Fear-Avoidance, Pain Acceptance and Adjustment to Chronic Pain: A Cross-Sectional Study on a Sample of 686 Patients with Chronic Spinal Pain

Carmen Ramírez-Maestre, Rosa Esteve & Alicia López-Martínez

Annals of Behavioral Medicine

ISSN 0883-6612
Volume 48
Number 3

ann. behav. med. (2014) 48:402-410
DOI 10.1007/s12160-014-9619-6

Springer

Your article is protected by copyright and all rights are held exclusively by The Society of Behavioral Medicine. This e-offprint is for personal use only and shall not be self-archived in electronic repositories. If you wish to self-archive your article, please use the accepted manuscript version for posting on your own website. You may further deposit the accepted manuscript version in any repository, provided it is only made publicly available 12 months after official publication or later and provided acknowledgement is given to the original source of publication and a link is inserted to the published article on Springer's website. The link must be accompanied by the following text: "The final publication is available at link.springer.com".

Author's personal copy

ann. behav. med. (2014) 48:402–410
DOI 10.1007/s12160-014-9619-6

ORIGINAL ARTICLE

Fear-Avoidance, Pain Acceptance and Adjustment to Chronic Pain: A Cross-Sectional Study on a Sample of 686 Patients with Chronic Spinal Pain

Carmen Ramírez-Maestre, PhD · Rosa Esteve, PhD · Alicia López-Martínez, PhD

Published online: 11 April 2014
© The Society of Behavioral Medicine 2014

Abstract
Background Prior studies found a range of psychological factors related to the perception of pain, maintenance of pain and disability.
Purpose The aim of this study was to investigate the role of pain fear-avoidance and pain acceptance in chronic pain adjustment. The influence of two diathesis variables (resilience and experiential avoidance) was also analyzed.
Methods The sample was composed of 686 patients with chronic spinal pain. Structural equation modelling analyses were used to test the hypothetical model.
Results Experiential avoidance was associated with pain fear-avoidance, and resilience was strongly associated with pain acceptance. Pain acceptance was negatively associated with negative mood, functional impairment and pain intensity. However, pain fear-avoidance was positively and significantly associated with negative mood but had no association with pain intensity. There was a path from functional impairment to pain fear-avoidance.
Conclusions Resilience and experiential avoidance appear as variables which could explain individual differences in pain experience.

Keywords Chronic pain · Experiential avoidance · Fear-avoidance · Resilience · Pain acceptance · Disability

C. Ramírez-Maestre (✉) · R. Esteve · A. López-Martínez
Departamento de Personalidad, Evaluación y Tratamiento Psicológico, Facultad de Psicología, Universidad de Málaga, Campus de Teatinos, 29071 Málaga, Spain
e-mail: cramirez@uma.es

Introduction

Fear-avoidance models suggest that individuals with catastrophic thinking become fearful of pain and avoid any movement and activity that may provoke pain. This leads to their disengagment from meaningful activities and to disability and depression [1–3]. From a cognitive-behavioural perspective, fearful patients will attend more to possible signals of threat (hypervigilance) and will be less able to shift attention away from pain-related information. The fear-avoidance approach also takes into account the influence of psychosocial variables prior to the pain experience that could be considered a source of individual differences. Several empirical studies have shown that personal characteristics act as differential variables that determine how chronic pain patients experience and adjust to pain [4–9]. Experiential avoidance is a dispositional variable associated with negatively experiencing internal events [10]. A recent study with a sample of patients with chronic back pain found that experiential avoidance contributed to pain fear-avoidance [11]. On the other hand, the original fear-avoidance model of pain identified another 'positive' pathway which leads to recovery. In this sense, acceptance has emerged as a valuable concept in contemporary theories of how patients adapt to chronic pain [5, 12]. Several early studies showed that acceptance was associated with better adjustment to chronic pain [5, 8]. Acceptance of pain might represent an adaptive form of 'confrontation' in contrast to avoidance, since pain acceptance includes responding to pain-related experiences without attempts at control or avoidance and engaging in valued activities and reaching personal goals regardless of these experiences [5]. The role of dispositional variables which could be associated with individual differences in pain acceptance has also been investigated. Resilience, conceptualized as a relatively stable

Author's personal copy

personal trait characterized by the ability to adapt to adversity [13], could explain individual differences in pain acceptance. Resilience has been defined as a multidimensional construct comprised of constitutional variables such as temperament and personality accompanied by specific skills [13]. Several authors have suggested that the concepts of resilience and acceptance are interconnected [14]. Thus, resilient people with a relatively stable tendency to display an accepting attitude toward life will probably develop accepting behaviour when faced with chronic pain [11]. Two studies on patients with chronic back pain found that resilience was highly associated with pain acceptance [8] (Ríos-Velasco L: Vulnerabilidad y resiliencia: diferencias interculturales en la experiencia de dolor crónico. Doctoral thesis, University of Málaga, 2011).

The aim of this study was to investigate the role of resilience and risk factors in the chronic pain experience. In order to simultaneously consider the influence of all the predictor variables on all the dependent variables, multivariate multiple regression by structural equation modelling was performed. According to the aforementioned research, a hypothetical model was proposed in which experiential avoidance was included as a dispositional variable which would be associated with individual differences in pain fear-avoidance. In addition, resilience was postulated as a dispositional variable associated with individual differences in pain acceptance. Pain intensity, functional impairment and negative mood are postulated to be associated with pain fear-avoidance and pain acceptance. In addition, time in pain was included in the model as an exogenous variable that would be associated with pain fear-avoidance and pain acceptance.

