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Self-pain enmeshment: future possible selves, sociotropy, autonomy and
adjustment to chronic pain

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Abstract

The aims of this study were to replicate and extend previous observations on the relationship between enmeshment of the self and pain and measures of adjustment [Morley et al., (2005). *Possible selves in chronic pain: self-pain enmeshment, adjustment and acceptance*. *Pain*, 115(1-2), 84-94], and to test the hypothesis that individual variation in motivational preferences interacts with enmeshment. 82 chronic pain patients completed standardized self-report measures of depression, anxiety, acceptance and the possible selves interview which generated measures of their hoped-for (own and other perspectives) and feared-for selves. They made judgments about the conditionality of each self on the continuing presence of pain as a measure of self-pain enmeshment. A series of hierarchical regression analyses that adjusted for demographics, pain characteristics and disability, confirmed the relationship between self enmeshment and depression and acceptance. When anxiety was considered there was no main effect for any of the self aspects but there were specific interactions between the hoped-for (own) and (other) selves and two motivational preferences – autonomy and sociotropy.

1. Introduction

Pincus and Morley (2001) have suggested that emotional adjustment (specifically depression) to chronic pain is partly determined by the extent to which aspects of the self are enmeshed with pain. Preliminary evidence for this was adduced from studies of cognitive bias in chronic pain. More recently Morley et al (2005) modified self-discrepancy methodology (Higgins, 1997) and showed that the degree to which characteristics of the future hoped-for self was conditional (enmeshed) on the absence of pain statistically predicted depression and acceptance.

The aims of the present study were to replicate and extend the previous observations. First, we sought to characterize the hoped-for and feared-for selves more fully. The method used by Morley et al. (2005) sampled aspects of future hoped-for and feared-for selves that may contain a mixture of ideal and ought. Self-discrepancy theory (Higgins, 1997) distinguishes between 'ideal' and 'ought' attributes. Discrepancies between the actual and ideal selves and between actual and ought selves are differentially associated with emotions of dejection/depression and agitation/anxiety respectively. The specific focus of the current study was the estimation of the degree to which the self aspects generated by the participants were saturated with 'ideal' attributes. There is substantial evidence for this in the literature (Higgins, 1997) and the predicted relationships have been observed in chronic pain (Waters et al., 2004). Second, we incorporated a second measure of depression, the Hospital Anxiety and Depression Scale - HADS (Zigmond and Snaith 1983). In contrast to the Beck Depression Inventory the HADS is relatively free from somatic items that might bias the assessment of depression in a chronic pain sample (Morley et al., 2002). Third, we extended our analysis to explore

the feared for self by including a measure of anxiety (HADS anxiety subscale). We hypothesised that both the magnitude of discrepancy (i.e. proximity to the feared-for self) and the degree of enmeshment would statistically predict the magnitude of anxiety. Finally, we tested the conjecture (Morley and Eccleston, 2004) that there would be an interaction between stable motivational preferences and self-pain enmeshment in determining the degree of affective distress (depression or anxiety). We assessed two dimensions of individual difference, autonomy and sociotropy, and predicted that individuals with high levels of autonomy whose future hoped-for self is enmeshed with pain would be more emotionally distressed than those with low levels of autonomy. With regard to sociotropy we hypothesised that individuals with high levels of sociotropy would be more distressed if a social aspect of their self was enmeshed. In this instance we assessed what participants thought other people hoped-for them; the hoped-for (other) self.

2. Method

2.1. Design

The design was a single group (cohort) observational study. The data analysis tested predicted statistical relationships between measures of the self (self-pain enmeshment and self discrepancies) and measures of emotional distress (depression and anxiety) using a series of hierarchical multiple regression models in which measures assessing demographic, pain status and interference (disability) were controlled prior to assessing whether the self measures contributed to the distress measures. The sample size was determined using the algorithm suggested by (Tabachnick and Fidell, 2001) ensure adequate power for $\alpha = .05$ and $\beta = .80$.

