PSYCHOMETRIC PROPERTIES OF THE PORTUGUESE VERSION OF THE PAIN SELF-EFFICACY QUESTIONNAIRE

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Abstract

Aims: This study sought to translate and evaluate the psychometric properties of a European Portuguese version of the Pain Self-Efficacy Questionnaire (P-PSEQ), in order to enable its use in clinical and cross-cultural studies.

Material and Methods: The Pain Self-Efficacy Questionnaire was translated into European Portuguese and then back-translated into English. A consensus version of the translated version was pre-tested with a pilot sample, followed by cognitive debriefing, resulting in a final version of the measure.

A convenience sample of 174 Portuguese adults with chronic musculoskeletal pain completed the Portuguese Pain Self-Efficacy Questionnaire (P-PSEQ) and criterion measures of pain intensity (Numerical Ratings Scale), pain interference (Portuguese Brief Pain Inventory Interference Scale), quality of life and general health (SF-12), and psychological functioning (Hospital Anxiety and Depression Scale). Cronbach's alpha and composite reliability coefficients were computed as measures of reliability, and confirmatory factor analysis was performed. Pearson correlation coefficients between the P-PSEQ score and the criterion measures were computed to evaluate the construct validity of the scale.

Results: The P-PSEQ demonstrated good to excellent reliability (Cronbach's alpha = 0.88 and Composite reliability = 0.92), and showed moderately strong associations with the criterion measures in the hypothesized directions, supporting its construct validity. Additionally, the confirmatory factor analysis supported a single factor solution, as hypothesized.

Conclusions: The findings provide strong support for the reliability and validity of the P-PSEQ. Research is needed to determine the responsivity of the P-PSEQ and to establish the generalizability of the results in other samples of Portuguese patients with chronic pain.

Keywords: Pain; Pain Assessment; Intractable Pain; Self-Efficacy.

Introduction

Biopsychosocial models of chronic pain hypothesize that psychological and social factors play a key role in the adjustment to chronic pain. Pain self--efficacy – that is, the belief or confidence in one's ability to engage in a specific behaviour or other action to achieve desired goals despite pain[1-4] – has been one of the factors thought to mediate the impact of pain on disability and depression[1,5-7]. There is strong support for the importance of pain self-efficacy across a broad range of pain populations and conditions, with patients endorsing higher levels of self-efficacy reporting lower levels of pain intensity, disability, depression and anxiety[1,4,5,8-14], and higher quality of life and general health[12,15]. Furthermore, self-efficacy is thought to influence thoughts and feelings, which in turn can affect functioning[2,4,16-18]. Self-efficacy may also influence the use of pain coping strategies via its effects on readiness to engage in those coping responses[4,11,19-21], with patients endorsing lower levels of self-efficacy being more likely to use passive coping responses and to catastrophize in response to pain[4,19]. On the other hand, patients endorsing higher levels of self-efficacy have been shown to

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use more adaptive coping responses[2,11,19,22], even after controlling for demographic and medical status variables[11]. Given the importance of self-efficacy in the adaptive management of chronic pain, multidisciplinary treatment programs often aim to increase pain self-efficacy as a way to increase patients' quality of life and enhance positive physical and psychological outcomes in response to treatment.

In order to determine the effects of treatment on pain self-efficacy as well as evaluate its potential role in adjustment to pain, a valid and reliable measure of pain self-efficacy is needed. Moreover, translated measures of the construct are needed for cross-cultural research to determine if the same treatments have similar effects on outcomes across cultures. The Pain Self-Efficacy Questionnaire (PSEQ)[4], which was developed from Bandura's Social Learning theory[2], is the only pain self-efficacy measure developed specifically to assess confidence of patients to engage in a number of activities of daily living, despite pain. The PSEQ was developed to be applicable to patients with all chronic pain conditions and to be easy to understand. It assesses self-efficacy regarding a wide range of functions such as household chores, social activities, work, and coping with pain without medication, yet takes less than two minutes to complete. Previous research shows the PSEQ to be reliable and to have both factorial and predictive validity across a number of languages, cultures, and clinical settings[4,9,12,14,23-33].

