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The Role of Sex/Gender in the Experience of Pain: Resilience, Fear, and Acceptance as Central Variables in the Adjustment of Men and Women With Chronic Pain

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Abstract: **The aim of the present study was to analyze differences between men and women in the experience of chronic pain. Resilience, fear-avoidance of pain, and pain acceptance were included in a hypothetical model as variables involved in chronic pain adjustment. A sample of 400 chronic spinal pain patients (190 men and 210 women) attending primary care units participated in the study. Student's t-test analyses showed that the women's scores were significantly higher than men's scores on pain intensity, pain anxiety, and current functioning. A LISREL multisample analysis of the theoretical model across genders was conducted. As expected, statistically significant associations were found between resilience and confrontation in both samples. Thus, resilient people will probably develop accepting behavior when faced with chronic pain. Confrontation yielded 3 statistically significant path coefficients: to pain intensity, functional status, and negative mood. Statistically significant associations were found between fear-avoidance and negative mood in both samples, but no association was found between fear-avoidance and functional status in either sample. Finally, fear-avoidance was associated with pain intensity in the sample of men alone. Despite this difference, the results suggest that the theoretical model had an adequate fit across both groups.**

Perspective: ***In the context of fear-avoidance models, this article analyzed differences between men and women with spinal pain in relation to the pain experience. The fear-avoidance model appeared to be a good theoretical reference model in both men and women.***

Key words: *Gender, sex, chronic pain, fear-avoidance, adjustment.*

The growing interest in sex, gender, and pain has been expressed in several review articles.[1,5,6,8,22,31,33,51,102] Clinical research suggests that there are important gender differences in susceptibility to pain-related diseases, analgesic effectiveness, and recovery from anesthesia.[6,14,35,67] Furthermore, experimental pain-induction studies show that women consistently exhibit lower thresholds and tolerance to a wide range of noxious stimuli than men,[1,34,47,88] whereas epidemiologic studies indicate that women report more pain experiences and more negative responses to pain than men.[7,43,56,96] Numerous explanations have been proposed to account for these differences.[31,96] Although most explanations concentrate on biological mechanisms, it is now clear that social and psychological factors are also important.[8,9,32,36,53,66,87,96] Therefore, a biopsychosocial approach may be useful when considering sex-related differences in pain.[31,52] Fear-avoidance models provide a theoretical explanation for the relationship between the variables involved in the experience of pain and chronic pain disability.[98] As Waddell et al[99] predicted, catastrophic thinking is a precursor of pain-related fear. Fear is characterized by escape and avoidance behaviors, and the avoidance of daily activities results in functional disability. In addition, avoidance also involves withdrawal from essential reinforcers, thus increasing depression. From a cognitive-behavioral perspective, fearful patients will attend more to possible signals of threat

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(hypervigilance) and will be less able to shift attention away from pain-related information. This will occur at the expense of other tasks, including actively coping with the problems of daily life.[98] This model has become increasingly popular and a large body of evidence has supported its assumptions.[39,55] However, this theoretical proposal pays little attention to the influence of psychosocial variables prior to the pain experience that could be considered as positive resources and a source of individual differences. Several empirical studies have shown that personal characteristics act as differential variables that determine how chronic pain patients experience pain and how they adjust to it.[2,26,28,77-80] Although research has traditionally focused on vulnerability factors, more recent studies have acknowledged the influence of resilience resources that may decrease sensitivity to acute pain[37,91] and increase adaptation to chronic pain.[30,38,69,103] In fact, in their theoretical review of the fear-avoidance model, Crombez et al[20] stated that what is missing in the fear-avoidance approach is how individuals try to function despite pain, or how they attempt to recover. Therefore, they proposed taking into account the positive paths in this theoretical approach. Resilience could explain individual differences in pain acceptance when conceptualized as a relatively stable personal trait characterized by the ability to adapt to adversity.[21,75,89] Thus, several studies have found that part of the effect of resilience on adjustment to chronic pain is due to the mediating role of pain acceptance.[26,79,89] Acceptance is emerging as a valuable concept in contemporary theories of how patients adapt to chronic pain.[26,58]

In summary, numerous recent review articles[8,22,31,33,51,52,56] have expressed growing interest in the differences between men and women in several pain-related variables. In general, these studies found evidence suggesting that men and women experience pain in different ways. Therefore, the aim of the present study was to analyze differences between men and women in relation to the experience of chronic pain. Resilience has been included in a hypothetical model (Fig 1) as a diathesis variable that could explain individual differences in adjustment among chronic pain patients. The role of fear-avoidance of pain and pain acceptance in predicting adjustment to chronic pain was analyzed in relation to depression, anxiety, functional status, and reported pain intensity. The suitability of the hypothetical model of men and women with chronic spinal pain was also analyzed.

