

Mental defeat is linked to interference, distress and disability in chronic pain

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ABSTRACT

Mental defeat is a psychological construct that has recently been applied to characterize the experience of chronic pain. Elevated levels of mental defeat have been identified in patients with chronic pain, and while its presence distinguishes treatment seeking from non-treatment seeking individuals, the link between mental defeat and disability in chronic pain is yet to be established. The current study investigated the extent to which mental defeat is associated with pain-related interference, distress and disability. A total of 133 participants completed the Pain Self Perception Scale that assessed mental defeat in relation to pain. Moreover, the participants were asked to complete a set of questionnaires that measured pain interference, distress, disability and other demographic (age, body mass index), clinical (pain intensity) and psychological (catastrophizing, worry, rumination and health anxiety) predictors of disability. Mental defeat was found to be strongly correlated with pain interference, sleep disturbance, anxiety, depression, functional disability and psychosocial disability. These correlations remained significant even when pain intensity and demographic variables were partialled out. Relative to chronic pain patients with lower levels of mental defeat, those with higher levels of mental defeat reported greater degree of pain interference, distress and disability. In a series of regression analyses, mental defeat emerged as the strongest predictor of pain interference, depression and psychosocial disability, whereas catastrophizing was the best predictor of sleep interference, anxiety and functional disability. These findings suggest that mental defeat may be an important mediator of distress and disability in chronic pain. Theoretical and clinical implications are discussed.

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1. Introduction

Mental defeat is a construct that has recently been applied to the experience of chronic pain as a way of characterizing the impact of pain on self-concept [34,35]. It can be described as a state of mind marked by a sense of a loss of autonomy, agency and human integrity. While some people experiencing severe and chronic pain show remarkable resilience and manage to live a fulfilling life despite the pain, many patients attending tertiary care services report feeling 'mentally defeated' by the pain [35].

Mental defeat can be conceptualized as a type of self-processing where persistent pain results in a linked set of negative beliefs about the self in relation to pain [34]. It may represent a type of catastrophizing where the feared future consequences of pain primarily concern the person's sense of identity, agency and self. Accordingly, the pain patient may simultaneously hold specific catastrophic beliefs about the physical consequences of pain (e.g.,

"The pain is so bad that I'll soon end up in a wheelchair") and a more self-related sense of mental defeat (e.g., "The pain will destroy me as a person/partner/parent").

The sense of mental defeat in chronic pain is comparable to that observed in victims of torture/assault who subsequently developed severe psychological consequences such as chronic depression and posttraumatic stress disorder (PTSD). In the PTSD literature, mental defeat is an important predictor of greater symptom severity and poorer treatment response [13,16,17]. Given the obvious overlaps between pain and torture/assault [3,11] and the established link between chronic pain and PTSD [5], it follows that chronic pain patients who experience higher levels of mental defeat should report more pain, distress and disability than those who do not.

We recently showed elevated levels of mental defeat in patients with chronic pain, but not in those with acute pain or anxiety disorders, community volunteers with chronic or acute pain and healthy volunteers without significant pain [34]. Mental defeat differentiated treatment seeking from non-treatment seeking individuals matched not only in terms of their demographics and pain intensity but also mood disturbance [34]. Although these findings seem to suggest that mental defeat may be linked to higher levels of disability, such relationship has yet to be directly examined.

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The primary aim of the current study was to investigate the extent to which mental defeat is associated with disability. Validated outcome measures were used to index pain-related interference (Brief Pain Inventory, Insomnia Severity Index), distress (Hospital Anxiety and Depression Scale) and disability (Pain Disability Questionnaire). While the conceptual distinctions between mental defeat and pain catastrophizing have been specified [34], their relative contributions to disability in chronic pain require empirical examination; the present study was intended to provide data in this area.

2. Method

2.1. Participants

Participants were 133 patients with chronic pain seeking treatment from a pain clinic in London, UK. All attendees of the clinic who met the following criteria were invited to complete a questionnaire for this study, which preceded an observational study investigating the sleep patterns in patients with chronic pain. Patients were included in the study if they (i) were aged between 18 and 65 (because our research focused on studying the psychological factors associated with chronic pain in working-age adults), (ii) were English-speaking and (iii) had a complaint of pain for 6 months or longer. Patients excluded from the study were those who (i) had pain known to arise from cancer, HIV/AIDS or a terminal illness, (ii) met diagnostic criteria for a psychotic disorder or a major mood disorder with signs of acute mania or distress, (iii) were illiterate or had a learning disability. Patients agreed to take part in this study completed and returned the questionnaire together with a signed consent form.