Although a Portuguese version of the PSEQ has been developed, it was translated and validated to be used in Brazilian populations[14]. However, a European Portuguese version of the PSEQ has not yet been translated and validated. A European Portuguese version of the PSEQ that is distinct from the Brazilian Portuguese version is needed because of the cultural and language differences between European Portuguese (as spoken in Portugal) and Brazilian Portuguese.

The purpose of this study is to translate and evaluate the psychometric properties of a European Portuguese version of the Pain Self-Efficacy Questionnaire (P-PSEQ), to enable its use in clinical and cross-cultural studies. Based on previous research with the PSEQ in other samples, we hypothesized that: (1) the internal consistency (Cronbach's alpha) of the P-PSEQ would be good to excellent (above 0.80)[34]; (2) the predictive validity of the P-PSEQ would be supported via a pattern of significant negative associations with pain intensity (*r* between -0.12 and -0.39)[4,5,9,12,14,30] and pain interference (*r* between -0.31 and -0.70)[5,9,12,14,30], anxiety (*r* between -0.49 and -0.56)[4,12] and depression (*r* between -0.48 and -0.66)[4,9,12,30] and moderate to strong correlations (i.e., 0.30 or larger) with measures of global physical functioning and psychological functioning[12]; and (3) a factor analysis of the P-PSEQ items would yield one factor that explains a substantial portion of the variance in the items.

Materials and Methods

Subjects

One-hundred and seventy four patients, all over 18 years old, with chronic musculoskeletal pain from seven health care institutions in northern and central Portugal completed the study protocol. Inclusion criteria included: (1) experiencing pain due to a diagnosed musculoskeletal condition for at least 3 months; (2) being at least 18 years old; (3) and being willing to participate in a research. Exclusion criteria included: (1) having a physical or cognitive disability which prevented participation, (2) known/diagnosed severe depression or other severe mental health condition, and (3) pain due to fibromyalgia. As can be seen in Table I, the participants' ages ranged from 23 to 90 years (M = 59.18, SD = 16.11), 60.2% were married or living with a significant other, 26.3% were either single or divorced/separate and 8.8% of the participants were widowed. The majority of the participants were female (60.2%). Most participants had a history of chronic pain for at least two years (65.3%), and 38.8% reported having had pain for more than 10 years.

Measures

All participants were asked to provide basic demographic and pain history information (e.g. age, sex, marital status, level of education, professional status, duration of pain, pain location and cause of pain). They were also asked to rate their pain intensity at its maximum, minimum and on average during the previous 24hours on a 0 to 10 Numerical Rating Scale (NRS). Research supports the validity of the NRS as a measure of pain intensity[35].

The Portuguese BPI Pain Interference subscale was used to assess pain interference across seven daily life activities (general activity, mood, walking

Table I. Demographic Information

	Portuguese sample	
	Frequency (%)	Mean (SD)
Age	–	59.18 (16.11)
Sex (female participants)	103 (60.2)	–
Education Level		
Primary education	76 (44.7)	–
Incomplete High School	35 (20.6)	–
High School	27 (15.9)	–
College	32 (18.9)	–
Marital Status		
Single	31 (18.1)	–
Married/Living with other	103 (60.2)	–
Divorced	15 (8.8)	–
Widow	22 (12.9)	–
Professional Status		
Employed	68 (39.8)	–
Unemployed	19 (11.1)	–
Retired (due to disability)	47 (27.5)	–
Retired (normal age)	37 (21.6)	–
Duration of Pain		
3 months to 1 year	36 (21.2)	–
1 to 2 years	23 (13.5)	–
2 to 10 years	45 (26.5)	–
More than 10 years	66 (38.8)	–

ability, normal work, relations with other people, sleep, and enjoyment of life) on 0 to 10 numerical rating scales. Research supports the validity and reliability of BPI in several samples, cultures and languages, including European Portuguese[36-38]. The Portuguese SF-12[39] was used as a measure of perceived Physical (Physical Component Summary, PCS) and Mental (Mental Component Summary, MCS) health status, with higher scores (ranging from 0 to 100) indicating better health. The Portuguese version has evidence supporting its reliability and validity[39]. The Portuguese version of the Hospital Anxiety and Depression Scale (HADS)[40] was used to assess psychological functioning. It asks respondents to rate the severity of 14 depressive or anxiety symptoms on 4-point Likert scales, and has shown good reliability and validity[40]. The possible scores range from 0 to 21. Higher scores reflect higher anxiety or depressive symptomatology. The Portuguese Pain Self-Efficacy Questionnaire (P-PSEQ)[4] was used to assess pain-related self-efficacy beliefs. The 10-item scale assesses confidence of patients to engage in a number of activities of daily living despite pain on 0 - 6 numerical rating scales, where 0 = "not at all confident" and 6 = "completely confident". Higher scores (ranging from 0 to 60) reflect stronger self-efficacy beliefs.