Methods

Participants

The participants consisted of a consecutive sample of 415 patients with chronic spinal pain who attended 4 primary care units. All the participants were white. Table 1 shows the participants' characteristics.

Men and women were compared using a t-test for the continuous variable (age) and χ^2 analyses for categorical variables (marital status, education, work status, and the primary site of reported pain). There were no significant differences between the 2 groups in these variables.

The recruitment process was conducted from October 2008 to October 2011. Individuals were considered eligible for inclusion if they fulfilled the following criteria: they were experiencing spinal pain at the moment of their participation in the study; they had been experiencing it for at least the last 3 months; they had not been diagnosed or were not being treated for a malignancy, terminal illness, or psychiatric disorder; they had not applied for a disability allowance or pension; 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

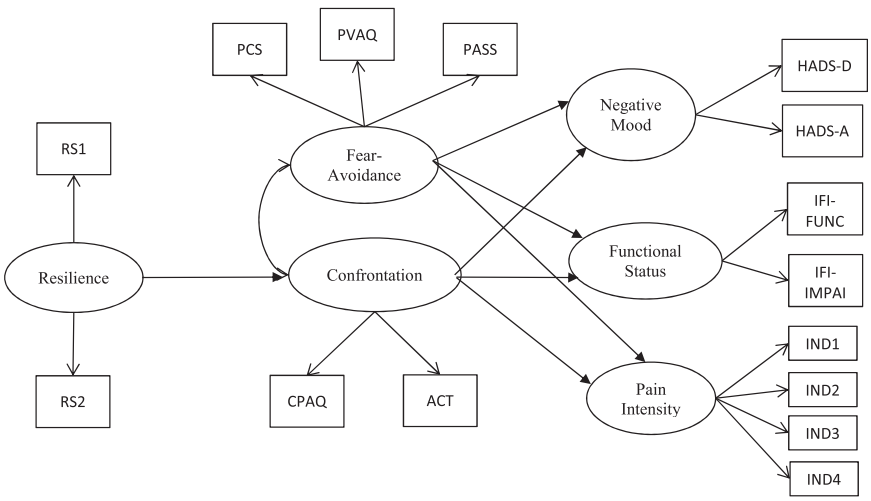

Figure 1. Hypothetical model. Latent variables are represented by circles and observed variables by squares. Covariation is presented as a curved arrow. Abbreviations: RS1, personal competence subscale, Resilience Scale; RS2, acceptance of self and life subscale, Resilience Scale; PCS, Pain Catastrophizing Scale; PVAQ, Pain Vigilance and Awareness Questionnaire; PASS, Pain Anxiety Symptoms Scale; ACT, active coping subscale, The Vanderbilt Pain Management Inventory; CPAQ, Chronic Pain Acceptance Questionnaire; IND1, IND2, IND3, IND4, the 4 questions of Composed Pain intensity index; IFI-I, impairment subscale, Impairment and Functioning Inventory; IFI-F, functioning subscale, Impairment and Functioning Inventory; HADS-A, anxiety subscale, Hospital Anxiety and Depression Scale; HADS-D, depression subscale, Hospital Anxiety and Depression Scale.

Table 1. Frequency Data (%) for the Demographic and Clinical Variables

Variables	Sample (N = 400)	Men (n = 190)	Women (n = 210)
Demographic			
Marital status			
Single	16.50	17.40	15.70
Married	61.50	61.10	61.90
Unmarried couple	9.30	11.10	7.60
Divorced	5.50	5.30	5.70
Separated	4.00	5.30	2.90
Widowed	3.30	0	6.20
Education			
Reading and writing	10.00	4.74	14.76
Primary school	35.80	37.90	33.80
High school	35.80	34.20	37.10
University education	18.40	23.15	14.28
Work status			
Housekeeping	15.80	.50	9.50
Working	52.8	62.10	44.30
Studying	3.50	2.63	4.28
Unemployed	11.80	14.20	9.50
Retired	16.30	20.50	12.4
Age (years)			
Mean	46.22	46.28	46.17
SD	13.21	13.03	13.39
Clinical			
Site of pain			
Cervical	56.50	47.40	64.80
Thoracic	31.80	25.30	37.60
Lumbar	93.25	86.84	99.04
Sacral	61.30	64.70	58.10
Leg below knee	33.30	31.60	34.80
Pain medication			
Analgesics (nonopioid)	31.80	27.40	35.70
Opioids	10.00	7.40	12.40
NSAIDs	34.30	28.9	39.00
Anxiolytics	17.50	8.95	25.24
Antidepressants	12.30	5.80	18.10
Muscle relaxants	22.3	18.4	25.70
Neuroleptics	.50	0	1.00
Anticonvulsants	.80	1.60	0
Antiparkinson drugs	.3	.50	0
Antimigraine drugs	.3	.50	0
Other treatments			
Physiotherapy	59.0	58.4	59.5
Electrostimulation	17.3	17.9	16.7

