denote this process of making patients protagonists and actors of their own care management (Menichetti et al., 2016). Engaging patients in their own healthcare management can indeed have a pivotal role in improving the effectiveness and efficiency of care (Zuckerman, Margolis, & Mate, 2013).

There are indications that patient engagement with their care process may indeed improve health outcomes across diseases (Alexander, Heard, Mittler, & Harvey, 2012; Begum, Donald, Ozolins, & Dower, 2011; Munson, Wallston, Dittus, Speroff, & Roumie, 2009). For example, studies have found that patients

who were actively involved in their care plans were more likely to trust their clinicians (Becker & Roblin, 2008) and less likely to experience adverse clinical events and hospital readmissions (Hibbard & Greene, 2013).

Multiple international studies have empirically demonstrated that patients who are more engaged in their care are also more likely to engage in preventive behaviors such as having regular check-ups, screenings, and immunizations (for a systematic review, see Domecq et al., 2014). Finally, more highly activated people are also significantly more likely to engage in healthy behavior such as eating a healthy diet and getting regular exercise (Tabrizi, Wilson, O'Rourke, & Coyne, 2011).

Patient engagement is also associated to a better health-related quality of life in individuals with different chronic diseases (Barello & Graffigna, 2015). For example, in people suffering from arthritis, the positive relationship between engagement and positive affect and the negative association with depression and anxiety have recently been demonstrated (Arends, Bode, Taal, & van de Laar, 2016). In individuals with chronic disabilities, engagement has been found to be positively related to life satisfaction (van Campen & van Santvoort, 2013). In patients suffering from chronic pain, the negative link that exists between engagement and depression (Kratz, Hirsh, Ehde, & Jensen, 2013) and negative affect (Payne-Murphy & Beacham, 2015) has been well established. Finally, in patients with different chronic diseases, a positive association between engagement and treatment adherence has been observed (Heaton, Räisänen, & Salinas, 2016).

There is growing consensus among healthcare professionals and scholars that a fundamental step to improve patient engagement is to systematically adopt reliable and validated measures to assess the level of engagement of chronic patients (Graffigna & Barello, 2016). The Patient Health Engagement scale (PHE-s) is the first validated measurement dedicated to assess the psychosocial experience of engagement which a chronic patient may undergo (Graffigna, Barello, Bonanomi, & Lozza, 2015). The PHE-s has been developed from the Patient Health Engagement model, which features the complex and dynamic process of engagement, consisting in four experiential positions: Blackout, arousal, adhesion, and eudaimonic project (Graffigna et al., 2015). Furthermore, the PHE-s has been successfully translated to another language (Zhang et al., 2017).

As no Spanish-language adaptation of the PHE-s has been carried out to date, the goal of the present study was to adapt it to Spanish-speaking populations (S.PHE-s). The adaptation of the PHE-s is a complex task that requires careful planning to ensure its content maintenance for the Spanish population (Muñiz, Elosua, & Hambleton, 2013). For this reason, the PHE-s has been adapted to Spanish following the guidelines for translation and cross-cultural adaptations (Gjersing, Capplehorn, & Clausen, 2010).

## Method

### Participants

The participants consisted of 413 individuals (75.5% female) aged between 18 and 70 years ( $M = 37.1$ ,  $SD = 11.8$ ), who suffered from a chronic disease condition (see Table 1). Furthermore, there was no severe floor or ceiling effect for the summary score of the S.PHE-s, as only 1 (0.2%) and 27 (6.5%) of the participants achieved the lowest and highest possible scores, respectively.

### Instruments

To measure patient engagement, the Spanish translation of the PHE-s (Graffigna et al., 2015) was used. The PHE-s has an ordinal nature and it consists of 5 items with 7 responses that potentially mirror the kind of engagement experience lived by the patients. To answer the scale, the patients are asked to position themselves along each item's continuous, according to the affirmation that better aligns with their experience. The Ordinal Alpha of the original version of the PHE-s was .85. Items in English, Italian, and Spanish can be seen in Table 2.