Procedure

The initial phase of the study involved translating and back-translating the instructions and items of the PSEQ. Through expert discussion, we arrived at a consensus version, and verified that its content assessed the same construct as the original. To ensure that the individuals in our population understood the instructions and scale items, we then performed a pre-test of the P-PSEQ in a pilot sample of 15 patients, followed by a cognitive debriefing. After making final modifications based on the results of the cognitive testing, we invited a sample of patients with chronic musculoskeletal pain to complete all of the study measures. All patients who agreed then signed an informed consent form and were administered the 0-10 NRS, P-BPI Interference Scale, SF-12, HADS and P-PSEQ questionnaires.

Data Analysis

Means and standard deviations of the study variables were computed for descriptive purposes. Internal consistency of the P-PSEQ was assessed by computing a Cronbach's alpha. Composite reliability was also computed[41,42]. Then, to test a hypothesized one-factor model for the P-PSEQ items, we performed a confirmatory factor analysis (CFA). Model quality of fitness was evaluated using the Chi Square (χ^2/df), Comparative Fit Index (CFI), Parsimony Comparative Fit Index (PCFI), Goodness of Fit Index (GFI), Parsimony Goodness of Fit Index (PGFI), and Root Mean Square Error of Approximation (RMSEA). The model was considered to have acceptable fit if χ^2/df was less than 5 [42-44], CFI and GFI higher than 0.8[42], the PCFI and PGFI were both higher than 0.6[42,45,46], the RMSEA was lower than 0.10[42,43]. The model was considered to have a good fit it χ^2/df was less than 2[42-44], the CFI and GFI were higher than 0.9[42], PCFI and PGFI higher than 0.8[42,45], and the RMSEA was lower than 0.08[43]. Model adjustment was performed, step-by-step, via Modification Indices analysis (higher than 11; $p<0.001$)[42,43] and based on theory. We also used the Expected Cross-Validation Index (ECVI), to compare fit after models' adjustment, with lower ECVI

Table II. Descriptive Statistics Study Variables

	Mean	(SD)	Min-Max
Pain Intensity (NRS)			
Maximum (last 24 hours)	5.70	(2.49)	0-10
Minimum (last 24 hours)	2.97	(2.25)	0-9
Average Pain	4.59	(2.18)	0-10
Pain Interference (P-BPI)	4.03	(2.44)	0-9
Physical Component Summary (SF-12)	39.07	(23.51)	0-100
Mental Component Summary (SF-12)	57.02	(20.39)	10-100
Anxiety (HADS-A)	7.58	(3.91)	1-20
Depression (HADS-D)	6.07	(3.87)	0-17
Self Efficacy (P-PSEQ)	40.83	(11.31)	6-60

Note: NRS = Numerical Rating Scale of pain intensity; P-BPI = Portuguese Brief Pain Inventory – Interference scale; HADS-A = Hospital Anxiety and Depression Scale – Anxiety scale; HADS-D = Hospital Anxiety and Depression Scale – Depression scale; P-PSEQ = Portuguese Pain Self-Efficacy Questionnaire.

reflecting better fit. Finally, Pearson correlation coefficients between the P-PSEQ score (or scores) and the criterion measures were computed to evaluate the construct validity of the scale. Statistical analyses were performed using software PASW Statistics (v.18, SPSS Inc. Chicago, IL) and AMOS (v.18, SPSS Inc. Chicago, IL).

Results

Descriptive information

As can be seen in Table II, the study participants reported mild to moderate levels of pain severity (NRS) and pain-related disability (BPI Pain Interference). Mean scores of SF-12 Physical Component Summary and SF-12 Mental Component Summary indicate significant dysfunction in these areas, relative to published norms for healthy individuals[39]. Overall, the mean scores on the HADS suggested mild levels of anxiety, similar to individuals with a variety of medical disorders, and normal ratings of depressive symptoms[40]. Finally, the sample was characterized by relatively high levels of self-efficacy, on average, according to the cut offs suggested by Tonkin[47] (mean > 40), and when compared to normative datasets for patients with chronic pain, as reported by Nicholas and colleagues[48] in a study of 6124 patients from across the Australian state of New South Wales.

