

Associations between psychosocial factors and pain intensity, physical functioning, and psychological functioning in patients with chronic pain: A cross-cultural comparison

Running Title: Psychosocial factors and adjustment to pain

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## Abstract

*Objective.* Current models of chronic pain recognize that psychosocial factors influence pain and the effects of pain on daily life. The role of such factors has been widely studied in English speaking individuals with chronic pain. It is possible that the associations of between such factors and adjustment may be **influenced by culture**. This study sought to evaluate the importance of coping responses, self-efficacy beliefs, and social support to adjustment to chronic pain in a sample of Portuguese patients, and discuss the findings with respect to their similarities and differences from findings of studies with English speaking samples.

*Method.* Measures of pain intensity and interference, physical and psychological functioning, coping responses, self-efficacy, and satisfaction with social support were administered to a sample of 324 Portuguese patients with chronic musculoskeletal pain. Univariate and Multivariate analysis were computed. Findings **are** interpreted with respect to those from similar studies using English speaking samples.

*Results.* Coping responses and perceived social support were **significantly associated with** pain interference and both physical and psychological functioning; self-efficacy beliefs were **significantly associated with** all criterion variables. All coping responses, except for task persistence, were associated positively with pain interference and negatively associated with physical and psychological functioning, with the strongest associations found for catastrophizing, praying/hoping, guarding, resting, asking for assistance and relaxation.

*Discussion.* The findings **provide** support for the importance of the psychosocial factors studied in adjustment to chronic pain in Portuguese patients, and also suggest **the possibility of some differences in the role of these factors due to** culture.

Key words: Chronic pain, cross-cultural, coping, social support, self-efficacy

## Introduction

Chronic pain is a significant health problem estimated to affect about one out of five adults worldwide [1,2]. Contemporary models of chronic pain hypothesize a key role for psychosocial factors in the adjustment to chronic pain [3-8]. Moreover, research supports the importance of psychosocial factors as predictors of pain and functioning. In particular, research indicates that self-efficacy beliefs (defined as an individuals' belief or confidence in his/her ability to engage in specific actions or behaviors in pursuit of desired aims) [5,9-16] and the coping responses of task persistence, guarding, resting, asking for assistance, praying/hoping and catastrophizing [4,5,7,16-27] demonstrate the most consistent associations with pain intensity and patient functioning in individuals with chronic pain. Social support has also been shown to be associated with patient functioning in some studies, although the strength and direction of this association has been less consistent [4,5,28-30]. Moreover, previous studies with patients with different health conditions suggest the existence of gender differences in social support, although the results are not always consistent regarding the existence or not of differences between men and women in the association between social support and physical health [31-32].

On the other hand, coping is a situation- and culturally-determined variable, and what may be adaptive in one culture may or may not be adaptive in another [33-38]. Thus, the generalizability of findings of pain coping research derived from studies with English speaking patients, in particular patients from the USA (which represent the majority of the studies on coping with chronic pain) [5,7,16,18,20,21,23-25], to other cultures, including Portuguese culture, is not clear [39]. Two types of studies could potentially help us to understand the role that culture might play in understanding the role that psychosocial factors plays in adjustment to chronic pain: (1) studies comparing the strengths of these associations between individuals in different countries [e.g. 4,15,40] and (2) studies comparing the strengths of these associations between individuals from different ethnic groups living in the same country [e.g. 12,31-33,38,41]. Findings from both types of studies support potential importance of culture.

In an earlier study, Ferreira-Valente and colleagues [39] examined the associations between coping and measures of patient functioning in a sample of patients from Portugal, and compared these findings to the results reported by researchers in the USA. The authors found many similarities but also some intriguing differences in the associations between coping and adjustment to chronic pain. Specially, it was found that unlike the results often found in English speaking samples, (1) task persistence, as measured by the Chronic Pain Coping Inventory, was not negatively associated with measures of pain and dysfunction, (2) seeking social support was moderately and positively associated to pain interference, (3) praying/hoping was moderately negatively associated with depression, and (4) increasing behavioral activities was negatively associated with depression. These dissimilarities suggest that not all research performed with English speaking samples generalize to other cultures.