To measure life satisfaction, the Satisfaction With Life Scale (SWLS) (English version: Pavot & Diener, 1993; Spanish version: Vázquez, Duque, & Hervás, 2013) was used. This scale is a 5-item measure with a good reliability ( $\alpha = .90$ ), which is answered through a 9-point Likert scale. Its score is computed by averaging the 5 items of the scale. Higher scores on the SWLS reflect a better evaluation of the satisfaction with one's life as a whole.

To measure positive and negative affect, the Positive And Negative Affect Schedule (PANAS) (English version: Watson, Clark, & Tellegen, 1988; Spanish version: López-Gomez, Hervás, & Vázquez, 2015) was used. The PANAS is a 20-item instrument

Table 1  
Clinical characteristics of the sample

Chronic disease	Percentage
Hypothyroidism	16.9%
Hypertension	12.3%
Crohn's disease	7.0%
Asthma	6.8%
Migraine	6.5%
Depression/Anxiety	5.3%
Diabetes	4.8%
Non specified chronic disease	4.4%
Ulcerative Colitis/Irritable bowel disease	3.9%
Chronic fatigue syndrome	3.6%
Hypercholesterolemia	3.4%
Chronic cardiac problems	2.7%
Fibromyalgia	2.4%
Hypotension	2.4%
Cystic fibrosis	1.9%
Arthritis	1.7%
Coeliac disease	1.7%
Chronic dermatological problems	1.7%
Multiple sclerosis	1.5%
Chronic kidney disease	1.5%
Endometriosis/Polycystic ovarian syndrome	1.2%
Lupus	1.0%
Anemia	1.0%
Hepatitis	.7%
Allergies	.7%
Cancer	.7%
Spondylitis	.7%
HIV	.5%
Muscular dystrophy	.5%
Visual chronic problems	.5%
Total	100%

that evaluates positive (10 items) and negative (10 items) affect. It is answered by means of a 9-point Likert scale (from 1-never to 9-always-). Positive and negative affect scores are computed by averaging items from the positive or negative affect scales respectively. Its Cronbach's alpha coefficient is .88 for the positive affect subscale and .88 for the negative affect subscale. Higher scores on the positive affect subscale reflect greater positive feelings. Higher scores on the negative affect subscale reflect greater negative feelings.

To measure depression and anxiety, the Hospital Anxiety and Depression Scale (HADS) (Zigmond & Snaith, 1983; Spanish version: Terol-Cantero, Cabrera-Perona, & Martín-Aragón, 2015) was used. This scale consists of 14 items that measure, across a 9-point Likert scale, depression (7 items) and anxiety (7 items). Two scores are computed by averaging the corresponding items for each of these subscales. Higher scores on depression ( $\alpha = .87$ ) reflect a lower mood. Higher scores on anxiety ( $\alpha = .80$ ) reflect a more nervous behavior.

To measure treatment adherence, the Morisky Medication Adherence Scale (MMAS-8) was used (Morisky, Ang, Krousel-Wood, & Ward, 2008; Spanish version: De las Cuevas & Peñate, 2015). The MMAS-8 is an 8-item measure that evaluates medication-taking behavior through yes and no questions. Its Cronbach's alpha coefficient is .63. Higher scores on MMAS-8 reflect greater treatment adherence.

#### Procedure

The data collection was performed through the Qualtrics online system. This Website contained the instructions and the online questionnaire for self-administration. The study was widely publicized in relevant Spanish associations for patients with chronic diseases.

In order to be included in the final sample, patients had to be: 1) Spanish and residing in Spain; 2) diagnosed with one or

more chronic diseases; 3) following a chronic treatment for their disease/s; and 4) aged >18 years old.

The PHE-s has been adapted to Spanish using the translation/back-translation methodology (Gudmundsson, 2009) and following the indications / rules of the International Test Commission (Hambleton, 2005) and the guidelines for translation and cross-cultural adaptations (Gjersing et al., 2010).

The first Spanish translation from Italian was performed by one of the authors. This Spanish translation was independently reviewed by an additional evaluator, who worked with the first translator to reach an agreed-upon translation of the items, especially those which posed the most difficulty from a semantic and/or grammatical standpoint. Afterwards, a bilingual Italian translator back-translated the agreed Spanish translation to Italian, with no knowledge of the original scale in Italian, in order to preserve the reliability of the back-translation. Items can be seen in Table 2.