Reliability

The P-PSEQ's internal consistencies (Cronbach's alphas) in our sample and in previous samples are listed in Table III. The scale shows a very good level of internal consistency in our sample that is consistent with other samples, with an alpha coefficient of 0.88[34]. Values for alpha if single items are deleted are comparable to the overall alpha, sug-

Table III. Reliability Analyses of Brief Pain Inventory Interference Scale

P-PSEQ Total scale or item	Our sample	Australia[4]	Brazil[14]	China[12]	Iran[9]
Cronbach's Alpha					
P-PSEQ Total scale	**0.88**	**0.92**	**0.90**	**0.93**	**0.92**
Cronbach's Alpha if item deleted (Item Total Correlation)					
P-PSEQ Items					
Item 1	0.87 (0.48)	- (0.70)	- (0.79)	0.92 (0.72)	–
Item 2	0.86 (0.56)	- (0.72)	- (0.73)	0.92 (0.71)	–
Item 3	0.86 (0.61)	- (0.71)	- (0.67)	0.92 (0.66)	–
Item 4	0.85 (0.70)	- (0.83)	- (0.71)	0.92 (0.66)	–
Item 5	0.86 (0.61)	- (0.74)	- (0.76)	0.92 (0.71)	–
Item 6	0.85 (0.67)	- (0.79)	- (0.77)	0.92 (0.81)	–
Item 7	0.88 (0.43)	- (0.67)	- (0.50)	0.93 (0.62)	–
Item 8	0.86 (0.62)	- (0.79)	- (0.82)	0.92 (0.80)	–
Item 9	0.85 (0.72)	- (0.84)	- (0.80)	0.92 (0.78)	–
Item 10	0.86 (0.63)	- (0.84)	- (0.79)	0.92 (0.75)	–

Note: P-PSEQ = Portuguese Pain Self-Efficacy Questionnaire

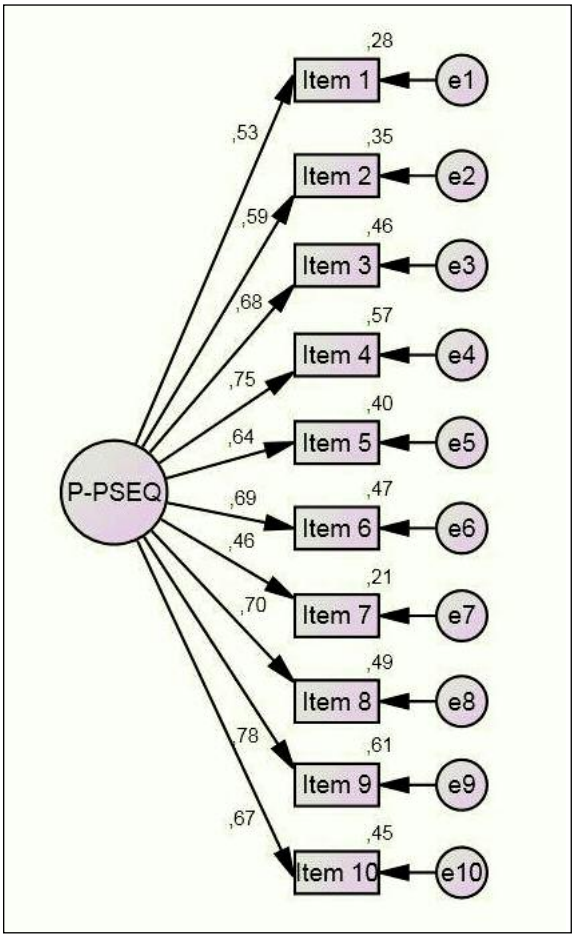

Figure 1. Confirmatory Factor Analysis: Initial Model $\chi^2(35) = 155.58$ ($p<0.001$); $\chi^2/df = 4.44$; CFI = 0.83; PCFI = 0.65; GFI = 0.84; PGFI = 0.54; RMSEA = 0.14 ($p<0.001$); ECVI = 1.15