Abbreviation: NSAIDs, nonsteroidal anti-inflammatory drugs.

fulfilled the inclusion criteria, their participation was requested. No one refused participation. Fifteen participants provided incomplete data (10 men and 5 women) and were excluded from the analyses. Thus, the final sample included 400 participants: 190 men and 210 women. This sample is representative of the patients with chronic pain attending primary care centers in Spain.[40]

Measures

Demographic and Clinical Pain-Related Variables

Participants were interviewed and provided information on a number of demographic and pain-related variables, including time in pain, medications, and other treatments (Table 1).

Resilience

A Spanish translation of the Resilience Scale was applied.[100,101] This inventory consists of 25 items that are rated on a scale ranging from 1 (strongly disagree) to 7 (strongly agree). This inventory contains 2 subscales, one for personal competence and one for acceptance of self and life. Both scales were used in this study. A team of professional translators participated in the translation process to enhance the linguistic accuracy of the European Spanish version. The translators had the opportunity to consult studies by Heilemann, Lee, and Kury[42] and Rodríguez and collaborators.[85] Both studies provide Spanish translations of the original English Resilience Scale[100] rendered in Mexican and Argentinean styles. Internal consistency reliability was estimated using Cronbach's alpha for the total score (alpha = .94) and for the 2 subscales (personal competence: alpha = .92; acceptance of self and life: alpha = .85). Test-retest reliability (6 months) was estimated using Pearson's correlation (r = .90). The European Spanish version of the Resilience Scale shows appropriate reliability and validity.

Chronic Pain Acceptance Questionnaire (CPAQ)[63]

We applied the Spanish version of the questionnaire (CPAQ-SV),[4] which was originally created by McCracken et al.[63] The instrument consists of 20 items. Similar to the original questionnaire, the CPAQ-SV yields a total score and 2 subscale scores for pain willingness and activity engagement. The CPAQ-SV subscales showed good internal consistency (activity engagement, α = .85; pain willingness, α = .75).[4] Two studies on the CPAQ-SV[4,84] support the validity of a 20-item version with 2 subscales corresponding to 2 independent factors. In addition, the CPAQ-SV demonstrated adequate criterion validity.[4]

Coping Strategies

The Vanderbilt Pain Management Inventory,[12] adapted into Spanish,[25] was used to assess active coping strategies. The scale consists of 18 items divided into 2 subscales designed to assess how often chronic pain patients use active and passive strategies when their pain reaches moderate or high intensities:

- Active strategies: handling the pain or carrying on functioning despite the pain.
- Passive strategies: strategies giving control over pain to another person or allowing pain to adversely affect other areas of the subject's life.

This adaptation demonstrates appropriate psychometric properties, with an internal consistency of α = .64 for active strategies and α = .70 for passive strategies. In the present study, only the active coping subscale was used.

Pain Anxiety Symptoms Scale[64]

This is a 40-item measure of anxiety and fear of responses associated with chronic pain. It consists of 4

subscales that measure 1) cognitive anxiety responses, 2) escape and avoidance, 3) fearful thinking, and 4) physiological anxiety responses. The psychometric properties of the Pain Anxiety Symptoms Scale subscales and total score are highly reliable.[86] The total score alone was used in this study. The Spanish version of the questionnaire[24] showed high internal consistency (α = .93).