Methods

Participants

The participants consisted of a consecutive sample of 686 patients with chronic spinal pain. The recruitment process lasted from May 2008 to January 2012. Individuals were considered eligible for inclusion if, at the moment of their participation in the study, they were experiencing spinal pain and had been experiencing pain for at least the last 3 months; they were not being treated for a malignancy, terminal illness or psychiatric disorder; and they were able to understand the Spanish language. The doctors who participated in the study reviewed the patients' clinical history; and if the patients fulfilled the inclusion criteria, their participation was requested. In total, 809 patients with spinal pain were invited to participate, and 95 refused. The reasons for not participating were as follows: 15.8 % of the patients did not reply to the phone calls; 66.3 % stated they 'had no time' for the assessment session; and 17.9 % expressly refused participation. Of the patients initially contacted, 28 were excluded from the study because they did not meet the inclusion criteria, or one of the exclusion criteria was present. Thus, the final sample included 686 participants. Table 1 shows the participants' characteristics.

Procedure

This research project was approved by the Carlos Haya Hospital Ethics Committee. To guarantee that the recruitment process was standardized, the researchers held a meeting with the participating doctors in which the eligibility criteria were explained and the procedures were decided on. At the end of their visit to their doctor, each patient who fulfilled the eligibility criteria was informed of the study aims, and their

Table 1 Frequency data for the demographic and clinical variables (N=686)

Variables	Mean	SD	Min/max
Age (years)	45.4	12.94	16/79
Time in pain (months)	48.7	58.9	4/240
Pain Intensity	20.9	6.5	2/38
	N	Percentage	
Sex			
Men	281	41	
Women	405	59	
Marital status			
Single	126	18.4	
Married	414	60.3	
Unmarried couple	55	8.0	
Divorced	40	5.8	
Separated	24	3.5	
Widowed	27	3.9	
Education			
Reading and writing	70	10.2	
Primary school	235	34.3	
High school	243	35.4	
University education	138	20.1	
Work Status			
Housekeeping	115	16.8	
Working	357	52.0	
Studying	17	2.5	
Unemployed	104	15.2	
Retired	93	13.5	
Site of Pain			
Cervical	366	53.4	
Thoracic	234	34.1	
Lumbar	253	36.9	
Sacral	437	63.7	
Leg below knee	243	35.4	

Participants could be coded as experiencing pain at more than one site

Author's personal copy

participation was requested. Some patients were interviewed after their visit, whereas others left their telephone number to make an appointment for another day. Informed consent was obtained prior to data collection. The participants were aware that the information collected was confidential and that this information would be linked to a number alone and not to their name. Each participant had a semi-structured interview with a psychologist to obtain information on their demographic and social characteristics or their medical history. A battery of questionnaires was also completed by each participant. Patients were interviewed in their usual primary care centre.

Measures

Acceptance and Action Questionnaire (AAQ)

This questionnaire assesses experiential avoidance [15]. The Spanish version of the AAQ [16] was used in this study. It consists of nine items in which participants are asked to rate each statement on a seven-point scale. Higher scores indicate higher levels of avoidance and immobility. The Spanish AAQ is a stable, internally consistent (α=0.74) and valid scale.

The Resilience Scale (RS)

This scale consists of 25 items arranged in two subscales: personal competence (17 items) and acceptance of self and life (8 items) [17]. The construct validity of the RS was supported by correlations with measures of self esteem and perceived stress. The RS has been adapted to the Spanish-speaking population [18] and adapted into Spanish for patients with chronic musculoskeletal pain (Ruíz-Párraga G: Adaptación española de la Escala de Resiliencia para su uso en pacientes con dolor crónico de origen músculoesqueletal. DegreeThesis, University of Málaga, 2011). This version showed good internal consistency (α=0.92) and test-retest reliability. Furthermore, the scale shows good concurrent validity with measures of adjustment to chronic pain.

Pain Catastrophizing Scale (PCS)

This scale is a 13-item measure in which respondents indicate on a 5-point scale the degree to which they experience various thoughts and feelings while in pain [19]. It consists of three subscales assessing rumination, magnification and helplessness and also provides a total score on catastrophizing. The total score alone was used in this study. The Spanish version of the scale shows appropriate reliability and validity. Internal consistency was high (rumination, α=0.89; helplessness, α=0.90; magnification, α=0.79; total PCS, α=0.95) [20].

Pain Vigilance and Awareness Questionnaire (PVAQ)

This instrument assesses awareness, vigilance, preoccupation and observation of pain [21]. The original PVAQ consists of 16 items and has been validated for use in chronic pain samples and non-clinical samples. The Spanish version consists of two related subscales, corresponding to two factors: active vigilance and passive awareness. It displays good internal consistency (α=0.86) and test-retest reliability (r=0.80) and has been validated for use in chronic pain and non-clinical samples [11]. The Spanish version shows adequate internal consistency (α=0.80). Both subscales and the total score are positively and significantly correlated with other fear-related constructs: fear-avoidance beliefs, pain anxiety and pain catastrophizing [22].

Fear-Avoidance Beliefs Questionnaire (FABQ)

The Spanish version of the FABQ-SV [23] consists of 15 items related to beliefs that physical activity (FABQ-Phy) and work (FABQ-Work) influence pain intensity [24]. The instrument showed high internal consistency (α=0.93).

Chronic Pain Acceptance Questionnaire (CPAQ)

We applied the Spanish version of the questionnaire (CPAQ-SV) [12, 25]. This instrument consists of 20 items. Similar to the original questionnaire, the CPAQ-SV yields a total score and two subscale scores for pain willingness and activity engagement. The subscales of the CPAQ-SV show good internal consistency (activity engagement, α=0.85; pain willingness, α=0.75) [25]. Two studies on the CPAQ-SV [25, 26] have supported the validity of a 20-item version with two subscales corresponding to two independent factors. In addition, the CPAQ-SV demonstrates good criterion validity [25].

Hospital Anxiety and Depression Scale (HADS)

This is a self-reporting scale that contains two 7-item scales, one for anxiety and one for depression [27]. Both subscales were used in this study. The internal consistency of both scales is high (α=0.86 for anxiety; α=0.86 for depression) [28].