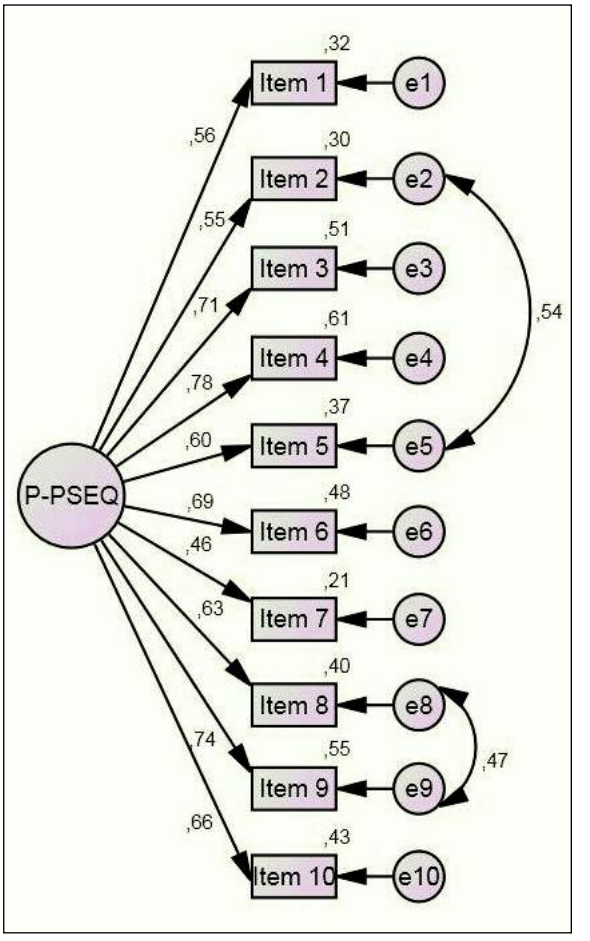

Figure 2. Confirmatory Factor Analysis: Final Model $\chi^2(33) = 66.95$ ($p<0.001$); $\chi^2/df = 2.03$; CFI = 0.95; PCFI = 0.70; GFI = 0.93; PGFI = 0.56; RMSEA = 0.08 ($p=0.05$); ECVI = 0.65

gesting that no item detracts from the reliability of the measure. Additionally, the Composite Reliability coefficient[41,42] of 0.92 indicates excellent reliability[34,41,42,49].

Factor Analysis

A factor analysis of the PSEQ in the original scale development sample resulted in a single factor that accounted for 59% of the variance. This result has been replicated in other samples of patients from Brazil[14] and China[12]. We used a confirmatory factor analysis, using maximum likelihood to estimate model parameters, to determine the fit of a single factor model. Four of the seven combined fit indices for the CFA supported a one-factor solution with acceptable fit. However, the fitness quality of the one-factor solution appeared somewhat limited in our sample [$\chi^2(35) = 155.58$ ($p<0.001$); $\chi^2/df = 4.44$; CFI = 0.83; PCFI = 0.65; GFI = 0.84; PGFI = 0.54; RMSEA = 0.14 ($p<0.001$); ECVI = 1.15] (Figure 1).

Inspection of P-PSEQ items suggests that some items have very similar content, which could potentially explain the reduced fitness levels for the one-factor solution. For example, Item 2 ("I can do most household chores (e.g. tidying-up, washing dishes, etc.), despite the pain") and Item 5 ("I can do some form of work, despite the pain. ("work" includes housework, paid and unpaid work)") appear to assess a very similar domain, as do Item 8 ("I can still accomplish most of my goals in life, despite the pain") and Item 9 ("I can live a normal lifestyle, despite the pain"). Based on an inspection of the modification indexes, specific error terms

Table IV. Correlations with Measures of Pain Intensity, Physical Dysfunction and Psychological Functioning

Scale	Self-Efficacy (P-PSEQ)
Pain Intensity (NRS)	
Maximum (last 24 hours)	-0.27**
Minimum (last 24 hours)	-0.32**
Average Pain	-0.28**
Pain Interference (P-BPI)	-0.41**
Physical Functioning (SF-12, PCS)	0.51**
Mental Health (SF-12, MCS)	0.46**
Anxiety (HADS-A)	-0.39**
Depression (HADS-D)	-0.55**

**p < 0.01
Note: P-PSEQ = Portuguese Pain Self-Efficacy Questionnaire; NRS = Numerical Rating Scale of pain intensity; P-BPI = Portuguese Brief Pain Inventory – Interference scale; HADS-A = Hospital Anxiety and Depression Scale – Anxiety scale; HADS-D = Hospital Anxiety and Depression Scale – Depression scale

were correlated sequentially, which resulted in a new model (Figure 2) that maintained all the items of the original P-PSEQ.

