

## Understanding the link between feelings of mental defeat, self-efficacy and the experience of chronic pain

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Abstract:	<p>Objectives: 'Mental defeat' (MD) has been identified amongst people with chronic pain as a type of 'self-processing' related to social role and rank. Research has linked it to anxiety, pain interference and functional disability. The relationship between MD and other cognitive constructs, such as hopelessness and depression remains poorly understood. The present study considers the association between MD, pain symptomatology and self-efficacy in the context of other cognitive factors.</p> <p>Methods: Fifty-nine participants completed a questionnaire pack assessing anxiety, depression, hopelessness, pain catastrophizing, and mental defeat in order to examine the relationship with pain symptomatology and self-efficacy.</p> <p>Results: Linear multiple regression analyses showed that anxiety was most strongly associated with pain symptomatology, accounting for 26% of the variance, while catastrophizing showed the strongest association with sensory pain, and mental defeat the strongest association with affective pain. Finally, mental defeat was found to be strongly associated with pain-related self-efficacy, accounting for 47% of the variance.</p> <p>Conclusion: This research has demonstrated the potential importance of assessing mental defeat in chronic pain patients suggesting that targeting these cognitions during interventions and therapy could be valuable. This may have an impact on how well people feel cope with their pain. Further, the study indicates that mental defeat differs from related cognitive constructs involved in pain, such as depression, hopelessness and catastrophizing.</p>

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Running head: *Feelings of defeat in chronic pain*

For Peer Review

## Abstract

*Objectives:* 'Mental defeat' (MD) has been identified amongst people with chronic pain as a type of self-processing related to social role and rank. Research has linked it to anxiety, pain interference and functional disability. The relationship between MD and other cognitive constructs, such as hopelessness and depression remains poorly understood. The present study considers the association between MD, pain symptomatology and self-efficacy in the context of other cognitive factors.

*Methods:* Fifty-nine participants completed a questionnaire pack assessing anxiety, depression, hopelessness, pain catastrophising, and mental defeat in order to examine the relationship with pain symptomatology and self-efficacy.

*Results:* Linear multiple regression analyses showed that anxiety was most strongly associated with pain symptomatology, accounting for 26% of the variance, while catastrophising showed the strongest association with sensory pain, and mental defeat the strongest association with affective pain. Finally, mental defeat was found to be strongly associated with pain-related self-efficacy, accounting for 47% of the variance.

*Conclusion:* This research has demonstrated the potential importance of assessing mental defeat in chronic pain patients suggesting that targeting these cognitions during interventions and therapy could be valuable. Further, the study indicates that mental defeat differs from related cognitive constructs involved in pain, such as depression, hopelessness and catastrophising.

## Introduction

Chronic pain is a potentially disabling and distressing condition. It is useful to distinguish the characteristics of chronic pain (its severity, distribution etc) from the level of impact that it can cause (pain interference, disability and distress). The latter variables, which represent the disruption to the individual's happiness and successful living, are predicted by a wide range of factors, of which the raw sensory characteristics of pain are far from the most important<sup>1</sup>. It has long been accepted that psychological variables – for example, related to coping or beliefs – can account for why some people struggle so much in the face of the chronic pain experience<sup>2</sup>. However, there is no consensus as to which psychological variables are most important, and sometimes psychological variables can inter-correlate and overlap – for example, concepts like catastrophising and helplessness share some aspects<sup>3</sup>.

Mental defeat is a carefully-defined cognitive construct that was created to explain aspects of the development and maintenance of both post-traumatic stress disorder<sup>4</sup>, and depression<sup>5</sup>. Ehlers et al. (1998)<sup>4</sup> defined mental defeat as a perceived loss of autonomy, a state of 'giving up in one's own mind' any effort to retain one's identity as a human being (p.45). The concept of Mental Defeat (MD) has most widely been studied in relation to uncontrollable traumatic events such as torture or rape, and has been shown to predict both the development and severity of Post-Traumatic Stress Disorder (PTSD) symptoms, and response to treatment<sup>4,6</sup>. However, it seems plausible that MD may be a factor where patients are seeking help for chronic pain, as in these situations the duration of pain is often long and the