#### Data analyses

Firstly, the factorial structure of the S.PHE-s was studied. The sample was randomly split in half and an exploratory categorical principal component analysis (CATPCA) was performed on one half and a confirmatory factor analysis (CFA) on the other half. The CATPCA was chosen because of the ordinal nature of the items. In the case of the CFA, the estimation method was asymptotically distribution free, which is particularly suitable for ordinal data and not-Gaussian distributions. Values lower than .05 on the Root Mean Square Error of Approximation (RMSEA) and Root Mean Square Residual (RMR) and higher than .95 on the Goodness of Fit Index (GFI) and Comparative Fit Index (CFI) indicate a good fit (Kline, 2011). In addition, non-significant chi-square values suggest a good fit of the model (Kline, 2011). Gender invariance was also tested. Moreover, a Rasch Model (RM) was implemented to further investigate whether the S.PHE-s was unidimensional

Table 2  
Items of the PHS-s: English, Italian, and Spanish version

Items	English	Italian	Spanish
	Thinking about my health status...	Pensando alla mia malattia...	Pensando en mi enfermedad...
1	I feel in Blackout; I am in alarm; I am aware; I feel positive	Mi sembra di essere in blackout; Mi sento in allerta; Mi sento consapevole; Mi sento positivo	Me siento bloqueado; Me siento en alerta; Me siento consciente; Me siento positivo
2	I feel dazed; I am in trouble; I am conscious; I feel serene	Mi sento perduto; Mi sento in allarme; Sono cosciente; Mi sento sereno	Me siento perdido; Me siento en problemas; Soy consciente; Me siento sereno
3	I feel overwhelmed by emotions; I feel anxious every time a new symptom arises; I got used to my illness condition; Despite my illness I perceive coherence and continuity in my life	Mi sento sopraffatto dalle emozioni; Sono in ansia ogni volta che sento un nuovo sintomo; Sento di essermi abituato alla mia malattia; Ho un senso di coerenza e continuità nella mia vita nonostante la malattia	Me siento abrumado por la emociones; Estoy ansioso cada vez que aparece un nuevo síntoma; Siento haberme acostumbrado a mi enfermedad; Tengo un sentido de coherencia y continuidad en mi vida a pesar de la enfermedad
4	I feel very discouraged due to my illness; I feel anxious when I try to manage my illness; I feel I adjusted to my illness; I am generally optimist due to my about my future and my health condition	Vivo momento di grande sconforto; Mi sento spesso in ansia quando cerco di gestire la mia malattia; Sento di essermi adattato alla mia malattia; Sono tendenzialmente ottimista sul mio futuro e sul mio stato di salute	Vivo momentos de gran incomodidad; Me siento frecuentemente con ansiedad cuando intento gestionar mi enfermedad; Siento haberme adaptado a mi enfermedad; Soy generalmente optimista sobre mi futuro y sobre mi estado de salud
5	I feel totally oppressed by my illness; I am upset when a new symptom arises; I feel I have accepted my illness; I can give sense to my life despite my illness condition	Mi sento completamente schiacciato dalla malattia; Mi agito molto quando appare un nuovo sintomo; Complessivamente sento di aver accettato la mia malattia; Riesco a trovare un senso alla mia vita nonostante la malattia	Me siento completamente destrozado por mi enfermedad; Me agito mucho cuando aparece un nuevo síntoma; En general, siento que he aceptado mi enfermedad; Consigo encontrar un sentido a mi vida a pesar de la enfermedad

(Brentari & Golia, 2007). A Partial Credit Model (PCM) was used. Infit and outfit mean-square standardized (MNSQ), logits, and Standard Error of Measurement (SEM) were estimated. If the data fitted the RM, the MNSQ should be between 0.6 and 1.4, and none of the thresholds should exceed the limit of 4.0 logit (Wright, Linacre, Gustafson, & Martin-Lof, 1994). The SEM is an estimation of item difficulty. Finally, the Person Separation Index (PSI) was calculated to evaluate the reliability in the RM.