Roland-Morris Questionnaire (RMQ)

This questionnaire [29] consists of 24 items, which refer to limitations in different daily activities attributed by the patient to low back pain. The patient must mark each item that applies to his or her current status. The Spanish version [30] showed adequate internal consistency (α=0.84) and the ability to predict self-reported pain intensity and quality of life.

Author's personal copy

Impairment and Functioning Inventory (IFI)

This consists of 30 items each referring to an activity related to one of the following areas: household, autonomous behaviour, leisure and social relationships [31]. First, the patients are asked whether they performed an activity during the previous week. If they have, they are asked about frequency, but if they have not, they are asked whether they practised this activity before suffering chronic pain. This approach differentiates between present functioning and impairment and is useful in assessing patients with a long history of pain where the degree of deterioration is at least as informative as the current level of functioning. The IFI has been specifically developed for patients with chronic pain and takes into account the distinguishing features of Spanish culture. The instrument provides an index of functioning, an index of impairment and scores for each of these areas. The subscales and global scales are very reliable (functional status, α=0.84; functional impairment, α=0.85).

Pain intensity

Patients were asked to rate their mildest, average and worst pain during the past 2 weeks, as well as their current pain, on a scale ranging from 0 to 10, with 0 indicating 'no pain' and 10 indicating pain as 'intense as you could imagine'. A composite pain intensity score was calculated for each participant by calculating the average of the mildest, average, worst and current pain (four questions). Composites of the 0–10 ratings are very reliable measures of pain intensity in chronic pain patients [32].

Statistical Analysis

First, we performed an analysis of correlations between the observed variables included in the model. The hypothetical model (Fig. 1) was then tested via structural equation modelling (SEM) using LISREL 8.30 software. We checked the data prior to the analyses and found that some variables were not normally distributed. Thus, we used the maximum likelihood estimation method because this is effective for any data distribution if the analyses are performed on covariance matrices [33]. Several goodness-of-fit indexes were used. The comparative fit index (CFI) [34] and the non-normed fit index (NNFI) [35] measure the proportional improvement in fit by comparing a hypothesized model with a more restricted baseline model (a null model is the most commonly used baseline model). The *CFI* and *NNFI* range from 0 (absolute lack of fit) to 1 (perfect fit). The root-mean-square error of approximation (RMSEA) is an absolute misfit index; the closer to zero, the better the fit. Values less than 0.08 indicate an adequate fit [36, 37]. The goodness-of-fit index (GFI) and the adjusted goodness-of-fit index (AGFI) both range between 0 and 1, where the closer to 1, the better the fit; whereas in the standardized root-mean-square residual (SRMR), the smaller the value, the better the fit (the smallest possible value being 0).

The path coefficients should not be interpreted as correlation coefficients. A path coefficient (e.g. 0.80) connecting two variables (*A* and *B*) means that if *A* increases by one standard deviation from its mean, *B* would be expected to increase its own standard deviations from its own mean by 0.80 while holding all other relevant connections constant. With a path coefficient of −0.16, when *A* increases by one standard deviation from its mean, *B* would be expected to decrease its own standard deviations from its own mean by 0.16 while holding all other relevant connections constant.

Eight latent variables—time in pain, experiential avoidance, resilience, pain acceptance, pain fear-avoidance, negative mood, functional impairment and pain intensity—were associated in a hypothetical structural equation model. Seventeen observable variables or indicators of the latent variables were used. Resilience was specified by the two subscales of the resilience scale, namely personal competence and acceptance of self and life. Pain fear-avoidance as a latent construct was specified by pain catastrophizing (PCS), hypervigilance (PVAQ) and fear-avoidance beliefs (FABQ). These three observable variables were combined in a latent variable because they were highly correlated; some authors have suggested that they may potentially share some overlap [38]. Pain acceptance was specified by the two subscales of the pain acceptance questionnaire, namely activity engagement and pain willingness. Negative mood was specified by the two subscales of the hospital anxiety and depression scale, namely anxiety and depression. Daily functioning was specified by the total score of the Roland-Morris Questionnaire (RMQ) and by the impairment subscale of the impairment and functioning inventory. Pain intensity was specified by the four items of the composite pain intensity index. One loading for each latent variable was fixed at 1.0 for setting the metric of the latent construct.

Experiential avoidance and time in pain were measured by one variable, thus the error variance was fixed at 0 and the loading value at 1.

Results

Correlation analyses

Table 2 presents the correlations between variables included in the hypothetical model. Correlations were assessed following the guidelines proposed by Cohen [39], wherein low correlations range from 0.10 to 0.29, moderate correlations from 0.30 to 0.49 and high correlations from 0.50 to 1. Given the large number of participants, we only considered moderate/high