On the other hand, two of the significant associations found in this previous study not only replicated associations found in studies from the USA, but have also been replicated in research performed in other countries. Specially, associations related to pain self-efficacy and catastrophizing, with the former being associated negatively with pain-related variables (pain intensity and pain interference), depression and anxiety, and positively associated with physical and mental health, and the latter being positively associated with pain and both psychological and physical dysfunction [15,39,40,42-46].

The primary aim of the current study was to further examine the importance of self-efficacy beliefs, perceived social support and pain coping responses to adjustment in a sample of Portuguese patients with chronic pain. If the findings from previous studies performed with English speaking samples were to replicate, we would hypothesize that (1) self-efficacy beliefs and perceived social support would be significantly and negatively associated with pain intensity and pain interference, and positively associated with general physical and psychological functioning [5,10,12-16,46-48]. We would also hypothesize that (2) both adaptive and maladaptive coping responses would show weak to moderate associations with pain, pain interference, and physical and psychological

functioning, with the coping responses classified as maladaptive tending to show stronger associations than measures of adaptive responses with measures of dysfunction [5,7,16,18,20,21,23-25].

## Materials and Methods

### Participants

Participants were 324 adults with chronic musculoskeletal pain who were outpatients of seven health institutions in the North, Center and South of Portugal. Study inclusion criteria were: (1) being at least 18 years old; (2) experiencing pain due to a musculoskeletal condition for at least 3 months; and (3) absence of a physical disability or cognitive impairment that would prevent participation. Exclusion criteria were: (1) significant psychopathology (e.g., active suicidal intention), and (2) diagnosis of fibromyalgia.

### Measures

Participants were asked to provide basic demographic and pain history information (age, sex, marital status, level of education, professional status, duration of pain, pain location and cause of pain), as well as information regarding pain intensity, pain interference, physical and psychological functioning, pain coping responses, self-efficacy and perceived social support, using self-report questionnaires.

*Pain Intensity.* Average pain intensity during the previous 24 hours was assessed using a 0-10 Numerical Rating Scale (NRS). Research supports the validity, responsivity and reliability of the NRS as a measure of pain intensity [49,50].

*Pain interference.* The Portuguese Brief Pain Inventory Interference Scale (P-BPI) was used to assess pain interference [51-53]. The scale asks respondents to rate the extent to which pain interferes with seven life activities (general activity, mood, walking ability, normal work, relations with other people, sleep, and enjoyment of life) on 0-10 numerical rating scales (0 = "Does not interfere"; 10 = "Completely interferes"). Scores can range from 0 to 70, with higher scores indicate

greater pain-related interference with functioning. The Portuguese version of the BPI used in this study has demonstrated good internal consistency (Cronbach's alpha = 0.82 and 0.91), and concurrent validity via its significant associations with measures of physical (SF-12 Physical Component Summary:  $r = -0.42$  to  $-0.61$ ) and psychological functioning (SF-12 Mental Component Summary:  $r = -0.45$  to  $-0.63$ ; HADS Anxiety Scale:  $r = 0.43$  to  $0.50$ ; HADS Depression Scale:  $r = 0.31$  to  $0.45$ ) [49,51]. Factorial validity of the P-BPI has also been supported via confirmatory factor analysis yielding a one-factor solution [53].

*Physical and Psychological Functioning.* The Portuguese SF-12 [54] was used to measure physical and psychological functioning. The scale has 12 items that are scored to provide a Physical Component Summary (PCS) score and a Mental Component Summary (MCS) score. Scores range from 0 to 100, with higher scores indicating better physical and mental health status. Evidence supports the validity and reliability of the Portuguese version of the measure [54].