2.2. Measures

Each participant completed a package of 10 questionnaires for this study. Below we briefly describe the function, method of scoring and psychometric properties of each of these questionnaires.

2.2.1. Pain interference, distress and disability measures

2.2.1.1. Brief Pain Inventory (BPI [9]). The BPI is an outcome measure recommended by the IMMPACT Group [12,37]. The seven-item interference subscale was used in the current study to assess *pain's interference* in terms of (i) general activity, (ii) mood, (iii) walking ability, (iv) work, (v) relationships, (vi) sleep and (vii) enjoyment of life. Responses are made on 0–10 numerical rating scales (NRS), with 0 representing “Does not interfere” and 10 representing “Interferes completely”. The sum of these items can be calculated to provide a global interference score ranging from 0 to 70, with higher ratings indicating high levels of interference. The interference subscale of the BPI has shown to have good internal reliability (Cronbach's $\alpha = 0.88$) and high sensitivity to the effect of treatment [33].

2.2.1.2. Insomnia Severity Index (ISI [7]). The ISI is a self-report measure validated to evaluate insomnia severity with reference to the diagnostic criteria for primary insomnia specified in the Diagnostic and Statistical Manual for Mental Disorders, 4th edition [2]. It was used in the current study to assess the degree of *sleep interference*. In line with the duration specification of current diagnostic criteria, the participants were instructed to respond to the questions based on their sleep in the last month, rather than 2 weeks as in the original instruction. The ISI comprises seven items measuring the severity of (i) initial, (ii) middle and (iii) terminal insomnia, (iv) dissatisfaction with current sleep pattern, (v) interference with daily functioning, (vi) noticeability of impairment attributable to

the sleep problem and (vii) degree of distress or concern caused by the sleep problem. Each item is rated on a five-point scale (0 = “Not at all”, 4 = “Extremely”), generating a total score that ranges from 0 to 28 (with higher scores indicative of more severe insomnia). A total score of 0–7 indicates “No clinically significant insomnia”, 8–14 “Subthreshold insomnia”, 15–21 “Clinical insomnia (moderate severity)” and 22–28 “Clinical insomnia (severe)”. The cut-off of 14 has been found to have optimal sensitivity (94%) and specificity (94%). The ISI has acceptable levels of internal consistency (Cronbach's $\alpha = 0.76$ –0.78; item-total $r = 0.36$ –0.67) and concurrent validity (correlation with sleep diary variables = 0.32–0.91; correlation with polysomnography variables = 0.07–0.45; correlation with clinician's ratings = 0.50–0.71). It has also been shown to be sensitive to the improvement in sleep over the course of both drug and non-drug treatments for insomnia.

2.2.1.3. Hospital Anxiety and Depression Scale (HAD [42]). The HAD is a 14-item self-report questionnaire that measures the overall severity of *anxiety* and *depression* (seven items each) in non-psychiatric medical contexts. It was used in this study to assess levels of mood disturbance. Participants were asked to complete the HAD based on how they had been feeling over the past week. Each item on the HAD is rated on a four-point scale (0–3), generating a total “Anxiety” or “Depression” score that ranges from 0 to 21. The HAD has good internal consistency (mean α for HAD-Anxiety = 0.83 and for mean α for HAD-Depression = 0.82) and concurrent validity (correlation with clinician ratings of anxiety = 0.54; correlation with clinician ratings of depression = 0.79). A score of 8 or above on the anxiety subscale identifies cases of anxiety with a mean sensitivity of 88% and a mean specificity of 90%, while a score of 8 or above on the depression subscale identifies cases of depression (as defined by the ICD-10) with a mean sensitivity of 90% and a mean specificity of 89% [8].