Author's personal copy

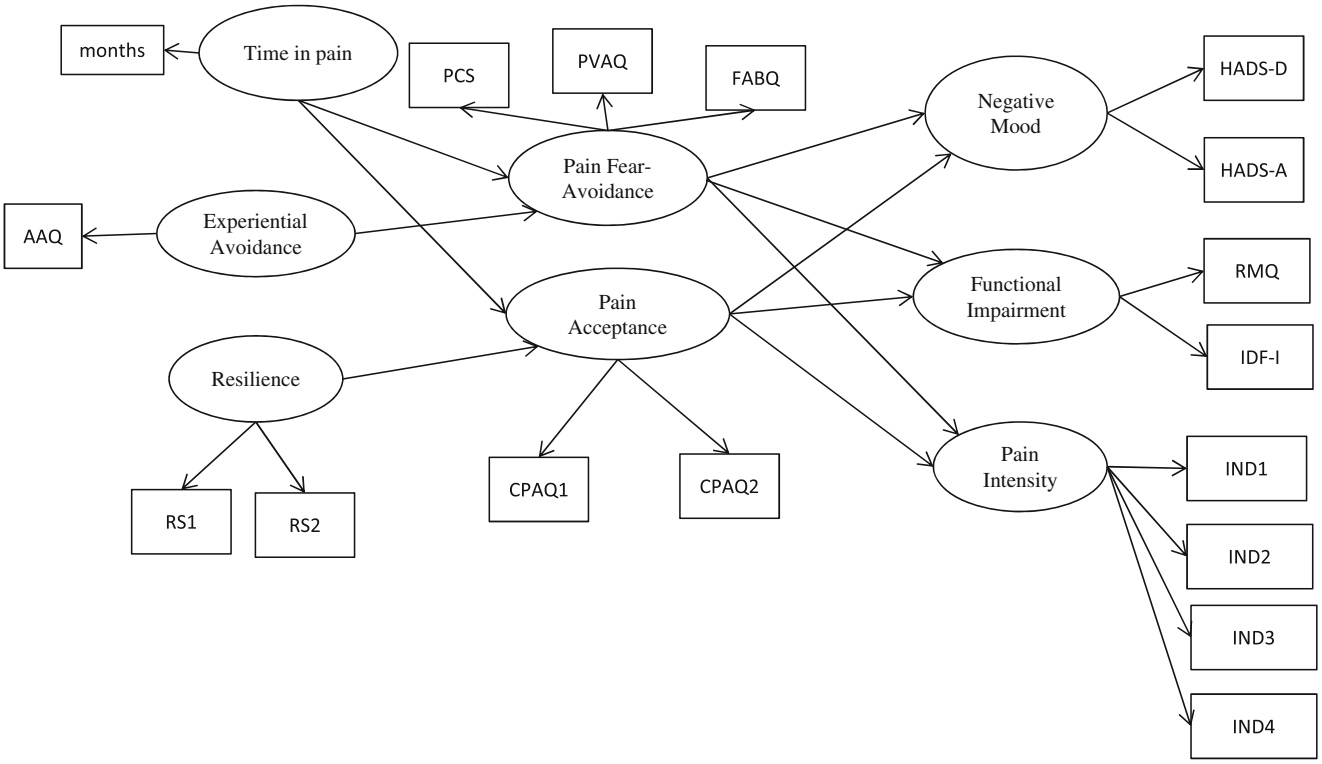

Fig. 1 Hypothetical model. *AAQ* Acceptance and Action Questionnaire; *RS1* Personal Competence Subscale, Resilience Scale; *RS2* Acceptance of Self and Life Subscale, Resilience Scale; *PCS* Pain Catastrophizing Scale; *PVAQ* Pain Vigilance and Awareness Questionnaire; *FABQ* Fear-Avoidance Beliefs Questionnaire; *CPAQ1*, Pain Willingness Subscale, Chronic Pain Acceptance Questionnaire; *CPAQ2* Activity Engagement Subscale, Chronic Pain Acceptance Questionnaire; *IND1*, *IND2*, *IND3*, *IND4* the four questions of composed pain intensity index; *IFI-I* impairment subscale, Impairment and Functioning Inventory; *RMQ* Roland-Morris Questionnaire; *HADS-A* anxiety subscale, Hospital Anxiety and Depression Scale; *HADS-D* depression subscale, Hospital Anxiety and Depression Scale. Latent variables are represented by *circles* and observed variables by *squares*

Table 2 Correlations

	Time in pain	AAQ	RS	CPAQ	FABQ	PCS	PVAQ	PAIN	RMQ	IFI-I	HADS-A	HADS-D
Time in pain	1											
AAQ	0.020	1										
RS	0.014	*−0.479***	1									
CPAQ	−0.098*	*−0.447***	*0.513***	1								
FABQ	0.287**	*0.400***	−0.173**	*−0.376***	1							
PCS	0.050	*0.509***	*−0.467***	*−0.441***	*0.419***	1						
PVAQ	0.020	*0.392***	*−0.395***	*−0.333***	*0.309***	*0.550***	1					
PAIN	0.124**	0.296**	−0.236**	−0.268**	0.290**	0.288**	0.293**	1				
RMQ	−0.037	0.253**	−0.214**	−0.184**	0.269**	*0.403***	0.295**	*0.394***	1			
IFI-I	−0.072	0.219**	*−0.390***	*−0.301***	0.225**	*0.462***	*0.312***	0.242**	*0.436***	1		
HADS-A	0.179**	*0.442***	*−0.505***	*−0.375***	0.205**	*0.447***	*0.387***	0.259**	0.161**	0.242**	1	
HADS-D	−0.041	0.297**	*−0.398***	*−0.381***	0.206**	*0.358***	*0.343***	0.198**	0.179**	0.270**	*0.487***	1

AAQ experiential avoidance, *RS* resilience, *CPAQ* pain acceptance, *FABQ* fear-avoidance beliefs, *PCS* catastrophizing, *PVAQ* hypervigilance, *PAIN* pain intensity, *RMQ* disability, *IFI-I* impairment, *HADS-A* anxiety, *HADS-D* depression. Moderate/high correlations in *italic text*

*Significance level $P<0.05$

**Significance level $P<0.001$

Author's personal copy

correlations with a high level of statistical significance ($P \leq 0.001$).

As shown, there was no correlation between time in pain and most of the variables included in the analysis. In fact, there was just a low positive significant correlation between time in pain and fear-avoidance beliefs. Resilience had a high correlation with pain acceptance. Experiential avoidance (AAQ) had moderate and high associations with resilience, acceptance, catastrophizing, fear-avoidance beliefs and hypervigilance (PVAQ). Finally, pain intensity, impairment, anxiety and depression had significant and moderate correlations with catastrophizing, hypervigilance and pain acceptance. Nevertheless, the correlations between these variables of adjustment and the fear-avoidance beliefs were low.