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3 50 impact high; patients are usually seeking help for the fact that their pain is partly  
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5 51 uncontrollable.  
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9 53 Mental defeat has been considered as a sort of self-processing where a given  
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11 54 traumatic situation results in a linked set of negative beliefs about the self in relation  
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13 55 to the experience of suffering<sup>7</sup>. As there is a considerable overlap between chronic  
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15 56 pain and PTSD (e.g. 34.7% prevalence of PTSD diagnosis in a pain population<sup>8</sup>), it  
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17 57 is likely that MD will be present in at least a subset of chronic pain patients.  
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19 58 Preliminary qualitative findings supported this idea; Tang et al. (2009) interviewed  
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21 59 treatment-seeking chronic pain patients and many used the word 'defeated' to  
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23 60 express feelings of a loss of control, autonomy and identity as a 'functional human  
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25 61 being'<sup>9</sup>. Patients referred to a sense of "defeat of the mind" and the pain "belittling  
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27 62 them as a person"<sup>9</sup>. Tang et al (2009) proposed that mental defeat may represent a  
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29 63 type of catastrophising around future consequences of the pain, primarily concerning  
30  
31 64 the individual's sense of identity, agency and self<sup>10</sup>. Mental defeat in relation to  
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33 65 chronic pain focuses not on the experience and meaning of pain itself, but instead, is  
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35 66 a type of self-catastrophising focused on the effects of pain as an attack on the  
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37 67 person's life and sense of identity<sup>9</sup>.  
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44 69 Further quantitative work has confirmed the importance of MD in chronic pain. Tang  
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46 70 et al. (2010) reported a significant correlation between mental defeat and pain  
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48 71 interference, sleep disturbance, anxiety, depression, functional disability and  
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50 72 psychosocial disability<sup>10</sup> and in a later paper found mental defeat was a significant  
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52 73 predictor of both functioning and distress<sup>11</sup>. However, these papers did not examine  
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54 74 whether there was a direct association between MD and pain symptomatology. Only  
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3 75 one study has specifically examined this; García-Campayo et al (2010) found a  
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5 76 significant association between levels of mental defeat and pain intensity in a  
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7 77 Spanish sample of patients with fibromyalgia<sup>12</sup>. MD may have an important role in  
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9 78 **suicide** risk; a 2016 study found specific relationships between MD and suicidal  
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11 79 intent<sup>13</sup>.

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16 81 It is likely that MD is related to other concepts used in the chronic pain literature; MD  
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18 82 implies a negative view of the self, and a sense of uncontrollability, both of which are  
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20 83 referenced by other important constructs in chronic pain research. In particular, a  
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22 84 loss of a sense of agency has been cited as central to MD. Self-efficacy represents  
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24 85 an opposing concept, as it reflects the belief that people can expend effort and  
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26 86 persist in the face of "obstacles and aversive experiences"<sup>14</sup>. Self-efficacy has been  
27  
28 87 shown to be a powerful, positive variable in relation to chronic pain, having been  
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30 88 linked to better pain tolerance<sup>15,16</sup>, as well as superior quality of life, general health,  
31  
32 89 activity level and reduced pain severity<sup>17,18,19</sup>. However, fewer studies have  
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34 90 examined which cognitive and emotional factors are predictive of high self-efficacy.  
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36 91 Sánchez al. (2011) found that depression was a significant predictor of self-efficacy  
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38 92 in fibromyalgia patients<sup>20</sup>; we predict that a sense of being mentally defeated would  
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40 93 be likely to reduce self-efficacy.