*Self-Efficacy Beliefs.* The Portuguese Pain Self-Efficacy Questionnaire (P-PSEQ) [43] was used to assess pain-related self-efficacy. The 10-item scale assesses confidence 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". Scores on the PSEQ can range from 0 to 60, and higher scores reflect stronger self-efficacy beliefs. The Portuguese version used in this study has shown good internal consistency (Cronbach's alpha = 0.88), as well as concurrent validity via significant correlations with measures of pain (NRS:  $r = -0.28$ ; BPI Interference scale:  $r = -0.41$ ), physical functioning (SF-12 PCS:  $r = 0.51$ ) and psychological functioning (SF-12 MCS:  $r = 0.46$ ; HADS Anxiety Scale:  $r = -0.39$ ; HADS Depression Scale:  $r = 0.55$ ) [41]. Also, confirmatory factor analysis has yielded a one-factor solution, supporting the factorial validity of this version of the scale [43].

*Social Support.* The Social Support Satisfaction Scale (ESSS) was used as a measure of perceived social support [55]. The scale consists of 15 items that assess satisfaction with perceived support of friends and family, as well as with intimacy and social activities. Respondents report the level of agreement with each item, in a 5-point Likert scale, from “Totally agree” to “Totally disagree”. Scores can range from 15 to 75, with higher scores on the measure represent higher levels of perceived social support. In validation studies, the ESSS has shown satisfactory to good reliability for the total scale (Cronbach’s alpha of 0.85), and discriminant and concurrent validity, via its association with health-related measures [55,56]. In the current sample, the internal consistency of the ESSS was satisfactory to good (Cronbach’s alpha of 0.84), both for women (Cronbach’s alpha of 0.86) and men (Cronbach’s alpha of 0.77).

*Pain Coping.* Coping responses were assessed using the Portuguese two-item per scale Chronic Pain Coping Inventory (CPCI-16) and the Portuguese two-item per scale Coping Strategies Questionnaire (CSQ-14) [55]. The CPCI-16 is a 16-item scale that assesses eight pain coping domains (guarding, resting, asking for assistance, relaxation, task persistence, exercise/stretch, seek support and coping self-statements). For each of the 16 items, respondents report the number of days out of the past seven that they used each coping strategy to deal with pain. Scores on the CPCI-16 scales can range from 0 to 7.

The CSQ-14 is composed of 14 items, grouped into seven coping domains (diverting attention, reinterpreting pain sensations, ignoring pain, praying and hoping, coping self-statements, catastrophizing and increasing behavioral activities), with scores ranging from 0 to 6. The CSQ-14 asks respondents to indicate the frequency that they use each coping strategy on a 7-point Likert scale (0 = “Never do that” and 6 = “Always do that”). The CPCI-16 and CSQ-14 subscales have shown validity through their strong associations ( $r \geq 0.70$ ) with the corresponding scales of their original full-length versions, as well as their patterns of associations with pain-related variables [18]. The Portuguese versions of both measures have shown concurrent validity through a pattern of



significant correlations with measures of physical and psychological functioning, consistent with previous research [57].

### Procedure

A convenience sample of participants was recruited among the outpatients of seven health institutions in the North, Center and South of Portugal. Patients meeting the inclusion criterion were invited to participate in the study while waiting for their physical therapy session to start, and informed about the study aims and procedures. By the time data collection began, all participants had started their rehabilitation program, with the majority of the participants completing the study measures between the second and fourth sessions of the physical therapy treatment. After signing an informed consent form, all participants completed a demographic and pain history questionnaire as well as the 0-10 NRS, P-BPI Interference Scale, CPCI-16, CSQ-14 and SF-12. To minimize assessment burden, not all participants complete both self-efficacy (P-PSEQ) and social support (ESSS) measures. Instead, participants were randomly assigned to complete either the P-PSEQ or the ESSS in addition to the others administered, and a smaller group of 11 participants did not complete either of these measures. Subjects who were unable to read or write were assisted by the investigators in completing the measures.

*Data analysis.* We first computed the means and standard deviations of all the study variables for descriptive purposes. Next, we computed a series of partial correlation coefficients, controlling for sex and age to examine the univariate association between the psychosocial factors (self-efficacy beliefs, social support and pain coping responses) and measures of pain and functioning (pain intensity, pain interference, physical and psychological functioning). We also computed a series of Pearson correlation coefficients between the psychosocial variables of the study for descriptive purposes.