2.2.1.4. Pain Disability Questionnaire (PDQ [4]). The PDQ is a relatively new disability measure for musculoskeletal conditions in general. It was used in the current study to assess both *functional* and *psychosocial disabilities* often reported by chronic pain patients. Functional disability is measured using nine items that ask about interference to areas such as work, travel, lifting, leisure activities, etc. Psychosocial disability is measured by six items that ask about the impact of pain on areas such as income, medication use, mood, etc. Participants were required to respond to each item placing a cross along a 10 cm line. Each line has two anchors, one at 0 representing no problem (e.g., “Work normally”) and the other at 10 representing worst disability in that area (e.g., “Unable to work at all”). Responses are scored by measuring how far along each cross is on the line and rounding it up or down to give a whole number. The total score for physical disability is calculated by summing the responses for the nine items and can range from 0 to 90. The total score for psychosocial disability is calculated by summing responses to the six items and can range from 0 to 60. The PDQ displays excellent internal consistency (Cronbach's $\alpha = 0.96$) and test–retest reliability ($r = 0.94$). The instrument has also been found to be responsive to treatment, with scores significantly decreasing from pre- to post-treatment.

2.2.2. Primary psychological predictors

2.2.2.1. Pain Self Perception Scale (PSPS [34]). The PSPS is a new instrument developed by our group to assess *mental defeat* in relation to pain. The PSPS includes 24 items that describe thoughts and feelings attributable to pain. All items begin with the phrase, “Because of the pain...”. Example items are “...I felt destroyed as a person”, “...I felt humiliated and that I was losing my sense of inner dignity” and “...I felt there was no fight left in me”. Respon-

dents are asked to recall a recent episode of intense pain before rating the extent to which each item applied to them during the pain episode. Ratings are made using a five-point scale where 0 means 'Not at all/Never' and 4 means 'Very Strongly'. Summing all responses provides a total score, which can range from 0 to 96. The PSPS is found to be unidimensional and demonstrates excellent internal consistency (*Cronbach* α = 0.98) and test–retest reliability (r = 0.92) when used with patients with chronic pain.

2.2.2.2. Pain Catastrophizing Scale (PCS [31]). The PCS was used in the current study to measure pain patients' *catastrophizing thinking* associated with pain. It contains 13 items and the respondents are asked to rate how frequently they experience each of these thoughts or feelings when they are in pain. Ratings are made on a five-point scale with 0 meaning "Not at all" and 4 meaning "All the time", giving a total score ranging from 0 to 52. The PCS has been shown to have high internal consistency (*Cronbach* α = 0.87) and test–retest reliability (r = 0.70–0.75) over a 6–10 week period.

2.2.3. Secondary pain and psychological predictors

2.2.3.1. Pain intensity Visual Analogue Scale (VAS). The 10-cm horizontal VAS in the Short-Form McGill Pain Questionnaire [21] was used to allow the participants to rate their overall *pain intensity* at the time of the study.

2.2.3.2. Short Health Anxiety Inventory (SHAI [28]). The SHAI is a measure of *health anxiety* for use with the general population and in psychiatric and medical contexts. Elevated health anxiety has been observed among patients undergoing treatment for chronic pain [19,27]. The SHAI comprises 14 groups of four statements, each of which is ranked on a four-point scale (0–3) and summed to give a total score that ranges from 0 to 42. The SHAI has good internal consistency (*Cronbach* α = 0.89) comparable to that of its long version and is sensitive to treatment for severe health anxiety if referenced 'over the past week'.

2.2.3.3. Ruminative Response Scale (RRS [25]). The RRS was used in this study to index the participants' tendency to engage in *rumination*. It contains 22 items describing responses to depressed mood that are focused on self or on possible consequences and causes of mood. Items are scored between 1 ("Almost never") and 4 ("Almost always"). Summing all item scores produce a rumination score that ranges from 22 to 88. The RRS has been shown to have high internal consistency (*Cronbach* α = 0.90) and test–retest reliability (r) of 0.67 [36].

2.2.3.4. Penn State Worry Questionnaire (PSWQ [22]). The PSWQ was used in this study to measure the tendency to *worry*. The PSWQ is made up of 16 items including "Many situations make me worry" and "Once I start worrying I cannot stop". Respondents are asked to rate to what extent each statement is typical of them using a five-point scale, where 1 represents 'Not typical of me' and 5 represents 'Very typical of me'. Five of the items are reverse scored. Responses to the 16 items can be summed to provide a total worry score, which ranges from 16 to 80. The PSWQ demonstrates excellent internal consistency (*Cronbach* α $\geq$ 0.91) and good test–retest reliability over periods ranging from 2 weeks to 2 months ($r \geq$ 0.74).

2.3. Data analysis

Pearson's correlation analyses were performed to examine the association between mental defeat and the interference (pain interference and sleep interference), distress (anxiety and depression) and disability (functional and psychosocial disability) measures. Three additional sets of partial correlation analyses were conducted to further examine the relationship amongst these vari-

ables, when controlling for (i) pain intensity, (ii) the combined effect of pain intensity and age and (iii) the combined effect of pain intensity, age and body mass index.