Evaluation of the structural model

In order to obtain a parsimonious model of the relationship between the variables, we examined the path coefficients and deleted all paths from the model that were not statistically significant. As can be observed, all the paths from time in pain were deleted, and thus, this was excluded from the model. Similarly, the paths from pain fear-avoidance to pain intensity and to functional impairment were not statistically significant.

Two relationships suggested by the modification indexes were also included in the final model; a path from pain fear-avoidance to pain acceptance and one from functional impairment to pain fear-avoidance. All the suggested paths are plausible and refer to relationships between the variables that were not considered in the initial model.

Figure 2 represents the final model (measurement and structural model). All path coefficients were statistically significant ($P<0.05$). The goodness-of-fit indexes calculated for the SEM indicate that the estimated model provides a good fit to the data (comparative fit index [CFI]=0.95; root-mean-square error of approximation [RMSEA]=0.08; goodness-of-fit index [GFI]=0.90; adjusted goodness-of-fit index [AGFI]=0.89; standardized root mean residual [standardized RMR]=0.058). Standardized *Lambda* (λ), *Beta* (β) *and Gamma* (T)coefficients are shown in Fig. 2. As expected, the findings show that experiential avoidance was significantly and positively associated with pain fear-avoidance, while resilience was significantly and positively associated with pain acceptance. In addition, the higher the pain acceptance, the lower the negative mood, functional impairment and pain intensity. Although pain fear-avoidance was significantly and positively associated with negative mood, it had no association with pain intensity. On the other hand, there was a path from functional impairment to pain fear-avoidance. Finally, there was a significant and negative association between pain fear-avoidance and pain acceptance.

Discussion

The aim of this study was to investigate the role of pain fear-avoidance and pain acceptance in chronic pain adjustment, as well as the influence of two diathesis (resilience and experiential avoidance) variables. The results obtained by correlational analysis showed that experiential avoidance had high and moderate correlations with hypervigilance, catastrophizing and fear-avoidance beliefs. In this regard, Esteve et al. [11] have highlighted the importance of experiential avoidance as a dispositional variable that could explain individual differences in fear-avoidance. On the other hand, catastrophizing and hypervigilance were highly correlated, and both constructs showed moderate correlations with fear-avoidance beliefs. These results are consistent with previous findings that showed that these constructs are strongly associated [11, 40, 41]. Some authors have even suggested that they appear to share some degree of overlap [38]. In the present study, these three constructs were combined in a latent variable called pain fear-avoidance, and the results indicate that they are a valid operationalization of the latent construct. Future research should clarify which elements are common to or particular to these constructs, thus leading to the formulation of more parsimonious theoretical models. In any case, it is noteworthy that only catastrophizing and hypervigilance showed moderate correlations with adjustment to pain (mood, impairment and intensity of pain); however, the association between fear-avoidance beliefs and adjustment appears to be low. Resilience showed a strong correlation with acceptance, while acceptance had significant, negative and moderate correlations with impairment, anxiety and depression. Its association with pain intensity was low. This study and other recent ones [5, 8] suggest that there is a strong association between pain acceptance and adjustment to chronic pain. All these correlational results are consistent with the results of the structural equation models, as discussed below.

Regarding the path analysis, resilience appears as a personal resource that increases the patients' capacity to manage pain effectively. In fact, the high association between resilience and pain acceptance is consistent with previous studies [8, Ríos-Velasco L: Vulnerabilidad y resiliencia: diferencias interculturales en la experiencia de dolor crónico. Doctoral Thesis, University of Málaga, 2011]. The consistency of the association between resilience and pain acceptance should be emphasized, as it indicates the relevance of studying the influence of 'positive' characteristics that help individuals to cope with and adapt to adversity in general and chronic pain in particular. Future longitudinal research should investigate whether resilient people develop an acceptance response when faced with chronic pain. On the other hand, experiential avoidance was associated with the latent variable pain fear-avoidance. There are two behavioural patterns in the fear-avoidance model, namely avoidance and confrontation. Both