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46 95 In this study, we predicted that greater Mental Defeat would be related to poorer self-  
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48 96 efficacy, and higher pain severity. However, we also knew from previous research  
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50 97 that MD would probably be correlated with other negative emotional states **in our**  
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52 98 **sample** (e.g. depression<sup>5</sup>) and we wished to establish whether MD had a specific  
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54 99 and unique role, **when controlling for the established influence of other negative**

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3 100 **cognitive and affective variables**. Previous research has demonstrated the negative  
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5 101 impacts of constructs such as catastrophising<sup>3</sup>, hopelessness, and negative affective  
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7 102 states<sup>2</sup>. Thus, we predicted that MD would **retain the power to significantly predict**  
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9 103 decreased self-efficacy and increased pain symptomatology, even when anxiety,  
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11 104 depression, catastrophising and hopelessness were controlled for **in previous steps**  
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13 105 **in a hierarchical regression design**.  
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## 108 **Method**

### 109 *Participants*

110 Participants were treatment-seeking patients with chronic, non-malignant pain  
111 attending either an outpatient pain clinic or an intensive residential service across  
112 three sites. Patients were included if they were (1) aged 18+ (2) English-speaking  
113 and could read (3) had a complaint of chronic pain for six months or longer (4) had  
114 no co-morbid malignant/terminal disease (e.g. HIV/AIDS, cancer) (5) had no severe  
115 psychopathological co-morbidity including substance misuse, schizophrenia, bipolar  
116 disorder, major depression with suicidal intention. *A priori* testing revealed that a  
117 sample size of 58 would provide sufficient statistical power to detect an effect of 0.25  
118 at power 0.8 and alpha 0.05. We sampled patients from both outpatient and  
119 residential (intensive specialist) pain management services in order to guarantee an  
120 appropriate range of variability in the data set. The different services catered for  
121 people with different levels of chronicity and pain-related disability, who would as a  
122 consequence be likely to have a broad range of levels of self-efficacy and pain  
123 symptoms.  
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3 125 *Design and Procedure*

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5 126 This cross-sectional study factors examined predictors of pain self-efficacy and pain  
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7 127 symptomatology. Participants were given an information sheet explaining that the  
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9 128 study was exploring feelings of defeat, pain and how well people feel they can cope  
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11 129 with pain. Eligible patients were provided with a questionnaire pack assessing  
12  
13 130 anxiety, depression, hopelessness, pain catastrophising, mental defeat, pain  
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15 131 symptomatology and self-efficacy. They were asked to sign a consent form and to  
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17 132 post this and their completed questionnaire pack back to the researcher.  
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22 134 *Measures*

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24 135 *The Generalized Anxiety Disorder-7<sup>21</sup> (GAD-7)*. The GAD-7 is a seven-item  
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26 136 self-administered measure of anxiety with a cut-off score of 7 widely used to indicate  
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28 137 clinical levels of anxiety symptoms. Total scores can range from 0-21. Higher scores  
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30 138 indicates higher levels of anxiety. It has been demonstrated to have good reliability  
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32 139 internal consistency and factorial validity.  
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37 141 *The Patient Health Questionnaire-9<sup>22</sup> (PHQ-9)* The PHQ-9 is a nine-item self-  
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39 142 administered measure of depressive symptoms with a cut-off score of 9 widely used  
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41 143 to indicate clinical levels of depression. Total scores can range from 0-27. Higher  
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43 144 scores indicates higher levels of depression. It has been demonstrated to have good  
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45 145 reliability and validity.  
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50 147 *The Pain Self-Perception Scale<sup>10</sup> (PSPS)* To assess Mental Defeat, the PSPS  
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52 148 was completed by participants who were asked to read 24 statements and rate to  
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54 149 what extent these applied to their experiences of pain. These could be rated on a 5-  
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3 150 point scale (from 0 = "Not at all/Never" to 4 = "Very strongly"), generating a total  
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5 151 score ranging from 0 to 96. A higher score indicates a greater level of mental defeat.  
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7 152 The scale has demonstrated good psychometric properties, including high levels of  
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9 153 internal consistency and test-retest reliability<sup>10</sup>.