To determine if patients with high mental defeat could be distinguished from those with low mental defeat in terms of their self-reported levels of interference, distress and disability, a median split was performed based on the PSPS score (median = 23) to generate two subgroups of participants; patients with high mental defeat (PSPS $\geq$ 23; n = 62) and patients with low mental defeat (PSPS < 23; n = 70). Between-groups comparisons were then carried out for (i) pain interference, (ii) sleep interference, (iii) anxiety, (iv) depression, (v) functional disability and (vi) psychosocial disability. Controlling for multiple comparisons, Bonferroni adjustments were applied adjusting the α level to 0.008 for each comparison to minimize chance capitalization. We also calculated the effect size (Cohen's d) of the differences between the high and low mental defeat groups on each disability measure, to give a better idea of the size of the between-groups difference.

A series of linear regression analyses were performed to examine the individual strength of mental defeat, catastrophizing, pain intensity, health anxiety, tendency to ruminate, tendency to worry in predicting each of the disability measures included in this study (i.e., a total of 6 $\times$ 6 linear regression analyses). This avoided the problems of multicollinearity and allowed a direct comparison of mental defeat against some other better-researched constructs (e.g., pain intensity and catastrophizing) in their abilities to explain disability in chronic pain. Then, another series of stepwise regression analyses were conducted to examine the interaction of the variables of interest in predicting disability in chronic pain. This enabled us to evaluate the functional boundary between mental defeat and catastrophizing. We were particularly keen to find out if the two variables would simultaneously be 'selected' into the model to explain the variance of the same dependent measure, as this would suggest a degree of independence between the two concepts. Raw data of all variables were standardized to enhance comparability of the findings. Again, Bonferroni adjustments were applied to correct for multiple comparisons within each outcome domain examined, such that the new α level was 0.008.

3. Results

3.1. Participant characteristics

The current sample comprised 103 female (77.4 %) and 30 male (22.6 %) participants. The group was largely white (74.4%), and most of the participants were either married or living as married (52.6%). The majority of the participants (60.9%) were on sick leave, disability allowance or were unemployed at the time of the study.

To be as inclusive as possible, we did not select participants based on the location or aetiology of their pain. As such, a range of pain conditions were reported, with most people citing pain in the lower back (71.4%), legs (51.9%), neck (41.4%), shoulder (34.6%), knee (30.1%), arms (25.6%), upper back (24.2%), and joints (21.8%). The mean age of this sample was 46.1 years (range: 20–65 years; median: 46 years). The mean duration of pain was reported to be 10.7 years (range: 0.5–42 years; median: 8 years). Their mean body mass index was 28 (range: 16.7–47.1; median: 26.7; percentage of BMI $\geq$ 30: 29%). As a group, characteristics of the current sample were comparable to those of other studies using clinical samples of chronic pain patients in the UK [39].

3.2. Correlation analyses

Pearson's and partial correlations of mental defeat with the six disability measures of interest are presented in Table 1. As is

Table 1

Pearson's and partial correlations of mental defeat with the disability measures.

	Mental defeat			
	Zero order pearson ^a	Partialling out: -pain intensity ^b	Partialling out: -pain intensity -age ^c	Partialling out: -pain intensity -age -body mass index ^d
1. Pain interference	0.51***	0.45***	0.44***	0.44***
2. Sleep interference	0.35***	0.28***	0.28**	0.29**
3. Anxiety	0.60***	0.59***	0.58***	0.57***
4. Depression	0.66***	0.63***	0.62***	0.63***
5. Functional disability	0.49***	0.43***	0.41***	0.41***
6. Psychosocial disability	0.61***	0.57***	0.57***	0.57***

** $p < .01$.*** $p < .001$.^a $df = 133$.^b $df = 130$.^c $df = 129$.^d $df = 127$.

evident, the level of mental defeat was significantly, positively correlated with pain interference, sleep interference, anxiety, depression, functional and psychosocial disability. The strength of the correlations were moderate to strong ($r = 0.35$ – 0.66), and importantly, these correlations remained significant (and as strong; $r = 0.29$ – 0.63) even when the effects of the participants' pain intensity, age and body mass index were partialled out.