Author's personal copy

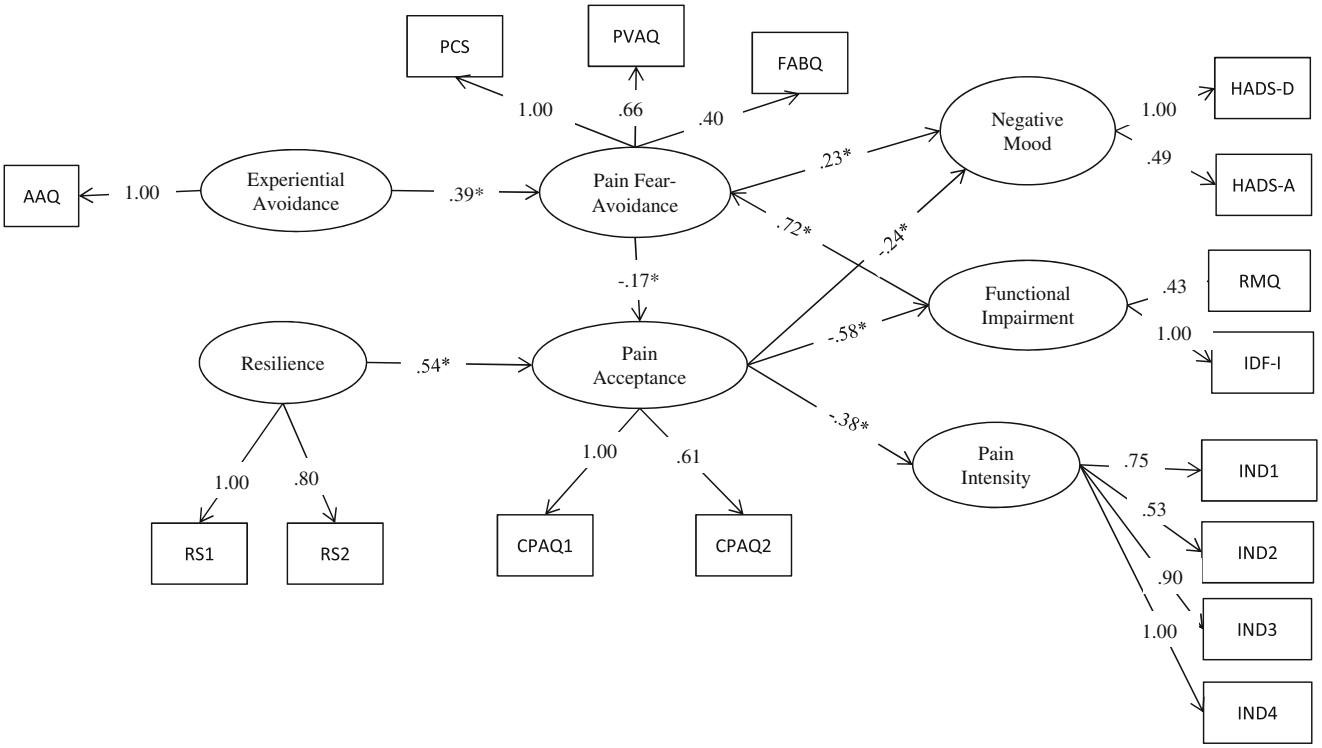

Fig. 2 Empirical model. Standardized β-coefficients.*$P \leq 0.05$. *AAQ* Acceptance and Action Questionnaire; *RS1* Personal Competence Subscale, Resilience Scale; *RS2* Acceptance of Self and Life Subscale, Resilience Scale; *PCS* Pain Catastrophizing Scale; *PVAQ* Pain Vigilance and Awareness Questionnaire; *FABQ* Fear-Avoidance Beliefs Questionnaire; *CPAQ1* Pain Willingness Subscale, Chronic Pain Acceptance Questionnaire; *CPAQ2* Activity Engagement Subscale, Chronic Pain Acceptance Questionnaire; *IND1*, *IND2*, *IND3*, *IND4*, the four questions of composed pain intensity index; *IFI-I*, impairment subscale, Impairment and Functioning Inventory; *RMQ*, Roland-Morris Questionnaire; *HADS-A* anxiety subscale, Hospital Anxiety and Depression Scale; *HADS-D* depression subscale, Hospital Anxiety and Depression Scale. Latent variables are represented by *circles* and observed variables by *squares*

are commonly considered to be habitual styles that are stable across time and situations. In fact, the wide variability in patients' responses to the same degree of physical disease may be due to the influence of psychosocial variables prior to the pain experience that could be considered a source of individual differences. As Turk [42] stated, a range of cognitive, affective and behavioural factors are related to the perception of pain, maintenance of pain and disability, exacerbation of pain and response to treatment. There is some evidence that individual differences and prior learning history also have a significant influence on the experience of pain and related disability [4–9]. From this perspective, as Crombez et al. suggested [43], patients at risk could be labelled as *avoiders* and those who recover as *confronters*. Moreover, a motivational perspective introduces the idea that, in light of the temporal and contextual dynamics of behaviour, on some occasions, avoiders become confronters and vice versa. Therefore, in relation to prevention, patients with increased experiential avoidance should be identified during the first stages of pain chronification as a matter of priority. Thus, it may be possible to change their tendency to engage in avoidance behaviour to one of engaging in confrontation behaviour.

The relationship between pain acceptance and adjustment appears to be clear. The results show that patients with high levels of pain acceptance appear to have less depression, less anxiety, lower levels of disability and less pain intensity. The results of this study and another recent one [5] clearly show the negative association between pain acceptance and disability. This is an expected result as acceptance means 'doing with pain'; this refers to an individual continuing to function and participate in daily activities even while experiencing pain [12, 44, 45]. From the motivational perspective, when pain persists and attempts to resolve the pain problem have repeatedly failed, patients may need to give up the goal of pain relief in order to achieve adjustment [43]. In fact, the concept of acceptance is linked to orientating the patient's attention toward positive everyday activities and other rewarding goals [12, 43]. As Crombez et al. [43] pointed out in their review of the fear-avoidance model, this theory has to take into account how individuals try to function despite pain, or how they attempt to recover. From this point of view, pain is an obstacle to be coped with in the daily pursuit of valued activities and goals that matter; in this sense, pain acceptance may be the way to reestablish the important goals in life. In fact, the

Author's personal copy

results show a negative association between pain acceptance and pain intensity. This result is expected since acceptance has been associated with decreased attention to pain; in clinical settings, it is assumed that decreased attention to pain leads to a lower intensity of perceived pain [46]. Many recent studies on chronic pain have shown that acceptance is a key factor in this context and is of clinical relevance in the management of pain [8, 25, 47, 48]. Future research could investigate the long-time effect of doing with pain in acceptance and commitment therapy [49].

On the other hand, the relationship between functional impairment and pain fear-avoidance is noteworthy since the final model suggests a path from the former to the latter; high levels of disability were associated with high levels of fear, catastrophizing and hypervigilance. It may be the case that when pain makes it difficult to engage with everyday activities and useful goals, fear beliefs about pain increase. At the same time, patients begin to feel helpless and unable to control pain and focus their attention on it [43]. In this sense, an association between pain fear-avoidance and negative mood was found. However, there was no association between pain fear-avoidance and pain intensity. Pain is considered to be a signal of a bodily threat designed to disrupt an ongoing behaviour. However, in the case of chronic pain, it may be a false alarm. In fact, research shows that adjustment is not related to pain itself but to the extent to which pain interferes with daily life [43]. In this sense, Engel et al. [50] have suggested that disability is more important than pain severity in predicting analgesic use and doctor visits.