2.2. *Participants*

Participants were recruited from a pain clinic situated in a large University Hospital in the North of England serving a predominantly urban population. The inclusion criteria were: age between 18-65 years; diagnosis of a chronically painful condition (duration > 6 months) and English as a first language. Exclusion criteria, determined by clinical interview and inspection of patient records, were: psychosis, a learning difficulty and pain of malignant origin. Clinical diagnoses were obtained from case notes. **The sample was independent of that reported in Morley et al. (2005). Data collection was separated by a period of approximately 3 years.**

2.3. *Measures*

In addition to recording basic demographic and clinically relevant descriptive data (age, gender, duration of chronic pain, clinical diagnosis, previous treatments for chronic pain, school leaving age, educational difficulties) we used the following measures.

2.3.1. *Visual analogue ratings of pain and feelings*

Visual analogue scales (VAS) were used to measure: pain at its highest intensity; pain at its lowest intensity, pain at its usual intensity, and pain-related interference with daily activities (150mm); and of levels of depression, anxiety, frustration, anger and fear over the past week (100 mm) (Wade et al., 1996). With the exception of the pain-related interference measure all judgements were made with reference to the past week as the time frame. The time frame for pain-related interference was not specified. The VAS for pain were anchored '0 = no sensation', '150 = most intense sensation imaginable'. The VAS for the emotions were anchored '0 = none, 100 = most severe imaginable'. The

VAS for interference was anchored '0 = no interference', '150 = complete interference – can't do anything'. All these verbal anchors are those used by Wade et al., (1996).

2.3.2. Pain Disability Index--PDI

The PDI is a brief 7-item self-report measure of the extent of interference that chronic pain causes to different domains of an individual's life (Pollard, 1984). The 7 domains are family, recreation, social activities, occupation, sexual behaviour, self care and life support activities. Each domain is rated on an 11-point scale (0 = no disability, 10 = total disability). There is evidence of good reliability for the PDI and factor analytic studies have reported one and two factor solutions (Tait et al., 1990; Chibnall and Tait, 1994). We used the single factor scoring method i.e., sum of all 7 domains. The PDI was selected for its brevity in contrast to other longer measures such as the Sickness Impact Profile which would have placed an undue demand on participants in the current study.

2.3.3. Word fluency – Controlled Oral Word Association Test (Benton and Hamsher, 1976).

The word fluency test was incorporated as a control variable to determine whether the method used to elicit possible selves was dependent on individual differences in verbal fluency i.e., a possible artifact and bias. The test requires the participant to say as many words that they can think of in one minute beginning with the letter F, followed by the letters A and S in two further one-minute trials. Proper nouns, numbers and the same word with a different suffix are not allowed. The score is the sum of words generated across the three trials.

2.3.4. Chronic Pain Acceptance Questionnaire – CPAQ

The CPAQ is a self-report questionnaire designed to measure acceptance of pain. Each item is a statement selected to measure dimensions of the construct of acceptance (McCracken, 1998). The statements are rated on a 7-point scale according to the extent to which the respondent feels the statement applies to them. The scores range from 0 to 6 where 0 means 'never true' and 6 means that the statement is 'always true'. There is adequate evidence of reliability and validity for the CPAQ. In this study we used the shorter, revised version of the scale (McCracken and Eccleston, 2003; McCracken et al., 2004b).

2.3.5. Beck Depression Inventory II (BDI-II) (Beck, 1996).

The BDI II is a 21-item self-report measure of depressive symptomatology. Each item has four possible responses. The scores for each item range from 0 to 3, depending on the symptom's presence and severity over the preceding two weeks. The total scores range from 0 to 63.

2.3.6. Hospital Anxiety and Depression Scale (HADS) (Zigmond and Snaith, 1983)

The HADS is a self-report tool originally designed to assess anxiety and depression in medical patients. The scale was designed to exclude somatic symptoms that might co-occur in medical and psychiatric conditions. The HADS is widely used in medical settings and it has high internal consistency and good construct validity (Bjelland et al., 2002). In this study the anxiety subscale of the HADS was used as the measure of anxiety and the depression subscale was used as an alternative index of depression in a conceptual replication of the previous study (Morley et al., 2005).