Secondly, the reliability of the S.PHE-s was analyzed. For that purpose, the inter-item polychoric correlations of the items were calculated. The average inter-item polychoric correlation may be considered a subtype of internal consistency reliability (Bonanomi, Nai Ruscone, & Osmetti, 2013). In addition, the Ordinal Alpha via empirical copula was estimated. Ordinal variables have an underlying multinormal distribution, by using a copula framework (Bonanomi, Cantaluppi, Rai Ruscone, & Osmetti, 2015). This estimator builds upon the Spearman grade correlation coefficient on a transformation of the ordinal variables, calculated by the copula function. A reliability index  $\geq .70$ ,  $.80$ , or  $.90$  can be interpreted as acceptable, good, or excellent, respectively (Gliem & Gliem, 2003).

Thirdly, to analyze the criterion validity of the S.PHE-s, the relationship between patient engagement and life satisfaction, positive and negative affect, depression, and anxiety was studied using Pearson's correlations. Finally, an ANOVA was conducted with low, medium, and high adherence patients. In addition, a Bonferroni Post Hoc Test was estimated.

The SPSS 23.0, Amos 23.0, and R 3.2.4 software packages were used to perform the analyses.

Results

Factorial structure

The sample was divided into 2 sub-groups, Group 1 ( $n = 245$ , 74.7% females, aged 18-67 years old;  $M = 37.6$  years,  $SD = 11.9$ ) on which the CATPCA was performed and Group 2 ( $n = 164$ , 76.8% females, aged 18-70 years old;  $M = 36.3$  years,  $SD = 11.6$ ) for which the CFA was used.

The CATPCA showed that the initial analysis yielded one factor (eigenvalue = 3.5), explaining 70.8% of the total variability (see Table 3).

All factor loadings had a very high value ( $>.80$ ), confirming the unidimensionality of the scale.

The CFA showed reasonable goodness of fit indices (see Figure 1). The Chi square value ( $\chi^2 = 1.88$ ,  $df = 4$ ,  $p = .75$ ) and goodness of fit indices (CFI = .99, RMR = .01, GFI = .99, RMSEA = .05) obtained suggest that the model is coherent with the data. Therefore, the fit indices met the criteria of fit for the

*Table 3*  
Factor loadings

S.PHE-s Item	One factor solution
Item 1	.83
Item 2	.83
Item 3	.83
Item 4	.85
Item 5	.84

hypothesized one-factor structure. Moreover, the factor structure was invariant by gender ( $\chi^2 = 1.9$ ,  $df = 18$ ,  $p = .13$ , RMSEA = .05, CFI = .99).

The RM showed that all the items fit the model well (see Table 4). Infit and Outfit statistics ranged from 0.95-1.07, which all are within the acceptable range (PSI = .86).

Internal consistency

Every inter-item polychoric correlation coefficient was higher than .60 (see Table 5). The average inter-item polychoric correlation is equal to .69, which indicates a high correlation between items.

The S.PHE-s had a very good reliability, since the value of the Ordinal Alpha was equal to .85. Therefore, the internal consistency of the 5-item S.PHE-S scale was satisfactory.

First order CFA

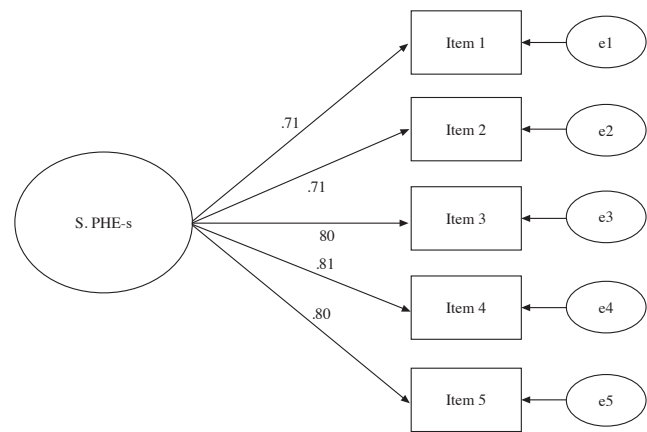


Figure 1. Standardized estimations of the model. The values of the arrows are the standardized regression coefficients ( $\beta$ )