In addition, there was a negative association between pain fear-avoidance and pain acceptance. In line with this result, training in pain acceptance could indirectly reduce the fear-avoidance behaviours that lead to a high level of maladjustment. It could be considered that a circular relationship between acceptance, impairment and fear-avoidance exists. Thus, if the level of pain acceptance increased, functional impairment would decrease, and this would reduce pain fear-avoidance. Finally, if fear-avoidance behaviours were reduced, pain acceptance would be higher.

Finally, contrary to predictions, time in pain did not seem to play any role in adjustment to chronic pain. In line with other research [8], these results highlight the fact that adjustment to chronic pain is mainly explained by psychological variables such as pain fear-avoidance and pain acceptance, and not length of time in pain. In a cross-sectional study, Kamper et al. [51] found that the influence of fear-avoidance does not appear to increase as pain become chronic. Therefore, the role of dispositional variables such as resilience or experiential avoidance should be borne in mind.

We wish to emphasize that this study is limited by the exclusive reliance on self-report measures. In addition, the cross-sectional study design means that causal associations cannot be identified. As Gheldof et al. [52] stated, most research supporting the fear-avoidance model is based on cross-sectional studies with chronic pain patients. It remains unclear how pain-related fear initiates a vicious circle of more pain and disability. Longitudinal methods could be used in future studies to investigate the predictive value of dispositional variables such as experiential avoidance and resilience, as well as the role of fear-avoidance behaviour and pain acceptance in the process from acute pain to chronic pain.

Acknowledgments This research was supported by grants from the Spanish Ministry of Science and Innovation (PSI2008-01803/PSIC) and the Andalusian Regional Government (HUM-566; P07-SEJ-3067).

Authors' Statement of Conflict of Interest and Adherence to Ethical Standards Authors Ramírez-Maestre, Esteve, and López declare that they have no conflict of interest. All procedures, including the informed consent process, were conducted in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000.

References

1. Asmundson GJG, Norton PJ, Norton GR. Beyond pain: The role of fear and avoidance in chronicity. *Clin Psychol Rev*. 1999; 19: 97-119.
2. Norton PJ, Asmundson GJG. Amending the fear-avoidance model of chronic pain: What is the role of physiological arousal? *Behav Ther*. 2003; 34: 17-30.
3. Vlaeyen JW, Linton SJ. Fear-avoidance and its consequences in chronic musculoskeletal pain: A state of the art. *Pain*. 2000; 85: 317-332.
4. Asghari A, Nicholas MK. Personality and pain-related beliefs/coping strategies: A prospective study. *Clin J Pain*. 2006; 22: 10-18.
5. Esteve MR, Ramírez-Maestre C, López AE. Adjustment to chronic pain: The role of pain acceptance, coping strategies and pain-related cognitions. *Ann Behav Med*. 2007; 33: 179-188.
6. Ramírez-Maestre C, Esteve R, López AE. Cognitive appraisal and coping in chronic pain patients. *Eur J Pain*. 2008; 12: 749-756.
7. Ramírez-Maestre C, Esteve R, López AE. Neuroticismo, afrontamiento y dolor crónico. *An Psicol*. 2001; 17: 129-137.
8. Ramírez-Maestre C, Esteve R, López AE. The paths to capacity: Resilience and spinal chronic pain. *Spine*. 2012; 37: 251-258.
9. Ramírez-Maestre C, López AE, Esteve R. Personality characteristics as differential variables of the pain experience. *J Behav Med*. 2004; 27: 147-165.
10. Berman NC, Wheaton MG, McGrath P, Abramowitz JS. Predicting anxiety: The role of experiential avoidance and anxiety sensitivity. *J Anxiety Disord*. 2010; 24: 109-113.
11. Esteve R, Ramírez-Maestre C, López-Martínez AE. Experiential avoidance and anxiety sensitivity as dispositional variables and their relationship to the adjustment to chronic pain. *Eur J Pain*. 2012; 16: 718-726.
12. McCracken LM, Vowles KE, Eccleston C. Acceptance of chronic pain: Component analysis and a revised assessment method. *Pain*. 2004; 107: 159-166.
13. Ramírez-Maestre C, Esteve R. Disposition and adjustment to chronic pain. *Curr Pain Headache Rep*. 2013; 17: 312.
14. Biglan A, Hayes SC, Pistorello J. Acceptance and commitment: Implications for prevention science. *Prev Sci*. 2008; 9: 139-152.
15. Hayes SC, Stronsahl K, Wilson KG, et al. Measuring experiential avoidance: A preliminary test of a working model. *Psychol Rec*. 2004; 54: 553-578.