3.3. Differences between patients with high and low mental defeat

Significant between-groups differences were observed for all disability measures of interest between the high and low mental defeat groups, even after applying the Bonferroni adjustments to control for multiple comparisons. As can be seen from Table 2, relative to chronic pain patients with low levels of mental defeat, those experiencing high levels of mental defeat reported greater pain and sleep interference, anxiety and depression, and functional and psychosocial disability. Medium to strong effect sizes ($d = 0.53$ – 1.35) were obtained for the between-groups differences [10]. It is worth noting that the high mental defeat group's average scores on the ISI (18.4) and HAD (anxiety = 11.3; depression = 10.2) were above the suggested cut-offs, indicating probable cases of clinical insomnia, anxiety and depression.

3.4. Linear regression analyses comparing strength of individual predictors

Table 3 presents the results of linear regression analyses performed to examine the individual strength of mental defeat, catastrophizing, pain intensity, health anxiety, tendency to ruminate, and tendency to worry in predicting each of the disability mea-

asures included in this study. Mental defeat was found to be the strongest predictor for pain interference ($Adjusted R^2 = 0.26$), depression ($Adjusted R^2 = 0.43$) and psychosocial disability ($Adjusted R^2 = 0.37$), whereas catastrophizing was found to be the strongest predictor for sleep interference ($Adjusted R^2 = 0.15$), anxiety ($Adjusted R^2 = 0.39$) and functional disability ($Adjusted R^2 = 0.26$).

3.5. Stepwise regression analyses allowing all predictors to compete for variance

The results of the six stepwise regression analyses conducted for physical and psychosocial disability, pain and sleep interference, anxiety and depression are graphically presented in Fig. 1. The sections below provide details how the various variables combined to predict chronic pain patients' levels of disability. Of particular interest is that, in three of the six disability measures, mental defeat and catastrophizing were simultaneously 'selected' into the same model to explain the total amount of variance. This suggests that mental defeat and catastrophizing are related but separate constructs.

3.5.1. Pain interference

Significant predictors of pain interference included mental defeat, pain intensity and catastrophizing [$F(3, 129) = 25.2$, $p < .001$]. Together, these factors accounted for 37% of the total variance.

3.5.2. Sleep interference

Significant predictors of insomnia severity included catastrophizing and pain intensity [$F(2, 130) = 59.1$, $p < .001$]. Together, these factors accounted for 22% of the total variance.

Table 2

Between-groups comparisons between patients with high and low mental defeat on the disability measures.

	High mental defeat ^a Mean (SD)	Low mental defeat ^b Mean (SD)	t (df), p	Cohen's d
1. Pain interference	50.3 (12.2)	37.3 (16.9)	5.1 (127)***	0.88
2. Sleep interference	18.4 (8.3)	14.0 (8.4)	3.0 (131)**†	0.53
3. Anxiety	11.3 (3.9)	7.1 (3.7)	6.4 (131)***	1.11
4. Depression	10.2 (4.6)	5.6 (3.7)	6.5 (131)***	1.12
5. Functional disability	55.3 (13.8)	39.1 (19.4)	5.6 (126)***	0.96
6. Psychosocial disability	40.0 (10.6)	23.8 (13.3)	7.8 (130)***	1.35

** $p < .01$.*** $p < .001$.† $p = .003$.^a High mental defeat = a PSPS score of 23 or above, $n = 62$.^b Low mental defeat = a PSPS score of below 23, $n = 71$.

Table 3

A summary of the regression analyses results directly comparing the relative strength of each independent variables in predicting pain interference, sleep interference, anxiety, depression, functional and psychosocial disability.