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13 155 *Pain Catastrophizing Scale*<sup>3</sup> (PCS) The PCS was used to measure the  
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15 156 participant's catastrophising thinking associated with pain. It consists of 13 items and  
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17 157 the participant is asked to rate how frequently they experience each of these  
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19 158 thoughts or feelings when they are in pain. Ratings are made on a five-point scale  
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21 159 from 0 ("Not at all") to 4 ("All the time"), giving a total score ranging from 0 to 52. A  
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23 160 higher score indicates more pain catastrophising cognitions. The PCS has  
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25 161 demonstrated high internal consistency and test-retest reliability over a 6 to 10-week  
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27 162 period<sup>3</sup>.

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33 164 *Pain Self-Efficacy Questionnaire*<sup>23</sup> (PSEQ) The PSEQ consists of 10 items  
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35 165 assessing self-efficacy regarding pain. Participants rate their answers on 7-point  
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37 166 scale ranging from 0 (Not at all confident) to 6 (Completely confident) with total  
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39 167 scores ranging from 0-60. Higher scores indicate stronger self-efficacy beliefs. It has  
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41 168 been shown to have good test-retest reliability, internal consistency and construct  
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43 169 validity<sup>24</sup>.

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48 171 *Beck Hopelessness Scale*<sup>25</sup> (BHS) To measure levels of hopelessness,  
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50 172 participants completed the BHS. This is a 20-item questionnaire measuring three  
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52 173 major aspects of hopelessness; feelings about the future, loss of motivation, and  
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54 174 expectations. It consists of twenty questions requiring the participant to respond

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3 175 either true or false and total scores can range from 0-20. A higher score indicates  
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5 176 greater levels of hopelessness. Beck et al. (1974) reported good internal consistency  
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7 177 (.93) and others have demonstrated adequate reliability and validity<sup>26</sup>.  
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11 179 *Short-Form McGill Pain Questionnaire*<sup>27</sup> (SF-MPQ) To assess pain levels,  
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13 180 participants completed the SF-MPQ with reference to their pain experience over the  
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15 181 past week. The SF-MPQ consists of 15 representative words from the sensory (11  
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17 182 items) and affective (4 items) categories of the standard MPQ<sup>28</sup>. Each pain  
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19 183 descriptor is ranked on a 4-point intensity scale (0="None", 1="Mild", 2="Moderate",  
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21 184 3="Severe"). Examples of Sensory Pain descriptors include 'stabbing' and 'aching'  
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23 185 whereas Affective Pain descriptors included 'fearful' and 'punishing-cruel'. The sum  
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25 186 of these rank values generates a Sensory Pain Rating Index (S-PRI) score  
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27 187 (range=0–33) and an Affective Pain Rating Index (A-PRI) score (range= 0–12). The  
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29 188 Total Pain Rated Index (T-PRI) score is the sum of the A-PRI and S-PRI (range= 0-  
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31 189 45). The SF-MPQ has been demonstrated to have good validity and reliability.  
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### 36 191 *Ethical considerations*

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38 192 The study protocol was approved by the relevant NHS Research Ethics Committee  
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40 193 as well as by Research and Development departments for all hospitals involved.  
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### 45 195 *Analytic strategy*

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48 197 *Missing data.* Missing data was limited apart from two participants who failed  
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50 198 to complete all items on the BHS, and three participants who failed to fully complete  
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52 199 the SF-MPQ. Appropriate steps were taken to impute missing values which included  
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3 200 using ratio imputation for the BHS and assigning a score of 0 to missing items on the  
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5 201 SF-MPQ. The latter decision was made due to feedback from several participants  
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7 202 who had assumed they should only tick an answer for the descriptors of pain they  
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9 203 actually experienced, and to leave blank those they did not.