Finally, we conducted a series of 12 hierarchical multiple regression analyses, three for each criterion variable, controlling for sex and age, in order to test the predictive importance of these psychosocial factors on adjustment. Because not all participants completed all the study measures, we conducted separate regression analyses using coping responses, self-efficacy beliefs and social support as **independent variables**. The Cohen's  $f^2$  for each hierarchical multiple regression were computed as measures of effect size, with effects of 0.02 being considered small, 0.15 medium, and 0.35 large effects [58]. **As we have done previously [5], we used principal components analyses (PCAs) to reduce the number of variables to be used in the planned regression analyses.** Specifically, and separately for the CSQ-14 and CPCI-16 subscale scores, we used PCA with an orthogonal rotation (**varimax**) to identify the **belief and coping** components **embedded in the CSQ-14 and CPCI-16 scales**. We used PCA because it enables the maximum variance extraction from the data [57]. Component scores were computed and used in the regression analyses. **To balance the need to control for alpha inflation with the need to protect against Type II errors (that is, identifying an association as not significant when it is present in the population), we used an alpha level of ,01 to determine that a regression analysis result was significant [59,60].**

The PCA of the CSQ-14 subscales resulted in a 2 component solution (first three eigenvalues: 3.16, 1.32, and 0.75), accounting for 61.27% of the variance in CSQ-14 coping responses. Four subscales loaded on the first component (Reinterpreting Pain Sensations, 0.75; Ignoring Pain, 0.75; Coping Self Statements, 0.69; and Increasing Behavioral Activities, 0.71), and two on the second (Catastrophizing, 0.86; and Praying/Hoping, 0.82). One subscale, Diverting Attention, loaded on both components (0.53 on the first component, and 0.52 on the second). Similarly, the PCA of the CPCI-16 subscales resulted in a 2 component solution (first three eigenvalues: 3.17, 1.37, and 0.79), accounting for 56.77% of the variance in CPCI-16 coping responses. Four subscales loaded on the first component (Guarding, 0.79; Resting, 0.74; Asking for Assistance, 0.76; and Seeking, 0.64), and another four on the second (Relaxation, 0.65; Task Persistence, 0.73; Exercise/Stretch, 0.59; and Coping Self Statements, 0.67). The results of the PCA are similar to the theoretical structure of

the original CPCI, distinguishing between wellness-focused and illness-focused coping [61]. Thus, we labeled the first component illness-focused coping, and the second wellness-focused coping.

Missing data from any of the coping scales resulted in that scale being excluded from the analyses, because each scale is only made up of two items. A single missing response from the 7-item for BPI Interference scale, 10-item P-PSEQ and the 15-item ESSS was replaced by the mean of the other items, although if more than one item was missing, the entire scale was excluded from the analyses. All statistical analyses were performed using PASW Statistics 18 (v. 18, SPSS Inc. Chicago, IL).

## Results

### Descriptive information

Table 1 presents descriptive information for the sample. As can be seen, most of the sample were women (66%), with ages ranging from 18 to 90 years ( $M = 60.97$  years,  $SD = 15.40$ ). Most of the participants were married or living with a significant other (62%). The remainder were widowed (16%), single (14%) or divorced/separated (8%). Education level tended to be low, with the plurality of the participants (46%) having attended only primary education (which in Portugal consists of grades one to four) and another 2% having never been to school. Only 11% of the participants had attended College. Most participants were retired (52%), with about half of these (27% of the sample) retired because of disability. 37% of the participants were employed. The majority of the participants had chronic pain for at least two years (69%), with 38% reporting pain for more than 10 years. About half of the participants reported having pain in more than one site of the body (53%). The most common pain locations for the individuals reporting only one site of pain was the lower limb (57%), followed by the back (33%), and the upper limb members (11%).

As can be seen in Table 2, the sample was characterized by moderate levels of pain severity (NRS) and pain-related interference (P-BPI Interference). Overall, mean scores of SF-12 PCS and SF-12 MCS indicate significant physical and psychological dysfunction [52]. For the 171 participants who completed the P-PSEQ, self-efficacy beliefs level on average were in the high range (Mean > 40), based on the proposed cutoffs [61] and when compared with normative datasets for English-speaking individuals with chronic pain [62]. Another 142 participants completed the ESSS assessing perceived social support, resulting on an average score of 54.38 ( $SD = 11.49$ ).