Author's personal copy

16. Barraca J. Spanish adaptation of the Acceptance and Action Questionnaire. *Int J Psychol Psychol Ther*. 2004; 4: 505-515.
17. Wagnild GM, Young HM. Development and psychometric evaluation of the Resilience Scale. *J Nurs Meas*. 1993; 1: 165-178.
18. Heileman MV, Lee K, Kury FS. Psychometric properties of the Spanish version of the Resilience Scale. *J Nurs Meas*. 2003; 11: 61-75.
19. Sullivan MJL, Bishop SC, Pivik J. The Pain Catastrophizing Scale: Development and validation. *Psychol Assess*. 1995; 7: 524-532.
20. Muñoz M, Esteve R. Reports of memory functioning by chronic pain patients. *Clin J Pain*. 2005; 21: 287-291.
21. McCracken LM. Attention to pain in persons with chronic pain: A behavioral approach. *Behav Ther*. 1997; 28: 271-284.
22. Esteve R, Ramírez-Maestre C, López-Martínez AE. Empirical evidence of the validity of the Spanish version of the Pain Vigilance Awareness Questionnaire. *Int J Behav Med*. 2013; 20: 59-68.
23. Waddell G, Newton M, Henderson J, Somerville D, Main CJ. A Fear-avoidance Beliefs Questionnaire (FABQ) and the role of fear-avoidance beliefs in chronic low back pain and disability. *Pain*. 1993; 52: 157-168.
24. Kovacs FM, Muriel A, Medina JM, Abraira V, Castillo-Sánchez MD, Olabe- Jaúregui J. Psychometric characteristics of the Spanish version of the FABQ Questionnaire. *Spine*. 2006; 31: 104-110.
25. Bendayan R, Esteve R, Blanca MJ. Empirical evidence of the validity of the Spanish version of the Chronic Pain Acceptance Questionnaire: The differential influence of activity engagement and pain willingness on adjustment to chronic pain. *Br J Health Psychol*. 2012; 17: 314-326.
26. Rodero B, García-Campayo J, Casanueva B, Lopez Y, Serrano-Blanco A, Luciano JV. Validation of the Spanish version of the Chronic Pain Acceptance Questionnaire (CPAQ) for the assessment of acceptance in fibromyalgia. *Health Qual Life Outcomes*. 2010; 8: 37.
27. Zigmong AS, Snaith RP. The Hospital Anxiety and Depression Scale. *Acta Psychiatr Scand*. 1983; 67: 361-370.
28. Quintana JM, Padierna A, Esteban C, Arostegui I, Bilbao A, Ruiz I. Evaluation of the psychometric characteristics of the Spanish version of the Hospital Anxiety and Depression Scale. *Acta Psychiatr Scand*. 2003; 107: 216-221.
29. Roland M, Morris R. A study of the natural history of back pain. Part I. *Spine*. 1983; 8: 141-144.
30. Kovacs FM, Llobera J, del Real MT G, et al. Validation of the Spanish version of the Roland-Morris Questionnaire. *Spine*. 2002; 27: 538-542.
31. Ramírez-Maestre C, Valdivia Y. Evaluación del funcionamiento diario en pacientes con dolor crónico. *Psicol Conduct*. 2003; 11: 283-291.
32. Jensen MP, Turner P, Romano JM, Fischer LD. Comparative reliability and validity of chronic pain intensity measures. *Pain*. 1999; 83: 157-162.
33. Batista JM, Coenders G. *Modelos de Ecuaciones Estructurales*. Madrid: La Muralla; 2000.
34. Bentler PM. *EQS 6 Structural Equations Program Manual*. Encino, CA: Multivariate Software, Inc.; 2006.
35. Bentler PM, Bonnet DG. Significance tests and goodness of fit in the analysis of covariance structures. *Psychol Bull*. 1980; 88: 588-606.
36. Hu L, Bentler PM. Fit indices in covariance structure modelling: Sensitivity to underparameterized model misspecification. *Psychol Methods*. 1998; 3: 424-453.
37. Hu L, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Struct Equ Model*. 1999; 6: 1-55.
38. Leeuw M, Goossens MEJB, Linton SJ, Crombez G, Boersma K, Vlaeyen JWS. The fear avoidance model of musculoskeletal pain: Current state of scientific evidence. *Behav Med*. 2007; 30: 77-94.
39. Cohen JW. *Statistical power analysis for the behavioral sciences*. 2nd ed. Hillsdale, NJ: Lawrence Erlbaum Associates; 1988.
40. Crombez G, Eccleston C, Van den Broeck A, Goubert L, Van Houdenhove B. Hypervigilance to pain in fibromyalgia. *Clin J Pain*. 2004; 20: 98-102.
41. Goubert L, Crombez G, Van Damme S. The role of neuroticism, pain catastrophizing and pain-related fear in fear vigilance to pain: A structural equations approach. *Pain*. 2004; 107: 234-241.
42. Turk DC. A diathesis-stress model of chronic pain and disability following traumatic injury. *Pain Res Manag*. 2002; 7: 9-19.
43. Crombez G, Eccleston C, Van Damme E, Vlaeyen JWS, Karoly P. Fear-avoidance model of chronic pain. The next generation. *Clin J Pain*. 2012; 28: 475-483.
44. Risdon A, Eccleston C, Crombez G, McCracken L. How can we learn to live with pain? A Q-methodological analysis of the diverse understandings of acceptance of chronic pain. *Soc Sci Med*. 2003; 56: 375-386.
45. Tan G, Jensen MP, Robinson-Whelen S, Thornby JI, Monga T. Measuring control appraisals in chronic pain. *Pain*. 2002; 100: 385-393.
46. Keefe FJ. Cognitive behavioral therapy for managing pain. *Clin Psychol*. 1996; 49: 4-5.
47. McCracken LM, Eccleston C. Coping or acceptance: What to do about chronic pain. *Pain*. 2003; 105: 197-204.
48. Viane I, Crombez G, Eccleston C, Devulder J, De Corte W. Acceptance of the unpleasant reality of chronic pain: Effects upon attention to pain and engagement with daily activities. *Pain*. 2004; 112: 282-288.
49. Hayes SC, Strosahl KD, Wilson KG. *Acceptance and commitment therapy*. New York: Guildford Press; 1999.
50. Engel CC, Von Korff M, Katon WJ. Back pain in primary care: Predictors of high health-care costs. *Pain*. 1996; 65: 197-204.
51. Kamper SJ, Maher CG, Menezes Costa L, McAuley JH, Hush JM, Sterling M. Does fear of movement mediate the relationship between pain intensity and disability in patients following whiplash injury? A prospective longitudinal study. *Pain*. 2012; 153: 113-119.
52. Gheldof LM, Crombez G, Bussche E, et al. Pain-related fear predicts disability, but not pain severity: A path analytic approach of the fear-avoidance model. *Eur J Pain*. 2010; 14: 870.e1-870.e9.