2.3.7. Personal Style Inventory – II (PSI-II) (Robins et al., 1994)

Morley and Eccleston (2004) conjectured that the effects of self-pain enmeshment on adjustment to chronic pain would in be partly dependent on the extent to which particular aspects of the enmeshed self corresponded with salient personal goals. For example, a person who highly values social activity and is strongly motivated to pursue social interaction will be more distressed if aspects of their self relating to social activity are enmeshed by pain than if other aspects, say those relating to physical activity are enmeshed by pain. Similarly a person who highly values autonomy will be more threatened if the corresponding self aspects are enmeshed with pain. Contemporary interested in sociotropy and autonomy is closely linked to the general stress-diathesis model of psychopathology, notably for depression. Both psychoanalytic and cognitive-behavioural theories have hypothesised that individual differences in personality type interact with life events to determine the onset of depression (Coyne and Whiffen, 1995). People with sociotropic characteristics place high value on establishing secure interpersonal relationships in order to main their sense of self-esteem and wellbeing. Coyne and Whiffen (1995, p.358) note that sociotropic individuals have ‘heightened needs for acceptance, understanding, support and guidance’. They therefore value social relationships and by implication other peoples’ positive appraisals of them and aspire to fulfil other peoples’ expectations of them. In contrast autonomous individuals are primarily concerned with achieving and maintaining their own standards and goals rather than those expressed by others as a source of self-esteem and wellbeing. Although sociotropy and autonomy have been construed as distinct personality types in theories of psychopathology, measurement by questionnaire (such as the PSI used in this study) indicates a more continuous distribution of a personality trait. As Coyne and Whiffen

(1995) note the common methods for dichotomising the continuum are problematic and not satisfactory, and the present study treats sociotropy and autonomy as traits. Although previous work has focused on depression we conjectured that the threat to the future possible self posed by self-pain enmeshment would relate to anxiety.

The present study addressed this issue as follows. Autonomy and sociotropy were selected as two candidate motivational preferences where there are likely to be individual differences (c.f. Champion and Power, 1995; Carver and Scheier, 1998) which broadly correspond to the two self aspects assessed in the future possible selves interview (see below): the hoped-for (own) self and hoped-for (other) self. We hypothesised that individuals whose hoped-for (own) self is enmeshed with pain and who also have a strong sense of autonomy might be more vulnerable to distress (anxiety) than those whose hoped-for (own) self is not enmeshed or who have a relatively weak sense of autonomy. Similarly, individuals whose hoped-for (other) self – a measure of how they think others might regard them – is enmeshed with pain and who also have a strong sense of sociotropy will be more distressed than others without this combination of characteristics. Thus we predicted interactions between the relevant self aspects and motivational preferences.

We selected the PSI to assess autonomy and sociotropy. At least one previous study (Fairbrother and Moretti, 1998) has investigated the relationship between sociotropy and autonomy and actual:ideal and actual:ought self-discrepancies. These authors assessed the contribution of sociotropy, autonomy and the actual:ideal discrepancy to depression levels (BDI) in depressed, remitted depressed and control participants. As predicted each variable made an independent contribution to depression

but their interactions were not assessed. The purpose of the present study was not to attempt to replicate Fairbrother and Moretti (1998) but to examine the hypothesised relationship between autonomy, sociotropy and self-pain enmeshment. Fairbrother et al., (1998) also report that the correlation between the scales in a mixed clinical/non clinical sample was $r = 0.57$, and that the correlation between autonomy, sociotropy and the BDI was $r = 0.37$. Several other studies (Robins et al., 1997; Sato and McCann, 2000; Bagby et al., 2001; Sato, 2003) have reported correlations in the range of 0.20 to 0.41 between the two PSI scales and the BDI. . There are 24 items in each subscale and each item rated on 6-point Likert response scale (1 'strongly agree' to 6 'strongly disagree'). Robins et al., (1994) report that the two scales are internally consistent (sociotropy, $\alpha = 0.88$: autonomy, $\alpha = 0.86$), stable (r between 0.69 and 0.80 between 5-16 weeks), have a low inter-correlation ($r = 0.18$) and good construct validity.