[Insert Tables 1 and 2 about here]

### Associations between psychosocial variables and criterion variables

**Table 2** presents partial correlation coefficients between psychosocial variables and measures of functioning (pain intensity and pain interference) and physical and psychological functioning, controlling for sex and age. Self-efficacy was significantly **associated to all criterion variables, showing negative associations** with pain intensity and pain interference ( $r_s = -0.25$  and  $-0.39$ , respectively), and **positive associations** with physical and psychological functioning ( $r_s = 0.50$  and  $0.45$ ). Similarly, perceived social support showed a weak to moderate significant negative association with pain interference ( $r = -0.24$ ), and moderate positive associations with physical and psychological functioning ( $r_s = 0.33$  and  $0.39$ , respectively).

Several of the CSQ-14 and CPCI-16 subscales were significantly associated with the criterion measures. Specifically, **statistically significant moderate positive associations were found between pain interference and CSQ-14 Catastrophizing, CSQ-14 Praying/Hoping, CPCI-16 Guarding, CPCI-16 Resting, CPCI-16 Asking for Assistance, and CPCI-16 Relaxation, ( $0.29 < r < 0.38$ ).** Furthermore, **significant moderate negative associations were found between physical functioning and CSQ-14 Catastrophizing, CSQ-14 Praying/Hoping, CPCI-16 Guarding, CPCI-16 Resting, CPCI-16 Asking for Assistance, CPCI-16 Relaxation, and CPCI-16 Support Seeking ( $-0.34 < r < -0.51$ ), and between psychological functioning and CSQ-14 Catastrophizing, , CPCI-16 Resting, and CPCI-16 Asking for Assistance ( $-0.32 < r < -0.37$ ).** Interestingly, only CPCI-16 Task Persistence was significantly (but weakly) positively correlated with both physical and psychological functioning status (both  $r_s = 0.12$ ).

[Insert **Table 3** about here]

Results of partial correlation coefficients between self-efficacy, social support and coping responses, controlling for sex and age, are showed on Table 3. As can be seen, self-efficacy and perceived social support were significantly and positively associated ( $r = 0.49$ ). On the other hand, several of the CSQ-14 and CPCI-16 subscales were significantly and negatively associated with self-efficacy and perceived social support ( $-0.41 < r_s < -0.25$ ), with the strongest associations being those between CSQ-14 Catastrophizing and self-efficacy and perceived social support ( $r_s = -0.40$

and -0.41, respectively), followed by the associations between CPCI-16 Guarding and self-efficacy and perceived social support ( $r_s = -0.35$ ). Only the CPCI-16 Task Persistence subscale yield moderate significant and positive associations with self-efficacy and perceived social support ( $r_s = 0.46$  and  $0.25$ , respectively).

#### Multivariate Regression Analysis: Associations between Psychosocial Factors and Pain Intensity

Results of the multiple hierarchical regression analyses for pain intensity, as measured by the NRS are presented on Table 4. In the first regression model that included coping responses as independent variables of pain intensity, both demographic variables explained 7% of the variance. When coping responses were added, they accounted for an additional, but not statistically significant, 3% of the variance in NRS ( $f^2=0.03$ ). In the next regression model, that test the predictive role of self-efficacy, the demographic variables explained 13% of the variance in NRS, and self-efficacy was also significantly associated with pain intensity, accounting for an additional and significant 5% of the variance ( $f^2=0.06$ ). The last model, examined the association between perceived social support and pain intensity. Demographic variables were significantly individually associated with pain intensity and accounted for 8% of the variance in NRS, and social support accounted for an additional (non-significant) 2% of the variance in the criterion variable ( $f^2=0.02$ ).