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13 205 *Regression analysis.*

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15 206 Our dependent variables were (1) self-efficacy, and (2) pain symptomatology. Self-  
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17 207 efficacy was a single variable, and we examined three aspects of pain  
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19 208 symptomatology – total pain, sensory pain, and affective pain (derived from the Short  
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21 209 Form McGill Pain Questionnaire described above. Thus, there were four dependent  
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23 210 variables. In all cases, we entered MD as a predictor, alongside age, anxiety,  
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25 211 depression, hopelessness, and pain catastrophising as other potential predictor /  
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27 212 independent variables. A planned stepwise linear regression approach was used.  
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29 213 We examined a range of coefficients **in order to verify** that the assumptions  
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31 214 underlying linear regression were not violated (Field, 2009).  
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## Results

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39 217 *Participant characteristics*

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41 218 The sample overall had a mean age of 47.8 years ( $SD=11.4$ ) and was largely  
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43 219 composed of female participants (76.3%). A majority (67.8%) were married or living  
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45 220 as married, and 44% were either unemployed, retired or on sick leave. 35.6% of  
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47 221 participants experienced back/spinal pain, 32.7% reported either fibromyalgia or pain  
48  
49 222 all over the body, and 27.1% experienced pain in the foot/leg/hip. Other sources of  
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51 223 pain included shoulder/neck/head (20.3%), arm/hand (11.9%) and 'other' including  
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53 224 testicles and stomach (5.1%). Using the 0-10 visual analogue scale, the mean pain  
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3 225 intensity score was 5.0 ( $SD=1.5$ ), the mean 'Sensory Pain Rating Index' score was  
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5 226 19.5 out of a possible 33 ( $SD=6.1$ ), and the mean 'Affective Pain Rating Index' score  
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7 227 was 6.8 out of a possible 12 ( $SD=3.3$ ). The sample scored a mean of 21.3 ( $SD=11.3$ )  
8  
9 228 for self-efficacy, with a lower score indicating a lower perceived self-efficacy  
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11 229 (possible range of 0-60). On the psychopathology measures, participants obtained a  
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13 230 mean score of 11 ( $SD=5.9$ ) for hopelessness, 11.1 ( $SD=6.2$ ) for anxiety, 15.8 for  
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15 231 depression ( $SD=6.8$ ), 44.4 ( $SD=28.2$ ) for mental defeat, and finally 26.9 ( $SD=10.5$ )  
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17 232 for catastrophising.  
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22 234 [INSERT TABLE 1 HERE]  
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### 235 *Correlations*

236 Results showed a significant positive correlation between mental defeat and Total  
237 Pain ratings,  $r=0.51$ ,  $n=59$ ,  $p<.001$ . There was a significant positive correlation  
238 between mental defeat and Affective Pain,  $r=0.62$ ,  $n=59$ ,  $p<.001$  and Sensory Pain,  
239  $r=0.38$ ,  $n=59$ ,  $p<.001$ . There was also a significant negative correlation between  
240 mental defeat and self-efficacy,  $r=-0.69$ ,  $n=59$ ,  $p<.001$ .

### 242 *Regressions*

243 Regression coefficients for the four stepwise linear regression models can be seen in  
244 Table 2. In all cases, MD was entered alongside age, anxiety, depression,  
245 hopelessness and catastrophising in a stepwise manner. With self-efficacy as the  
246 dependent variable, only MD showed a significant association,  $\beta = -.69$ ,  $t(59) = -$   
247  $7.23$ ,  $p=.001$ , explaining a significant proportion of the variance  $R^2 = .47$ ,  $F(1,59) =$   
248  $52.26$ ,  $p=.001$ . All other variables were excluded from the model.  
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3 250 [INSERT TABLE2 HERE]

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7 252 The same analysis was carried out for the Total Pain Score, and in this case only  
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9 253 anxiety was a significant predictor,  $\beta = .51$ ,  $t(59) = 4.52$ ,  $p = .001$ , explaining a  
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11 254 significant proportion of the variance,  $R^2 = .26$ ,  $F(1,59) = 20.41$ ,  $p = .001$ . MD did not  
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13 255 account for independent variance. Similarly, MD was not a predictor of sensory pain,  
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15 256 and only pain catastrophising remained in that equation  $\beta = .40$ ,  $t(59) = 3.38$ ,  $p < .01$ ,  
16  
17 257 explaining a significant proportion of variance  $R^2 = .16$ ,  $F(1,59) = 10.73$ ,  $p < .01$ .  
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19 258 However, the results were again different for affective pain, where MD was the only  
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21 259 variable in the final equation,  $\beta = .62$ ,  $t(59) = 6.01$ ,  $p < .001$ , explaining a significant  
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23 260 proportion of variance,  $R^2 = .39$ ,  $F(1,59) = 36.06$ ,  $p = .001$ .  
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### Discussion