Pain Catastrophizing Scale[93]

This questionnaire comprises 13 items in which participants are asked to report the degree to which they experience various thoughts and feelings while in pain. It consists of 3 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 = .89; helplessness, α = .90; magnification, α = .79; total Pain Catastrophizing Scale score, α = .95).[65]

Pain Vigilance and Awareness Questionnaire

This instrument assesses awareness, vigilance, preoccupation, and observation of pain. The original Pain Vigilance and Awareness Questionnaire consists of 16 items and has been validated for use in chronic pain samples and nonclinical samples.[57] The Spanish version consists of 2 related subscales, corresponding to 2 factors: active vigilance and passive awareness. The total scale and the subscales show good internal consistency. Both subscales and the total score are positively and significantly correlated with other fear-related constructs: fear-avoidance beliefs, pain anxiety, and pain catastrophizing.[27]

Hospital Anxiety and Depression Scale[104]

This is a self-report scale that contains two 7-item Likert scales, one for anxiety and one for depression. Both scales were used in this study. The Spanish version of the scale shows appropriate reliability and validity. The internal consistency of both scales is high (α = .86 for anxiety; α = .86 for depression).[72]

Impairment and Functioning Inventory[81]

This consists of 30 items each referring to an activity associated with one of the following areas: household, autonomous behavior, leisure, and social relationships. First, the patients are asked whether they performed an activity during the previous week. If so, they are asked about frequency, but if not, they are asked whether they practiced this activity before the onset of 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 Impairment and Functioning Inventory 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 and an index of impairment. The subscales and global scales are very reliable (functional status, α = .84; functional impairment, α = .85).

Pain Intensity Index

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 a 0 indicating "no pain" and 10 indicating pain as "intense as you could imagine." A composite pain intensity score was calculated for each subject by calculating the average of the mildest, average, worst, and current pain (4 questions). Jensen et al[46] showed that composites of the 0 to 10 ratings are very reliable measures of pain intensity in chronic pain patients.

Procedure

Each participant had a semistructured interview with a psychologist to obtain demographic, social, or medical history data. A battery of questionnaires was also completed for each participant. At the end of the consultation, the doctors provided the patients with information about the study and asked for their participation. Some of the patients were interviewed after their consultation, whereas others left their telephone number to make an appointment another day. All of them were interviewed in an office at their usual primary care center.

The research project was approved by the Carlos Haya Hospital Ethics Committee. Informed consent was obtained prior to data collection. Participants were aware that the information collected was confidential.

Data Analysis

First, we analyzed the correlations between the observed variables included in the model for men and women. The correlation matrices used in this study are presented in Supplementary Table 1. A t-test was also conducted to examine mean differences between women and men in the variables included in the hypothetical model. Multisample analyses were then performed to test the statistical significance of the parameter differences between the samples by structural equation modeling using LISREL 8.30 software.[48] In a multisample analysis, χ^2 is a measure of the overall fit of all models in all groups and cannot be decomposed into a χ^2 for each group separately.[48] In multisample analyses, it is first assumed that all the parameters are the same in all groups; this forms the baseline model. Next, successive models are estimated in which each parameter, one by one, is allowed to vary for each group. The relative fit across the groups is compared in relation to the changes in χ^2. If the change in χ^2 is significant compared to the baseline model—that is, the model shows a better fit—it can be concluded that the parameters are significantly different across the groups.

Six latent variables—resilience, fear-avoidance, confrontation, negative mood, functional status, and pain intensity—were compared in a hypothesized structural equation model (Fig 1). Fear-avoidance and confrontation were allowed to covariate. Fifteen

observable variables or indicators of the latent variables were used. Fear-avoidance, as a latent construct, was specified by pain catastrophizing (Pain Catastrophizing Scale), hypervigilance (Pain Vigilance and Awareness Questionnaire), and pain anxiety (Pain Anxiety Symptoms Scale). As in a previous study,[29] these 3 observable variables were combined in a latent variable because they were highly correlated; some authors have suggested that they seem to share some potential overlap.[55] The latent variable confrontation was specified by the total score of the CPAQ and the active strategies subscale of the Vanderbilt Pain Management Inventory. Similar to the results in this paper, previous studies[79] have found a positive correlation between acceptance and active coping. In fact, within a theoretical framework, we can "accept" having pain and at the same time "cope" with its negative consequences. In this sense, other authors have expanded the original definition to emphasize that active strategies relate to the amount of effort the patients exert in order to function, despite their pain, by using their resources. This definition of "acceptance-based responding" has much in common with the definition of active coping.[3] Finally, the remaining latent variables (resilience, negative mood, functional status, and pain intensity) were constructed using the subscales of the questionnaires that appear to be highly correlated[15] (see Supplementary Table 1). Thus, resilience was specified by the 2 subscales of the Resilience Scale: Personal Competence and Acceptance of Self and Life. Negative mood was specified by the 2 subscales of the HADS: Anxiety and Depression. Daily functioning was specified by the 2 subscales of the Impairment and Functioning Inventory: Functioning and Impairment. Pain Intensity was specified by the 4 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.