After taking into account the error term correlations, the combined fit indices for the CFA, support the one factor solution hypothesized [$\chi^2(33) = 66.95$ ($p<0.001$); $\chi^2/df = 2.03$; CFI = 0.95; PCFI = 0.70; GFI = 0.93; PGFI = 0.56; RMSEA = 0.08 (p=0.05); ECVI = 0.65], with six of the seven combined fit indices for the CFA supporting this solutions, with acceptable to good fit. This new model revealed a goodness of fit significantly higher than the initial model [$\chi^2(33) = 66.95$ ($p < 0.001$), and ECVI considerably different: 1.15 *vs.* 0.65].

Correlational Analysis

Table IV presents the Pearson correlation coefficients computed between the P-PSEQ score and the criterion variables. As hypothesized, statistically significant negative associations were found between the self-efficacy score and pain intensity [ranging between -0.27 and -0.32, $p < 0.01$], pain interference [$r = -0.41$, $p < 0.01$], anxiety [$r = -0.39$, $p < 0.01$] and depression [$r = -0.55$, $p < 0.01$]. Moreover, a statistically significant positive association was found between the P-PSEQ score and the SF-12 Physical Health score [$r = 0.51$, $p < 0.01$] and SF-12 Mental Health score [$r = 0.46$, $p < 0.01$]. All of the significant associations were in the hypothesized directions and showed magnitudes that were within the anticipated ranges, with the exception of anxiety, which was slightly lower than expected, although even for this criterion a moderate association with self-efficacy in the hypothesized direction was found.

Discussion

Consistent with previous findings for other versions of the PSEQ, our results provide strong support for the reliability and validity of the Portuguese PSEQ. Its internal consistency (Cronbach's alpha) is greater than 0.80, indicating good reliability. Moreover, its Composite Reliability coefficient of 0.92 indicates excellent reliability[34,41,42,49]. These values are similar to those found in the original scale development sample and other translated versions of the measure[4,9,12,14]. In addition, the results of a confirmatory factor analysis support a one factor solution[41-46,50] and provides further support for a high level of internal consistency. The correlation coefficients between P-PSEQ scale score and criterion measures are consistent with those found in previous studies[4,9,12,14,30], and support the validity of the P-PSEQ.

Consistent with previous research[1,4,5,8-14], our findings support the importance of self-efficacy as a predictor of adjustment to chronic pain, given its significant associations with pain intensity, physical and psychological functioning (pain interference, anxiety and depression), as well as with global quality of life and general health[12,15]. As a group, the findings from the current and previous studies suggest that the concept and effects of pain self-efficacy are similar across cultures, in line with the findings available for the effects of self-efficacy beliefs on performance[17,51].

There are a number of study limitations that should be considered when interpreting the findings. First, we employed a cross-sectional correlational design. As a result, we were unable to examine the test-retest stability of the P-PSEQ. Also, such a design does not allow for an evaluation of the causal effects of self-efficacy on functioning. Further research is needed to study the stability of P-PSEQ score over time, as well as to determine the potential beneficial effects of interventions that increase pain self-efficacy beliefs. Second, the study sample was one of convenience. We were not able to determine how representative the sample is of

the population of patients in Portugal with chronic musculoskeletal pain. Research is therefore needed to help establish the generalizability of the findings. Third, we did not administer other measures of self-efficacy to help establish the convergent validity of the P-PSEQ. Additional research is needed to help determine the extent of overlap between the P-PSEQ and other pain self-efficacy measures.

Nevertheless, our findings provide support for the reliability and validity of the Portuguese PSEQ, and suggest that the measure may be useful for understanding the importance of the self-efficacy concept to pain and adjustment to pain in Portuguese patients with chronic pain, as well as for cross-cultural research examining similarities and differences in the role that self-efficacy plays in patients from Portugal and patients from other countries and cultures.

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