Dependent variable	Individual predictors	R^2	SE	Std. β	t	p^*
Pain interference	Mental defeat	0.26	0.86	0.51	6.79	<.008
	Catastrophizing	0.23	0.88	0.49	6.38	<.008
	Pain intensity	0.17	0.91	0.42	5.33	<.008
	Health anxiety	0.17	0.91	0.42	5.25	<.008
	Rumination	0.09	0.96	0.30	3.65	<.008
	Worry	0.03	0.96	0.19	2.24	=.027
Sleep interference	Catastrophizing	0.15	0.92	0.39	4.87	<.008
	Mental defeat	0.12	0.94	0.35	4.29	<.008
	Pain intensity	0.11	0.94	0.35	4.21	<.008
	Health anxiety	0.08	0.96	0.30	3.59	<.008
	Rumination	0.04	0.98	0.22	2.59	=.011
	Worry	0.02	0.99	0.18	2.03	=.044
Anxiety	Catastrophizing	0.39	0.78	0.63	9.20	<.008
	Mental defeat	0.36	0.80	0.60	8.67	<.008
	Worry	0.36	0.80	0.60	8.62	<.008
	Health anxiety	0.34	0.81	0.59	8.35	<.008
	Rumination	0.34	0.81	0.58	8.23	<.008
	Pain intensity	0.02	0.99	0.17	2.02	=.045
Depression	Mental defeat	0.43	0.75	0.66	10.10	<.008
	Catastrophizing	0.23	0.88	0.48	6.28	<.008
	Health anxiety	0.29	0.85	0.54	7.32	<.008
	Rumination	0.23	0.88	0.49	6.43	<.008
	Worry	0.09	0.95	0.32	3.80	<.008
	Pain intensity	0.08	0.96	0.30	3.50	<.008
Functional disability	Catastrophizing	0.26	0.86	0.51	6.79	<.008
	Mental defeat	0.24	0.87	0.49	6.44	<.008
	Rumination	0.24	0.87	0.49	6.46	<.008
	Pain intensity	0.20	0.89	0.46	5.88	<.008
	Health anxiety	0.20	0.90	0.45	5.80	<.008
	Worry	0.10	0.95	0.32	3.92	<.008
Psychosocial disability	Mental defeat	0.37	0.79	0.61	8.84	<.008
	Catastrophizing	0.36	0.80	0.60	8.63	<.008
	Rumination	0.31	0.83	0.56	7.74	<.008
	Health anxiety	0.23	0.88	0.49	6.39	<.008
	Pain intensity	0.19	0.90	0.45	5.72	<.008
	Worry	0.16	0.92	0.41	5.07	<.008

* Bonferroni adjustments were made, adjusting the α level to 0.008.

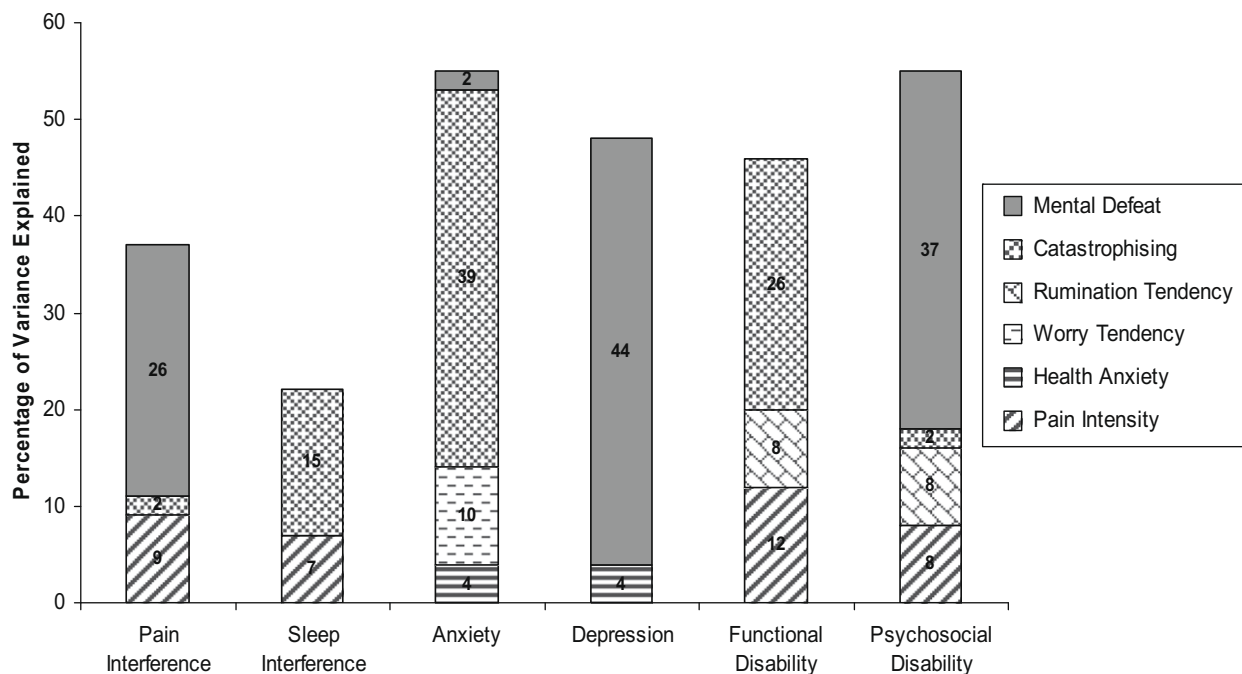


Fig. 1. Results from a series of stepwise regression analysis conducted for each of the disability measures. The bars show the amount of variance explained by the pain and psychological predictors included in the regression analyses.