Table 2. Student's t-Test Presented for Men and Women

Variables and Instruments	*Mean*	*SD*	*t*	*Significance*
Time with pain				
Male	70.58	93.41	.806	.421
Female	63.26	88.12		
Resilience				
Male	129.69	19.85	.313	.754
Female	129.07	19.24		
Catastrophizing				
Male	23.53	8.71	.060	.952
Female	23.47	8.91		
Pain anxiety				
Male	66.93*	26.15*	−3.06*	.002*
Female	75.64*	29.83*		
Hypervigilance				
Male	40.38	9.25	−1.116	.265
Female	41.47	10.18		
Pain acceptance				
Male	68.66	17.67	1.035	.301
Female	66.86	16.81		
Pain intensity				
Male	4.90*	1.55*	−4.289*	.000*
Female	5.57*	1.58*		
Depression				
Male	22.45	4.86	1.419	.157
Female	21.70	5.59		
Anxiety				
Male	18.34	5.14	.730	.466
Female	17.96	5.39		
Functional impairment				
Male	2.56	2.88	−1.780	.076
Female	3.13	3.51		
Daily functioning				
Male	37.18*	9.76*	−11.18*	.000*
Female	48.06*	9.67*		

*Signifies significant differences.

Results

Student's t-Tests

Student's t-tests were conducted to examine mean differences between women and men. The results displayed in Table 2 show that the women's scores were significantly higher than the men's scores on Pain Anxiety (M_{women} = 75.64 vs M_{men} = 66.93; $P < .005$), Pain Intensity (M_{women} = 5.57 vs M_{men} = 4.90; $P < .001$), and Daily Functioning (M_{women} = 48.06 vs M_{men} = 37.18; $P < .001$).

Structural Equation Modeling Analysis

Measurement Model

The invariance of the measurement model across groups has to be examined before testing multigroup hypotheses.[13] Thus, the complete measurement invariance assumption was tested first; the results indicated that this model had an adequate fit across both groups[11,44,54] ($\chi^2_{(70)}$ = 146.74, P = .000; goodness of fit = .90; comparative fit = .92). Fig 2 includes the measurement model.

Baseline Model

Following the establishment of the measurement model, structural equation modeling was performed specifying that all structural path coefficients were equal between the 2 groups. Path coefficients should not be interpreted as correlation coefficients. A path coefficient (eg, .80) connecting 2 variables (A and B) means that if A increases by 1 standard deviation from its mean, B would be expected to increase its own standard deviations from its own mean by .80 while holding all other relevant connections constant. With a path coefficient of –.16, when A increases by 1 standard deviation from its mean, B would be expected to decrease its own standard deviations from its own mean by .16 while holding all other relevant connections constant.

Table 3 shows the path coefficients for this baseline model. The value of χ^2 indicated that this model had a good fit between the 2 groups ($\chi^2_{(208)}$ = 414.42, P = .000).

Linear Differences Between Groups

The next step in the analysis was to remove the constraint that the path coefficients between the latent variables were equal between the groups, taking into