[Insert Table 4 about here]

#### Multivariate Regression Analysis: Associations between Psychosocial Factors and Pain Interference

Table 4 presents the results of the regression analyses predicting pain interference. In the regression model including coping responses as independent variables, the demographic variables explained a significant 5% of the variance in the first step, and coping responses accounted for an additional and statistically significant 20% of variance in the criterion ( $f^2=0.25$ ), representing a large

variance explained by these independent variables. CSQ-14 Component 2, and CPCI-16 Illness focused component were significantly independently associated with pain interference. In the second model, the demographic variable sex was significantly associated with pain interference (9% of variance explained). In step 2, self-efficacy accounted for an additional 5% of the variance ( $f^2=0.17$ ). In the third regression, the demographic variables explained 10% of the variance, and perceived social support accounted for an additional and statistically significant 5% of the variance in pain interference ( $f^2=0.05$ ).

#### Multivariate Regression Analysis: Associations between Psychosocial Factors and Physical Functioning

Table 5 presents the results of the multiple hierarchical regression analyses predicting physical functioning, as measured by the physical component of the SF-12 scale (PCS). In step 1 of the first model, the demographic variables explained 9% of the variance in the PCS scale, and coping accounted for an additional 30% of the variance ( $f^2=0.42$ ), representing a large variance explained by coping responses. In the next model, the demographic variables explained 16% of the variance, and self-efficacy contributed to an additional and significant 5% of the variance ( $f^2=0.26$ ). In the third model, the demographic variables accounted for 10% of the variance in step one, and perceived social support contributed to an additional and statistically significant 10% of the variance in the PCS scale ( $f^2=0.10$ ).

[Insert Table 5 about here]

#### Multivariate Regression Analysis: Associations between Psychosocial Factors and Psychological Functioning

The results of the regression analyses predicting psychological functioning, as measured by the mental component of the SF-12 scale (MCS), are presented on Table 5. In the first model, the demographic variables explained 5% of the variance in the first step, and the coping factors accounted

for an additional 19% of variance in the criterion ( $f^2=0.23$ ). In the next model, the demographic variables explained 6% of variance, and self-efficacy accounted for an additional 18% of the variance ( $f^2=0.22$ ). Finally, in the last model, the demographic variables explained 7% of the variance in psychological functioning, and perceived social support made an additional significant contribution, accounting for an additional 13% of the variance ( $f^2=0.42$ ).



## Discussion

The findings from this study provide limited support for the study hypotheses. Consistent with previous research with patients of other countries and cultures [4,5,7,9,10,13,15-18,20,22,40,41,65,66], psychosocial factors were significantly associated with pain intensity, pain interference, and both physical and psychological functioning. Specifically, self-efficacy was significantly associated with all four criterion measures, and both perceived social support and coping responses were associated with pain interference, physical functioning, and psychological functioning in our Portuguese sample of individuals with chronic musculoskeletal pain. However, inconsistent with the study hypotheses, there was not a clear pattern of “adaptive” coping responses being significantly associated with lower levels of pain interference and higher levels of physical and psychological functioning. Instead, in our sample virtually all coping responses, with the exception of task persistence, were associated positively with pain interference and negatively associated with physical and psychological functioning. Also, although relatively few differences in the associations were found between our sample and English speaking samples (mostly from the USA), the few differences that did emerge are intriguing.

Consistent with previous research with Portuguese and USA samples [5,7,18,21,24,39], coping responses were not strongly associated with pain intensity. This finding is consistent across at least two cultures, and suggest that the role of coping in enhancing or buffering the intensity of pain is likely to be minimal. These findings are also consistent with the results found in some studies conducted in other English speaking countries and with non-English speaking samples [e.g. 4,20,26,40,66].

Coping responses were, however, significantly associated with pain interference, psychological functioning, and physical functioning, with a large amount of variance of these dependent variables explained by coping. As predicted, the measures of maladaptive coping (catastrophizing, pray/hope, guarding, resting, and asking for assistance) generally demonstrated the strongest associations with the criterion variables. This is consistent with previous research with

USA samples, and also with some of the findings in research with patients from other countries and cultures [15,17,19,22,66], and suggests that there are a large number of associations between coping and adjustment that generalize across cultures [15,17-19,21,22,24,32,37,66].