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31 263 This study examined the impact of mental defeat (MD) on the experience of chronic  
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33 264 pain. Specifically, we explored the impact of MD on pain self-efficacy and pain  
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35 265 symptomatology whilst accounting for other related variables. Mental defeat was  
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37 266 negatively associated with self-efficacy and had the strongest influence on this  
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39 267 variable, even when examined alongside anxiety, depression, catastrophising and  
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41 268 hopelessness. With regard to the pain variables, MD demonstrated the strongest  
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43 269 association with affective pain (incorporating qualities such as punishing and  
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45 270 frightening pain). Total pain scores were associated with anxiety, and catastrophising  
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47 271 showed the strongest association with sensory pain (incorporating qualities such as  
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49 272 throbbing and stabbing pain). Each of these associations will be considered in turn.  
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55 274 *Mental defeat, self-efficacy and affective pain*  
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3 275 Many studies have shown self-efficacy to be an important predictor of distress and  
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5 276 functioning, but fewer have examined influences on self-efficacy. The link between  
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7 277 MD and low self-efficacy is understandable when considering theory and other  
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9 278 research in the area. In an early qualitative exploration of mental defeat in chronic  
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11 279 pain, patients interviewed by Tang et al. (2009)<sup>9</sup> described feelings of a loss of  
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13 280 control, autonomy and ability to maintain their identity as a human being. In short,  
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15 281 many felt like they had 'given up'. It seems clear that this experience of the self as  
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17 282 helpless, out of options and disempowered would decrease self-efficacy, and this is  
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19 283 what our results show.  
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24 285 Our results add to the increasing literature on the power of self-related processes in  
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26 286 chronic pain. MD, along with other variables such as self-efficacy, the hoped-for  
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28 287 self<sup>30</sup>, and self-as-context<sup>31</sup>, are all variables that emphasise the self, in contrast to a  
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30 288 literature that has often focused on variables such as beliefs about pain or coping  
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32 289 styles. It could be argued that MD and self-efficacy are simply conceptual opposites;  
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34 290 for example, that it is **logically** necessary that an increase in one produces a  
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36 291 reduction in the other; **previous research has shown them to be negatively**  
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38 292 **correlated**<sup>12</sup>. However, this does not do justice to the exact nature of the items in the  
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40 293 questionnaires. The PSPS (**mental defeat questionnaire**) asks entirely about  
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42 294 historical experiences of MD – for example “I felt destroyed as a person” – whereas  
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44 295 the self-efficacy items are all framed in the present moment around “I can do X,  
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46 296 despite the pain”. It may be interesting to come to understand how historical  
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48 297 experiences of feeling ‘defeated’ by pain can have an enduring impact on a person’s  
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50 298 ability to feel effective in the present moment.  
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3 300 This study introduces the new finding that MD is specifically associated with the  
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5 301 experience of affective pain, **above and beyond the influence of other correlated**  
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7 302 **variables**. Previous studies have demonstrated the effects of psychological variables  
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9 303 on pain severity, for example, studies of pain catastrophising<sup>32</sup>. This study also  
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11 304 shows that MD may directly change the experience of one aspect of pain. The exact  
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13 305 mechanism by which this might happen is unclear. Studies of health anxiety indicate  
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15 306 that anxiety can promote great vigilance to a sensation, increasing its magnitude.  
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17 307 However, it is not clear that MD is primarily an anxiety-related variable, and the items  
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19 308 in the PSPS do not emphasise physical hypervigilance, or, indeed, pain at all. This is  
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21 309 an area for future investigation.  
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### 311 *Catastrophising and pain*