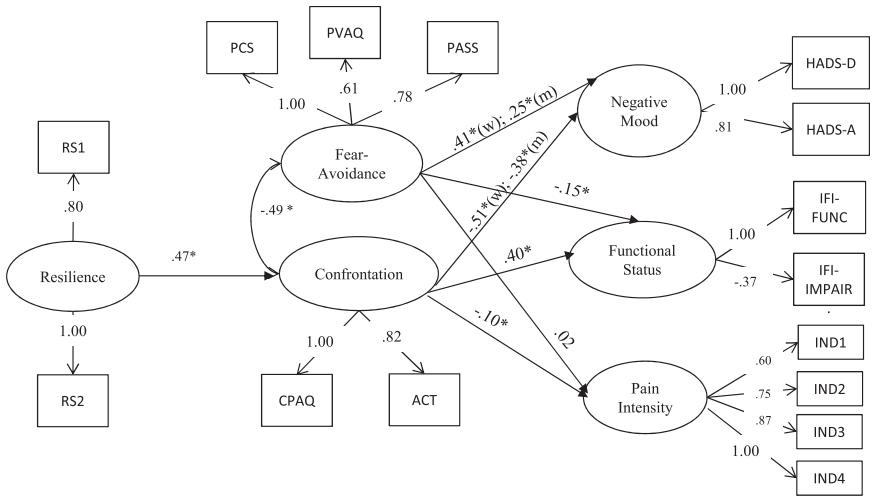

Figure 2. Empirical Model. Standardized β-coefficients and covariation between Fear and Confrontation (curved arrow). Latent variables are represented by circles and observed variables by squares. Covariation is presented as a curved arrow. *$P \leq .05$. Abbreviations: m, men; w, women. RS1, personal competence subscale, Resilience Scale; RS2, acceptance of self and life subscale, Resilience Scale; PCS, Pain Catastrophizing Scale; PVAQ, Pain Vigilance and Awareness Questionnaire; PASS, Pain Anxiety Symptoms Scale; ACT, active coping subscale, The Vanderbilt Pain Management Inventory; CPAQ, Chronic Pain Acceptance Questionnaire; IND1, IND2, IND3, IND4, the 4 questions of Composed Pain intensity index; IFI-I, impairment subscale, Impairment and Functioning Inventory; IFI-F, functioning subscale, Impairment and Functioning Inventory; HADS-A, anxiety subscale, Hospital Anxiety and Depression Scale; HADS-D, depression subscale, Hospital Anxiety and Depression Scale.

account one path at a time. Compared to the baseline model in which all the paths in the 2 groups are constrained to be equal, this analysis tests whether there is a difference between groups for a particular path coefficient. This analysis is similar to analysis of variance. Table 3 shows the path coefficients that were successively estimated between the latent variables between the groups; the differences in the χ^2 values compared to the baseline model and the significance of these differences are also shown. A significant difference in χ^2 values would represent a significant improvement in model fit and indicate that there is a difference between these path coefficients. As can be seen, resilience had a positive significant association with confrontation and was equal across the 2 groups: the higher the resilience, the higher the confrontation. Fear-avoidance also showed a significant association with negative mood of an equal magnitude between the 2 groups; thus, the higher the fear-avoidance, the higher the negative mood. On the other hand, no relationship was found between fear-avoidance and functional status in the 2 groups of patients. However, fear-avoidance was significantly associated with pain intensity alone in the sample of men. Finally, confrontation had a significant association with negative mood, functional status, and pain intensity and was equal between the 2 groups: the higher the confrontation, the higher the functional status and the lower the negative mood and pain intensity.

Discussion

The present study analyzed differences between genders/sexes in the pain experience. The suitability of the theoretical model in men and women with spinal chronic pain was examined.

Women showed significantly higher levels of pain anxiety and pain intensity. This finding agrees with prior studies that suggest that women are more sensitive than men to threat-related stimuli and that this would generally lead to increased pain perception.[76,80,82] Interestingly, it was also found that women had higher levels of daily functioning. In the chronic pain context, the perception of greater intensity of pain has been considered evidence of maladjustment to chronic pain.

Table 3. Path Coefficients (γ and β) Between the Latent Variables Across Groups (Women and Men)

	Resilience to Confrontation (γ)	*Fear-Avoidance to Negative Mood* (β)	*Fear-Avoidance to Functional Status* (β)	*Fear-Avoidance to Pain Intensity* (β)	*Confrontation to Negative Mood* (β)	*Confrontation to Functional Status* (β)	*Confrontation to Pain Intensity* (β)
Baseline model	.47*	.34*	−.15	.02	−.44*	.40*	−.10*
Women	.52	.41	−.14	.07	−.51	.42	−.15
Men	.41	.25	−.15	.03	−.38	.38	−.06
χ^2 change	2.48	5.6	1.58	−.01	4.9	1.6	.23
P value	.10	.02	.10		.05	.10	.90

NOTE. When χ^2 changes are not significant, it indicates that there is not a significant improvement in model fit over the baseline model and the path coefficients are not different. When χ^2 changes are negative, it indicates that there is a worsening in model fit over the baseline model and the path coefficients are not different.
*$P < .05$.

However, according to several studies, daily activity is an indicator of adjustment, quality of life, and well-being among chronic pain patients.[78] The level of daily functioning may be a better index of capacity and adjustment in a sample of patients who have had pain for an average of 5 years. On the other hand, gender roles have been associated with the pain response, with masculine gender norms dictating increased tolerance of pain among men, whereas feminine gender norms determine the acceptance of pain as a normal part of life and are more permissive of pain expression.[1,8,9,16,17,33] Therefore, despite lower levels of pain anxiety and pain intensity among the sample of men, it appears that the women in the sample might be better adapted to chronic pain, given their current levels of functioning and the similar levels of depression and anxiety.