Two differences in the associations between pain coping responses and measures of pain and functioning in a sample of patients from Portugal, relative to samples of patients from the USA, emerged. First, use of task persistence, usually negatively correlated with pain and dysfunction in English speaking samples from the USA [5,7,18,21,23] showed only weak positive associations with physical and psychological functioning in our sample. Second, seeking social support, which has been shown to be inconsistently and weakly associated with pain interference and psychological functioning in USA samples [5,18,21,23], showed a significant positive association with pain interference, and moderate negative associations with physical and psychological functioning in our sample. These differences found could be attributed to a number of non-mutually exclusive factors, as previously noted by Ferreira-Valente and colleagues [39], as for example subtle differences between our sample and the English-speaking samples in other studies (e.g. age differences, sex differences, or differences in some other factors, such as level of education). Nevertheless, although the English speaking countries, including the USA, tend to be multicultural and multiethnic societies, with different health and health insurance systems to those that prevail in Portugal, the most interesting possible explanations are related to cultural nuances.

Our findings partially replicate the findings previously found by our group in a different sample of Portuguese patients [39]. In both the previous and the current study, and unlike findings from research with USA patients, we found that task persistence was not significantly associated with measures of pain intensity, pain interference, and depression. One possible explanation for the discrepancies in the importance of task persistence as a coping response between patients from the USA and patients from Portugal, is that these last group may be more prone to depressive symptoms and hopelessness than people from the USA, and that this might impact the effects of task persistence on pain and functioning [39]. Consistent with this idea, the prevalence of

depression in Portugal (about 20%) [67,68] is higher than that found in the USA (about 5% - 9%) [69]. Also, as noted by Ferreira-Valente et al. [39], the Portuguese language is filled with words expressing melancholia, depressive feelings, and hopelessness. For example, Portuguese has a unique word (“*saudade*”) that has no correspondence with any word in any other language. This expresses the sadness associated with being apart from one’s loved one. Another common Portuguese word is “*fado*”, the name of a traditional Portuguese style of music. When a person from Portugal says “this is my *fado*” he/she express the disappointment and the impossibility of defeating fate; a view that negative life events cannot be changed, confronted or defeated.

It is possible that this tendency towards melancholia among Portuguese could act as a moderating factor that vitiates the positive impact of task persistence on pain and functioning; even among those who report relatively high levels of task persistence, there may also be high levels of helplessness and hopelessness, interfering with the potential (positive) impact of task persistence. Patients in the USA may not have this characteristic to the same degree that Portuguese patients do, allowing for task persistence to have a greater beneficial impact. Of course, research would be needed to test this speculation. For example, in cross-cultural studies, researchers could determine if increases in task persistence are associated with decreases in catastrophizing and disability in samples of individuals from the USA, but not associated with decreases in catastrophizing and disability in samples of patients from Portugal.

A second possible reason for the differences in the importance of task persistence between patients from Portugal and patients from the USA is that people from the two cultures might define “task persistence” differently. To the extent that Portuguese patients have worse economic status and sense of control over their lives, they may feel like they have no alternative but to persist at tasks and chores, including work, just to survive. When viewed as something that one *must* do, as opposed to something that one *chooses* to do, task persistence may not be “adaptive” and helpful. If this hypothesis is supported in future research, then pain treatment with Portuguese patients might need to help them identify when they might have a choice to persist in adaptive coping or not,

helping them to define task persistence as an adaptive coping response, rather than a requirement for survival.

A second finding from our study that is inconsistent with the findings from English speaking samples concerns the associations between the coping response of support seeking and measures of adjustment. Whereas these associations tend to be positive and weak in USA samples [5,18,21,23], we found that social support seeking was associated with higher levels of pain and dysfunction in our sample. Also, this pattern of associations is inconsistent with that found for *perceived social support* (which was associated to better functioning) in our sample. One possible explanation for the finding that support seeking may be maladaptive in Portuguese patients, but not in USA samples, was advanced by Ferreira-Valente and colleagues [39]. Specifically, we noted that in Mediterranean culture, interpersonal relationships are given a very important role [70-72], and *organic* communities [72] that encourage interdependence are developed. This could lead Portuguese patients to rely more than patients from the USA on the community for support. If so, Portuguese patients with greater impairment and pain-related distress may seek more social support than those with better functioning, relying more in others support to help them cope with pain and pain-related distress than patients from Anglo-Saxon (North) cultures.