*Table 4*  
Rasch analysis

S.PHE-s Item	Measure (logits)	SEM	Infit MNSQ	Outfit MNSQ
Item 1	.17	.07	.97	.97
Item 2	.10	.08	.97	.98
Item 3	-.11	.07	1.07	1.05
Item 4	.01	.07	.95	.99
Item 5	.00	.07	.98	.98

SEM = Standard Error of Measurement; MNSQ = Mean-square standardized

*Table 5*  
Item-Item Polychoric Correlation Matrix for Ranks on the S.PHE-s

S.PHE-s Item	Item 1	Item 2	Item 3	Item 4	Item 5
Item 1	–	.78	.62	.72	.64
Item 2		–	.63	.65	.66
Item 3			–	.71	.72
Item 4				–	.73
Item 5					–

### Criterion validity

It was found that S.PHE-S was positively related to life satisfaction and positive affect and negatively correlated to negative affect, depression, and anxiety (see Table 6).

For treatment adherence, an ANOVA was conducted to measure the S.PHE-s for patients with low adherence (MMAS-8 score <6) ( $M = 2.82$ ,  $SD = .84$ ), medium adherence ( $6 \leq \text{MMAS-8 score} < 8$ ) ( $M = 2.99$ ,  $SD = .89$ ) or high adherence (MMAS-8 score = 8) ( $M = 3.12$ ,  $SD = .83$ ). The ANOVA confirmed that the differences were significant [ $F(2,410) = 3.23$ ,  $p < .05$ ]. The Bonferroni Post Hoc Test showed a significant difference between the S.PHE-s-level for patients with low adherence and patients with high adherence.

Table 6  
Correlations between the variables

Variables	S.PHE-s
Life satisfaction	.34**
Positive affect	.39**
Negative affect	-.34**
Anxiety	-.42**
Depression	-.44**
** $p < .01$	

### Discussion

According to the above-mentioned results, the goal of this study, adapting the PHE-s to the Spanish population, was fulfilled.

Firstly, the PHE-s was successfully translated to Spanish (Beaton et al., 2000). Secondly, evidences of construct validity confirming the factorial structure proposed by Graffigna et al. (2015) among a Spanish population were obtained. In both studies, the same one factor structure was observed. Furthermore, the results of the Chinese version of the PHE-s also supported the single-factor structure of this instrument (Zhang et al., 2017). Thirdly, the reliability of the S.PHE-s was appropriate given the Ordinal Alpha found. Ordinal Alphas obtained with our Spanish sample and in the original study were the same (.85). The Chinese version of the PHE-s showed a similar internal consistency

(.89). Fourthly, evidences of criterion validity were obtained by analysing the relationship between S.PHE-s and life satisfaction, positive and negative affect, depression, anxiety, and treatment adherence. As expected, patient engagement was positively related to life satisfaction (van Campen & van Santvoort, 2013), positive affect (Arends et al., 2016), and treatment adherence (Heaton et al., 2016) and negatively correlated to depression (Kratz et al., 2013), anxiety (Arends et al., 2016) and negative affect (Payne-Murphy & Beacham, 2015). However, the Chinese version of the PHE-s did not show a significant correlation with medicine adherence behavior (Zhang et al., 2017).

### Practical implications

The S.PHE-s may be self-administered, allowing the patient with a chronic disease to position his/her engagement experiences along a continuum. Engaging patients in their healthcare management may have an important role in improving treatments for patients with chronic diseases (Zuckerman et al., 2013). Furthermore, patient engagement helps to improve health outcomes across different diseases (Alexander et al., 2012). Therefore, healthcare professionals in Spanish-speaking countries may use the S.PHE-s in primary care settings to better understand the patient engagement levels among patients with chronic diseases.

### Limitations

This study has at least two limitations. Firstly, the ratio of women/men of our sample (75.5% female) should be more similar to that of the general population. Secondly, it is an online study. Some researchers have expressed concern about Web-based studies, but following expert recommendations, these problems may be overcome (Reips, & Birnbaum, 2011).

### Conclusions

Despite these limitations, we believe that the S.PHE-s may be an appropriate tool for measuring patient engagement. Our research adds to the accumulating evidence that the PHE-s has good validity and reliability (Graffigna et al., 2015; Zhang et al., 2017).

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