In contrast to the results of previous studies, there were no differences between men and women in catastrophizing. Sullivan et al[93] defined catastrophizing as an exaggerated negative orientation toward noxious stimuli. Catastrophizing can result from past experiences perceived as negative or from threatening information coming from the environment leading to fear and anxiety.[19] Several researchers have found that women reported higher levels of catastrophizing compared to men.[23,45,49,50,68,94] However, Unruh[97] found that women reported having more intense pain and using more coping strategies than men, although men and women did not differ in catastrophizing.[33] The results of the present study are consistent with these findings and in fact show that there were no sex differences in catastrophizing or in hypervigilance. Note that the participants were male and female patients who attend primary care units rather than pain units, despite the amount of time they have experienced pain. A recent study[30] found that patients treated at a pain unit showed worse adjustment to pain, whereas patients attending primary care units had a higher level of adjustment.

As several important variables were similar in both samples, similarities between genders could also be expected regarding associations between the variables included in the hypothetical model. The results showed that the theoretical model has a good fit with the empirical data used in this study, although there were some significant differences between sexes in the path coefficients between fear-avoidance and pain intensity. Regarding the final model, in both samples, confrontation was associated with functional status, negative mood, and pain intensity. According to these results, the higher the scores in pain acceptance and active coping, the higher the levels of functional status and the lower the levels of depression, anxiety, and pain. Several studies have assumed that pain acceptance would predict better adjustment independently of perceived pain intensity.[62] McCracken and Eccleston[59,60] suggested that acceptance involves a behavioral change entailing better daily functioning despite pain.[83,92] It has often been stated that acceptance does not mean resignation and that acceptance paradoxically entails an active attitude.[41] From this point of view, we can "accept" having pain and at the same time "cope" with its negative consequences.[26,79] In this sense, active strategies are related to the amount of effort patients exert in order to function, despite their pain, by using their resources. This definition of "acceptance-based responding" has much in common with the definition of active coping.[26] In the study by Ramírez-Maestre et al,[79] the final adjusted model clearly highlighted the negative relationship between acceptance, depression, and functional impairment and showed that when active coping is practiced, levels of depression, anxiety, and pain decrease. The results of the current study show similarities between men and women in pain acceptance levels and in the use of active coping. In fact, the final model shows that pain acceptance and active coping could increase capacity, whatever the sex of the patients. In this sense, resilience also had a direct and positive association with confrontation. Several authors have suggested that the concepts of resilience and acceptance are interconnected[10,95]; it has even been proposed that some measures of psychological resilience contain measures of psychological acceptance.[10] Thus, resilient people with a relatively stable tendency to display an accepting attitude in life will probably develop accepting behavior when faced with chronic pain. Finally, the latent variable fear-avoidance (including catastrophizing, hypervigilance, and pain anxiety) was associated with negative mood (higher in women), and with pain intensity (only in the sample of men), although there was no relationship between fear and functional status in either sample; in fact, confrontation seemed to play a more important role than fear in the pain experience. However, it must be borne in mind that there was a negative covariation between fear of pain and confrontation. Therefore, an indirect relationship could be expected between resilience and fear through confrontation behavior. Resilience appears as a personal resource that increases patients' capacity to manage pain effectively. 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. In the light of these results, training patients in effective pain coping may be more appropriate than applying psychological interventions that focus on the elimination of fear, and thus the current study has potentially important implications for pain management. The similarity of the structural model in men and women suggests that the fear-avoidance theory is applicable to both sexes. According to these results, men and women present few differences in their response to persistent pain. As Peuter et al[70] pointed out, we have learned that there are individual variations in the threat value of pain and that fear of pain is a key factor in the development and maintenance of chronic pain and disability.[98] As Keogh and Herdenfeldt[53] noted, we are already aware of differences between men and women. However, the current results suggest that these differences have little effect on the relationship between the key variables of the fear-avoidance models. There is a clear need for further research on whether the

differences between men and women in catastrophizing, depression, and anxiety would generate differences in the effects of fear-avoidance on them.

The systematic review of the literature conducted by Racine et al[73,74] suggests that there is a need to assess and improve the ecological validity of findings from laboratory studies on healthy subjects to better understand the factors/mechanisms that influence the experience of women and men with chronic pain. In this context, Gheldof et al[39] reported that most studies have used a regression approach in which the unique contribution of several variables in explaining pain and disability was tested.[55,90] An analysis of these relationships requires a path-analytic or structural equation approach, although few studies have used either of these approaches.[18] Therefore, the current study attempts to answer these needs and offers some interesting contributions to the study of differences between men and women with chronic pain.