312 The association found between pain catastrophising and sensory pain is in line with  
313 several findings from similar research<sup>32</sup>. The fear avoidance model<sup>33</sup> has guided  
314 understanding of these findings. The fear avoidance model states that pain initiates a  
315 set of cognitive, emotional and behavioural responses which can at times,  
316 exacerbate pain and disability. If the pain is interpreted as threatening or  
317 catastrophic (e.g. 'the pain is causing my body damage'), this typically leads to an  
318 excessive fear of pain and injury which gradually incorporates a fear of physical  
319 movement. People thus limit their physical activity, and this avoidance then limits the  
320 individual's opportunity to disconfirm these beliefs. Although in the short-term the  
321 pain may decrease due to resting, in the long-term inactivity leads to more pain,  
322 disability and poorer quality of life<sup>34</sup>. This pain is then feeding back into initial beliefs  
323 about illness and makes avoidance more likely to continue, a vicious cycle.

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3 325 *Anxiety and pain*

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5 326 The association between anxiety and overall pain rating (incorporating sensory and  
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7 327 affective pain) found in this study is interesting. Specifically, it is **significant** that  
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9 328 anxiety remained as a predictor in the equation where pain catastrophising, a  
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11 329 powerful and pain-specific variable, did not. It may be that general anxiety, measured  
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13 330 in this study by the GAD-7, was more powerful due to its emphasis on overall  
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15 331 anxious physical arousal (e.g. “being so restless that it is hard to sit still”), rather than  
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17 332 the Pain Catastrophizing Scale’s focus on pain-related cognition (e.g. “I keep  
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19 333 thinking of other painful events”). Equally, the mechanism could simply be via  
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21 334 physical avoidance as noted for catastrophising above. For example, Asmundson  
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23 335 and Norton (1995) found that chronic back pain patients with high anxiety sensitivity  
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25 336 (as here, not pain-specific) reported more fear of pain and tended to have greater  
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27 337 avoidance of activities than those with lower anxiety sensitivity, despite equal levels  
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29 338 of pain<sup>35</sup>. Later the authors showed that high anxiety directly exacerbates fear of  
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31 339 pain, affecting escape and avoidance behaviours<sup>36</sup>. This may, again promote  
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33 340 avoidance and safety behaviours that worsen pain. It is important to consider the  
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35 341 directionality of these types of associations; one cannot determine whether higher  
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37 342 anxiety causes more pain or whether higher levels of pain leads to heightened  
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39 343 anxiety.  
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46 345 *Limitations*

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48 346 This study is not without limitations. The sample was not homogeneous, being drawn  
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50 347 both from an outpatient and a national residential pain service. However, this  
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52 348 sampling guaranteed variability; by recruiting patients with greater and lesser  
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54 349 disability, we were more likely to see a range of levels of MD, pain and self-efficacy.  
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3 350 The sample size of 59 was adequate but a higher number of patients sourced from a  
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5 351 range of clinics would improve the study. The sample also comprised of 76.3%  
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7 352 females and so future work would benefit from gaining greater data from males.  
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9 353 Unfortunately, the study did not record duration of pain symptomatology which might  
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11 354 be expected to be linked to the extent of Mental Defeat. Finally, the nature of the  
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13 355 cross-sectional analysis means that we are not able to determine causal  
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15 356 relationships. We consider it likely that there are reciprocal relations among feelings  
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17 357 of defeat, pain symptomatology and self-efficacy.  
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### 21 22 359 *Research implications*

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24 360 Further research is needed to experimentally examine the extent to which the  
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26 361 associations noted in this study are causal or not. Whilst this initial work is promising,  
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28 362 the study was not able to answer the question regarding impact of MD on self-  
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30 363 efficacy and pain symptomatology. Previous research has suggested that there may  
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32 364 be a relationship between the activation of negative self-beliefs and engagement in  
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34 365 safety seeking behaviours (SSBs) in chronic pain<sup>37</sup>. Future research could examine  
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36 366 whether those higher in mental defeat are engaging in more SSBs (such as  
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38 367 avoidance of activity and reliance on medication) and if so, whether this affects self-  
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40 368 efficacy and pain symptomatology. Finally, longitudinal studies examining mental  
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42 369 defeat would also be useful to track changes over time and research could consider  
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44 370 the use of mental defeat prospectively as a predictor for how well patients do in  
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46 371 chronic pain rehabilitation programmes for example.  
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### 51 52 373 *Clinical implications*