A number of studies in English speaking populations (conducted mostly in the USA) have examined possible differences in pain-related coping responses between men and women, as well as between different ethnic groups . Although significant differences in the frequency of use of the different coping responses between ethnic groups sometimes emerge (with African-Americans and Hispanics tending to use praying and hoping, catastrophizing and diverting attention more often than Caucasians) [12,33,34,41], these differences have been shown to become very small when groups are closely matched by age, gender, education level and clinical status [34]. Moreover, the associations between coping and adjustment are similar between Caucasians and African-Americans effect [41,73].

On the other hand, more consistent differences have been found in the frequency of use of pain coping responses between men and women. For example, women tend to catastrophize and seek social support more than men [74,75], and men engage in active coping responses more than women [76]. However, the associations between pain coping responses and adjustment to pain have been shown to be similar between men and women [75,77]. In short, even though there may be differences in the frequency with which individuals use different coping responses as a function of gender or ethnicity, the role that coping ultimately plays in adjustment is mostly similar. Nevertheless, it is important to keep potential gender and ethnicity effects in mind when interpreting the findings from the current study. Because the majority of our sample were Caucasians, it is not possible to know with certainty how many of the differences that were found in coping between our sample and those from other studies were due to country effects (e.g., Portuguese versus USA) or ethnicity differences (e.g., Caucasian versus other ethnicities). Further research examining the effects of country of origin, gender, and ethnicity is needed to help better understand the importance of each of these variables.

There are a number of other limitations that should be considered when interpreting the findings. First, we employed a cross-sectional correlational design. Therefore, we are not able to make causal conclusions regarding the associations among the study variables. Future research should address questions of causality using both longitudinal and experimental designs. Second, the study sample was one of convenience, and its representativeness of the population of patients in Portugal with chronic musculoskeletal pain cannot be assumed. Thus, additional research is needed to determine the extent to which our findings generalize to other samples of patients from Portugal. Third, to minimize the assessment burden in this study, not all participants completed all study measures. This approach did not allow us to examine the associations between all of the psychosocial factors (coping, self-efficacy and social support) and the criterion variables in the same analysis. As a result, we were not able to determine which psychosocial factor or factors are most important (and independent) relative to the others. Future researchers should consider administering measures of each of these domains to all participants in a study, perhaps using brief versions of measures when

available, to minimize assessment burden. Finally, the participants had pain problems stemming from a variety of chronic musculoskeletal conditions. It is possible that relationships between pain coping and adjustment to pain may be moderated [78], at least in part, by pain etiology, thus, the strength of the associations may have been obscured by the use of such a heterogeneous sample.

Despite the study's limitations, however, the findings provide support for the importance of self-efficacy, social support and coping responses in adjustment to chronic pain in Portuguese samples. The findings also suggest the possibility that culture may moderate some of the associations between coping and adjustment, influencing the ways in which individuals react to pain. It is possible that coping strategies found to be adaptive and maladaptive in one culture are not necessarily similarly adaptive and maladaptive in another; for example, whereas previous research in English speaking patients suggests that task persistence and support seeking may be adaptive and associated with positive outcomes, these same coping strategies were weakly or positively associated with negative outcomes in our sample.

Given the high level of similarity for many of the associations between psychosocial variables and pain-related outcomes in our sample as well as those from the USA, however, and consistently with the conclusions reached by previous cross-ethnic and cross-cultural studies [15,24,31,34,38] the findings suggest that pain treatments developed to address psychosocial factors and shown to be effective in the USA may also be effective in other countries and cultures, such as Portugal. However, some of the subtle cultural differences that were found suggest that wholesale import of these treatments may not be indicated; some adaptation may be necessary to ensure and maximize treatment efficacy.

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