Finally, we wish to emphasize that one of the limitations of this study is the exclusive reliance on self-report measures. In addition, the cross-sectional study design means that causal relationships cannot be identified. As Gheldof et al[39] noted, support for the fear-avoidance model is mainly based on cross-sectional studies of chronic pain patients.[71] The mechanism by which pain-related fear initiates a vicious circle of more pain and disability remains unclear. Future research could employ longitudinal methods to investigate the differences between men and women in the pain chronification process.

Although research on sex, gender, and pain has continued to increase and generate novel findings, this new knowledge has had limited clinical impact.[33] In fact, the main conclusion of the present study is that regardless of the fact that men and women present different levels of pain, anxiety, or functioning, fear-avoidance models are theories that should be taken into account in psychological interventions in patients with chronic pain, whichever the patient's sex. Given the significant relationship between acceptance and adjustment, acceptance and commitment therapy[41] appears be a good option. Moreover, as another study indicated,[79] if resilience is relevant to pain acceptance, future research could be directed at determining whether acceptance and commitment therapy and contextual cognitive-behavioral therapy[61] should focus on resilience in order to increase their effectiveness.[91]

Supplementary Data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.jpain.2014.02.006.

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Supplementary Table 1. Correlation Coefficients Among Observed Variables Included in the Model for Males (Above Diagonal) and Females (Below Diagonal)

	RS	*RS1*	*RS2*	*CPAQ*	*ACT*	*PCS*	*PASS*	*PVAQ*	*PAIN*	*HADS-DE*	*HADS-AN*	*IDF-I*	*IDF-F*
RS	1	.974**	.886**	.259**	.521**	−.390**	−.467**	−.385**	−.151*	−.619**	−.493**	−.318**	.199**
RS1	.981**	1	**.757****	.584**	.532**	−.363**	−.496**	−.375**	−.152*	−.600**	−.464**	−.293**	.183*
RS2	.930**	**.841****	1	.391**	.394**	−.357**	−.293**	−.317**	−.100	−.561**	−.474**	−.300**	.160*
CPAQ	.602**	.591**	.551**	1	**.655****	−.579**	−.555**	−.394**	−.402**	−.591**	−.435**	−.458**	.440**
V-ACT	.596**	.585**	.557**	**.663****	1	−.491**	−.499**	−.425**	−.286**	−.527**	−.456**	−.368**	.365**
PCS	−.536**	−.503**	−.538**	−.719**	−.567**	1	**.496****	**.567****	.274**	.496**	.485**	.506**	−.374**
PASS	−.499**	−.505**	−.443**	−.483**	−.441**	**.494****	1	**.392****	.256**	.453**	.442**	.390**	−.243**
PVAQ	−.379**	−.347**	−.392**	−.530**	−.476**	**.612****	**.372****	1	.267**	.316**	.450**	.301**	−.223**
PAIN	−.286**	−.262**	−.321**	−.395**	−.266**	.351**	.275**	.316**	1	.305**	.220**	.167*	−.244**
HADS-DE	−.684**	−.643**	−.697**	−.660**	−.606**	.658**	.504**	.478**	.422**	1	**.537****	.477**	−.320**
HADS-AN	−.562**	−.523**	−.575**	−.448**	−.437**	.510**	.408**	.365**	.271**	**.679****	1	.274**	−.239**
IDF-I	−.348**	−.360**	−.295**	−.442**	−.264**	.427**	.256**	.280**	.197**	.327**	.118	1	**−.399****
IDF-F	.416**	.414**	.384**	.510**	.401**	−.421**	−.178*	−.298**	−.233**	−.484**	−.352**	**−.482****	1

Abbreviations: RS, Resilience total score, Resilience Scale; RS1, personal competence subscale, Resilience Scale; RS2, acceptance of self and life subscale, Resilience Scale; CPAQ, Acceptance total score, Chronic Pain Acceptance Questionnaire; ACT, active coping subscale, The Vanderbilt Pain Management Inventory; PCS, Pain Catastrophizing Scale; PASS, Pain Anxiety Symptoms Scale; PVAQ, Pain Vigilance and Awareness Questionnaire; PAIN, Composed Pain intensity index; HADS-DE, depression subscale, Hospital Anxiety and Depression Scale; HADS-AN, anxiety subscale, Hospital Anxiety and Depression Scale; IFI-I, impairment subscale, Impairment and Functioning Inventory; IFI-F, functioning subscale, Impairment and Functioning Inventory.

NOTE. High and moderate correlations are in **bold**.

*$P < .05$.

**$P < .001$.