2.3.8. Possible selves interview (Morley et al. 2005).

The possible selves interview generates measures that are related to two theoretical perspectives; Self Discrepancy Theory (Higgins, 1987, 1997) and the self-pain enmeshment model (Pincus and Morley, 2001). (1) Discrepancies between the actual self and the future hoped-for selves (own and other) are similar to the actual:ideal discrepancies posited in Higgins's (1987, 1997) self-discrepancy theory (SDT). In SDT the key self aspects are the ideal self and the ought self each of which may be considered from the perspective of the individual (own) or how the individual considers others appraise him or her (other). The present study employed the hoped-for self rather than the ideal self. Morley et al (2005) noted that in pilot studies clinical participants found it difficult to think about their ideal future self in the abstract. They adapted the method

used by Hooker and Kraus (1994) to interrogate the person's view of their hoped-for self was more appropriate in this context. As noted by Morley et al (2005) the extent to which the hoped-for self aspects are saturated with ideal characteristics is not known. One purpose of the present study was to determine this. If the hoped-for selves do contain a considerable proportion of ideal characteristics then according to SDT the actual:hoped-for discrepancy should correlated with depression – as observed by Morley et al (2005). (2) The possible selves interview can also be used to derive measures of self-pain enmeshment that relate to Pincus and Morley's (2001) model of self-pain enmeshment. Whereas SDT hypothesises that the magnitude of discrepancy between the current actual self and ideal and ought selves is associated with emotion, the self-enmeshment model suggests that the degree to which the self is enmeshed (trapped) by pain is an additional factor determining emotional adjustment. This proposition is similar to Carver and Scheier's (1998) control theory analysis that predicts that it is the rate at which discrepancies are resolved that determines the emotional state. The possible selves interview operationalizes enmeshment by asking individuals to judge whether individual characteristics of their future self is independent of the continuing presence of pain. Thus if all characteristics of a future hoped-for self cannot be realised while pain persists then the individual's hoped-for self is regarded as enmeshed. Conversely a hoped-for self that can be achieved despite the continuing presence of pain is regarded as not enmeshed. It is suggested that the enmeshment model will provide additional explanatory variance to that predicted by SDT.

We modified the possible selves interview reported in Morley et al., (2005). Participants generated adjectival descriptions (characteristics) of their actual, hoped-for

and feared-for selves from their own perspective: hoped-for (own) and feared-for (own). In the present study participants were also asked to generate descriptions of what they thought other people close to them hoped they would be like in the future: the hoped-for (other)¹. Participants also made judgments concerning the conditionality of each characteristic for both the hoped-for selves (own and other) and feared-for self on the presence and absence of pain. The proportion of characteristics judged as conditional is an estimate of self-pain enmeshment. Participants also made judgments about the likelihood that each possible self would be realised (expectancy) and their ability to influence its occurrence (efficacy). In a second modification of the original interview participants also judged every characteristic in each of the possible selves to reflect whether the characteristic was one that they personally wanted to possess or felt they should possess. These judgments were made to estimate the extent to which a self aspect represented an ideal (wanted) or ought (should have) characteristics. The modifications to the possible selves interview were made after pilot testing which showed that the terms ‘ideal’ and ‘ought’ were not readily used by the target population whereas ‘wanted’ and ‘should have’ were used and thus offer the best available fit to the local population.

2.4. Procedure

Ethical approval was obtained through the standard UK National Health Service procedures. Participants could elect to be interviewed at their home or in a quiet place in the clinic. After giving signed consent demographic information was collected and the

¹ In this study we explicitly distinguish between hoped-for (other) and hoped-for (own) selves but readers should be mindful that the hoped-for (own) is the same as the hoped-for self in Morley et al., 2005.

participant completed the VAS pain scales. The possible selves interview was followed by the administration of the PDI, BDI-II, HADS, CPAQ and PSI-II.

2.5. Data analysis

2.5.1 Possible selves

Four measures were derived from the possible selves interview. (i) The number of self descriptive characteristics generated in for each self. (ii) The proportion of self descriptive characteristics that are enmeshed in each future possible self. For the hoped-for (own) self this is the proportion of characteristics that cannot be achieved with the continued presence of pain. For the feared-for self this is the proportion of characteristics that cannot occur if pain were to be absent. More details of these measures are given in Morley et al., (2005, p.86-87). For the hoped-for (other) self, enmeshment was computed as the proportion of characteristics that cannot be achieved with the continued presence of pain. This is analogous to the hoped-for (own) self computation. These measures represent the degree to which each aspect of the self is conditional on the absence of pain. The term conditional self is used to refer to them in the results section. (iii) The proportion of ideal characteristics contained in each future possible self. This is the proportion of characteristics that participants endorsed as 'wanted' as opposed to 'should have'. (iv) The magnitude of the discrepancy between each future possible self and the actual self were computed using the standard method developed by Higgins (Higgins et al. 1986) that identifies the number of matches (replications and synonyms) and mismatches (opposites and antonyms) occurring in the actual and future self. We used Collins English Thesaurus as the reference for confirming synonym and antonym status. The self discrepancy value is the number of mismatches minus the number of matches.