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3 374 The results from this study indicate that mental defeat may be an important factor in  
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5 375 how well individuals perceive their ability to cope with chronic pain as well as the  
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7 376 extent to which they perceive their pain in an emotional or affective manner. Tang et  
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9 377 al. (2010) offer hope by arguing that, as opposed to general mood states such as  
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11 378 depression, the specific psychological processes involved in mental defeat are  
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13 379 amenable to more direct interventions, for example by classic cognitive challenging  
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15 380 techniques<sup>10</sup>. Equally, other approaches to restrictive cognitions, such as  
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17 381 mindfulness or acceptance-based approaches, may also help. However, the PTSD  
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19 382 and chronic pain literature have not identified specific interventions which have been  
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21 383 shown to be effective in reducing mental defeat. We therefore can only suggest the  
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23 384 use of interventions that have a proven track record in addressing cognitions and  
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25 385 self-beliefs around pain, such as cognitive behavioural therapy (CBT) and  
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27 386 acceptance-based therapy (ACT), though if other interventions can alter self-beliefs  
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29 387 they should also be effective.  
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### 35 389 **Conclusion**

37 390 It may be useful to directly target cognitions of mental defeat in the treatment of  
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39 391 chronic pain, as they are important in determining the affective impact of pain.

41 392 Further, the study also advances our understanding of cognitive variables in chronic  
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43 393 pain by showing that mental defeat is a valid construct, with additional predictive  
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45 394 power above established variables such as depression, hopelessness and  
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47 395 catastrophising.  
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3 399 **Conflict of interest**

4  
5 400 The author(s) declared no potential conflicts of interest with respect to the research,  
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7 401 authorship and/or publication of this article.  
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Table 1: Participant characteristics

	Sample (n= 59)
Age	47.8 (11.4)
Sex (% female)	76.3
Marital status (% married/ living as married)	67.8
Employment status (% retired, unemployed or sick leave)	44
<i>Sources of pain (%)</i>	
Back/spine	35.6
Shoulder/head/neck	20.3
Arm/hand	11.9
Fibromyalgia/all body	32.2
Foot/leg/hip	27.1
Other	5.1
<b>Mental Defeat</b> (PSPS)	44.2 (28.2)
<b>Hopelessness</b> (BHS)	11.1 (5.9)
<b>Depression</b> (PHQ-9)	15.8 (6.8)
<b>Anxiety</b> (GAD-7)	11.1 (6.2)
<b>Catastrophising</b> (PCS)	26.5 (10.9)
<b>Self-efficacy</b> (PSEQ)	21.3 (11.3)
<b>Sensory Pain</b> (SF-MPQ)	19.5 (6.1)
<b>Affective Pain</b> (SF-MPQ)	6.8 (3.3)
<b>Total Pain</b> (SF-MPQ)	26.2 (8.5)

Table 2: Regression analysis: coefficients for each dependent variable

	<i>B</i>	<i>SE B</i>	$\beta$	$R^2$
<b>Self Efficacy</b>				
<i>Constant</i>	33.53	2.00		
<i>Mental defeat</i>	-.28	0.38	-.69**	.47
<b>Total Pain</b>				
<i>Constant</i>	18.34	1.99		
<i>GAD-7</i>	0.71	0.16	.51**	.26
<b>Sensory Pain</b>				
<i>Constant</i>	13.55	2.00		
<i>Pain catastrophizing</i>	.22	.07	.40*	.16
<b>Affective Pain</b>				
<i>Constant</i>	3.56	.63		
<i>Mental defeat</i>	.072	0.1	.62**	.39

\* $p < .01$ , \*\* $p < 0.001$