3.5.3. Anxiety

Significant predictors of anxiety included catastrophizing, worry tendency, health anxiety and mental defeat [$F(4, 128) = 37.7, p < .001$]. Together, these factors accounted for 54% of the total variance.

3.5.4. Depression

Significant predictors of depression included mental defeat and health anxiety [$F(2, 130) = 59.1, p < .001$]. Together, these factors accounted for 48% of the total variance.

3.5.5. Physical disability

Significant predictors of functional disability included catastrophizing, pain intensity and rumination tendency [$F(2, 129) = 36.1, p < .001$]. Together, these factors accounted for 46% of the total variance.

3.5.6. Psychosocial disability

Significant predictors of psychosocial disability included mental defeat, pain intensity, rumination tendency and catastrophizing [$F(4, 128) = 40.2, p < .001$]. Together, these factors accounted for 56% of the total variance.

4. Discussion

4.1. Mental defeat is closely linked to disability and distress in chronic pain

Findings above converge to suggest a strong, positive association between mental defeat and a range of established disability measures in chronic pain patients. Although it is reasonable to think that reports of interference and disability are proportionate to the amount of pain experienced, the current findings appear to suggest that psychological factors such as mental defeat may play an important role in explaining individual differences in patients' functional status.

Against catastrophizing, rumination, worry, health anxiety and pain intensity, mental defeat emerged as the strongest predictor of pain interference, depression and psychosocial disability. The amounts of variance explained by mental defeat for these three variables were large, consistent with the hypothesis that mental defeat may be a cognitive mechanism through which disability develops in patients with persistent pain. This hypothesis is particularly relevant to the development of depression in chronic pain. Previous research has shown in patients diagnosed with major depression that the perception of defeat is highly correlated with depression symptoms even when hopelessness is statistically controlled for [18]. Further research into the mediational role of mental defeat may elucidate the high prevalence of depression in chronic pain [6]. As opposed to general mood states, specific psychological processes of this type are amenable to more direct interventions and should serve well as the focus of new treatment or prevention strategies.

4.2. Mental defeat and catastrophizing as different aspects of the chronic pain experience

Although we specifically differentiate catastrophizing from mental defeat, we propose that mental defeat can be conceptualized as a type of catastrophizing that focuses not on the physical meanings of the pain experience, but rather on the effects of pain on the person's identity [34]. Findings of the current study provided initial evidence that mental defeat and catastrophizing are inter-related but distinct variables.

Central to the concept of mental defeat is the *self* in relation to pain, rather than the awfulness or uncontrollability of the pain. The

study of mental defeat would allow another level of analysis to pain-related distress and disability, particularly in terms of exploring the sense of self being eroded by the pain, stuck in an impossible situation or humiliated by the loss of ability to do things. These are highly complex psychological phenomena often identified in qualitative studies [29,30,40] and yet largely unexplored in quantitative research on pain. One possible reason for this lack of progress is the difficulty involved in operationalizing these complex psychological experiences. In developing the concept of mental defeat, we devised the PSPS to assess these feelings in relation to pain. It is psychometrically sound [34] and has allowed us to explore these identity issues empirically, bridging the qualitative and quantitative psychological pain literature.

4.3. Fitting mental defeat into the existing psychological pain literature

The concept of mental defeat has been developed from phenomenological investigations of chronic pain [30,35]. It draws on theoretical and empirical work in the depression and PTSD literature that seeks to explain individual variations in symptom severity and treatment response given similar life circumstances [16,18]. Within the field of chronic pain, it can be related to the schema-enmeshment model by Pincus and Morley [26]. Three schemas (self, pain and illness) are proposed in this model, and it is suggested that the more these schemas are enmeshed with each other, the poorer the resulting psychological adjustment. Self-pain enmeshment is conceptualized as an indication of a person's sense of self [24]. In two recent studies [23,32], self-pain enmeshment was elicited by a structured interview and indexed by the extent to which the individual thinks what they want to become (i.e., the hoped-for self) is dependent on the absence of the pain. It was found that the conditionality of the hoped-for self positively predicted the magnitude of depression and negatively predicted the degree of pain acceptance, although it did not predict anxiety.

Thus, both mental defeat and self-pain enmeshment examine the concept of *self* in pain, but while the former suggests distress is a result of the person feeling defeated by the pain (following repeated failure in their struggle against pain), the latter regards maladjustments as problems stemming from an excessive overlap between schemas (such that the person thinks they can only live their lives when pain is eliminated). Another distinction between the two concepts lies in their respective assumptions of the relationship between self and pain. In the enmeshment model, the degree of distress is measured by the distance between the self- and pain-schemas and there are circumstances in which overlap of these schemas is considered to be normal and healthy. The concept of mental defeat, on the other hand, takes a further step to suggest an antagonistic relationship between the patient and the pain, with pain being seen as an attacker who has won the contest in not just pain but also other key areas of the patient's life. Increased enmeshment may thus be a possible consequence of mental defeat.

Mental defeat can also be related to the effort to examine the "cognitive reality of chronic pain" using the misdirected problem-solving framework [15]. In this model, people are viewed as active problem-solving agents, but because of the intractable nature of pain, it is proposed that chronic pain patients (particularly those who considered pain as the primary cause of their problems) are more likely to be confronted with unresolved threats and get trapped in a self-perpetuating loop of pain hypervigilance and worry [14,1]. It is further suggested that worry serves to motivate the person to keep combating pain, but as more effort is recruited to resolve pain, the person may become more inflexible in their 'problem-solving', resulting in them being unable to objectively reappraise their situation and shift their valued goals accordingly. Therefore, even though this process of perseverance has the advantage of preventing one from giving up self-management prema-

turely, the person may become trapped in a never-ending struggle with pain despite repeated failure to control pain.

The misdirected problem-solving model focuses on explaining the persistence of hypervigilance and worry in chronic pain. It did not specify the cognitive-emotional experience of those who get trapped in that perseverance loop. Given the repeated failure to resolve pain, we speculate that mental defeat may well be experienced by patients stuck in such a loop. The presence of mental defeat does not necessarily imply giving up the fight with pain; findings of our studies suggest that pain patients with higher levels of mental defeat tend to experience greater pain, depression, interference and psychosocial disability while requiring more support from health services. In addition to testing if mental defeat is as speculated a state of mind characterizing chronic pain patients with a long history of unsuccessful treatments, it may be beneficial for future research to investigate if cognitive processes such as worry and rumination would act to reinforce mental defeat and if mental defeat would, in turn, heighten pain-related interference through increased worry and rumination about pain. Potentially, better understanding of the pathways through which mental defeat increases distress and disability could help develop strategies to short-circuit this perseverance loop.

4.4. Clinical implications

Longitudinal studies tracking the level of mental defeat over time will provide important information to determine its role in the transition from acute to chronic pain and in the evolution of disability. If mental defeat is, as hypothesized, a factor involved in the development of chronic disability in pain patients, treatment programs should seek to address the sense of mental defeat in addition to imparting skills of pain management. This would involve helping patients to make sense of the pain and to reposition themselves in relation to the pain. In this regard, individual therapy is preferred over group treatment as dealing with mental defeat involves asking the patient to disclose and discuss thoughts that are particularly personal; a strong therapeutic alliance and a safe therapeutic environment are prerequisites to this type of treatment. Instead of striving to 'control' pain, treatment should aim to help patients reframe their pain situations so they may see alternative ways to achieve important aims of their lives. This is crucial because it helps the patient to rebuild a sense of agency and to preserve their identity. Additionally, treatment should strive to increase patients' level of pain acceptance so that living with pain is more like a dance than a fight. As far as we can see, both appraisal-based [38,41] and acceptance-based [20] cognitive-behavioral therapy have the potential to develop treatment strategies that meet these goals.

5. Conclusions

Mental defeat is a psychological construct derived from work on torture and depression where it predicts prolonged distress and psychological disturbance. Chronic pain is often described as "torturing", inviting comparison of the phenomenon. We found mental defeat to be strongly associated with functional and psychosocial disability, emotional distress, self-reported pain interference and sleep disturbance. We propose that it represents a previously unconsidered aspect of catastrophizing. Developing prevention and treatment strategies to reverse mental defeat should help reduce pain-related disability and distress.

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