Positive scores represent higher levels of discrepancy. Conversely negative scores represent low discrepancy i.e. relative proximity to the actual self.

2.5.2. Statistical analysis

Data were examined to check distributions and appropriate transformations were made where necessary. Comparisons between possible-selves were made with one-way repeated measures ANOVAs. Regression models were constructed after appropriate checks for collinearity and tolerance. Analysis of the suspected interactions between autonomy/sociotropy and enmeshment were carried out using multiple regression models. The relevant variables were centered and the analyses followed the procedures outlined by Aiken and West (1991).

3. Results

3.1. Participants

96 patients were recruited from the pain clinic of which 14 either cancelled or failed to attend their appointment for the research interview. Of those who completed the interview the average age was 45 years, 51 were female; the range in school leaving age was 14-18 years which was correlated with age ($r = 0.49$), reflecting the statutory raising of the school leaving age in the last 50 years. The mean and median durations of chronic pain were 10.7 (SD = 9.38) and 7.5 (IQR = 11, 4-15 years) years respectively. The group was heterogeneous with regard to the site of pain and diagnosis. Of the 82 participants about half ($n = 40$) reported back pain, 8 reported pain of arthritic origin, 9 had neuropathic pain and 4 had chronic head pain. The remaining participants had pain from a variety of diagnosed disorders (e.g. menorrhagia, endometriosis) and unspecified pain from specific locations (e.g. hand pain).

3.2. Pain and affect measures

The mean scores for usual, highest and lowest pain (range for all scales 1 – 150) were = 85.1 (SD = 33.1), 129.2 (SD = 20.3), and 52.3 (SD = 37.8) respectively, and the self rated pain-related interference was = 103.4 (SD = 33.4). The mean scores for the emotion ratings (range for all scales 1-100) were: depression = 54.9(SD = 31.0), anxiety = 50.2 (SD = 34.0), frustration = 70.5 (SD = 26.3), anger = 55.8 (SD = 33.7) and fear = 46.7 (SD = 36.2).

3.3. BDI-II, HADS, CPAQ, PDI, Word fluency, PSI.

The summary statistics (mean scores and standard deviations) of these measures are given in Table 1. Table 1 also reports their inter-correlations and the correlations between the measures and the measures derived from the possible selves test. Overall the characteristics of the sample (age, gender ratio, and mean scores on CPAQ and PDI) is similar to the one reported by Morley et al., (2005) and to other samples from this clinic. The present sample scored slightly higher on the BDI than in the sample in the previous study ($M = 26.5$ vs. $M = 21.7$; $P < 0.05$, t-test). The correlations between the standardized measures were in the expected directions and magnitude.

3.4. Descriptive data from the possible selves test

Table 2 shows a summary of the number of characteristics generated for each of the selves, the mean expectation and efficacy ratings, the proportions of each self aspects that was judged as ideal, the proportions of each self that is conditional on pain (extent of enmeshment), and the self discrepancy means. Comparisons between each self were initially made with one-way repeated measures ANOVAs, with Greenhouse-Geisser corrections where necessary. Significant omnibus F ratios were analyzed with a series of

paired t-tests with Bonferroni adjusted α levels. A résumé of these analyses is shown in the last column of the Table 2. In summary, participants generated significantly more descriptors of their actual-self than any other self, and more descriptors of their hoped-for (own) self than either the feared-for or hoped-for (other) selves. The ANOVA suggested differences between the selves with respect to the expectation that they would be achieved (or avoided in the case of the feared-for self) but Bonferroni corrected tests were not significant ($P > 0.017$). Ratings of efficacy were similar across all selves. In both the efficacy and expectancy ratings the participants' average ratings were clearly in the mid-point of the scales. There was significant difference in the proportion of ideal characteristics in the selves. The post hoc test indicated that participants identified more ideal characteristics in the feared-for self i.e., essentially negative characteristics that they would not like to be. As anticipated there were relatively fewer ideal characteristics in the hoped-for (other) self, but this was not significantly different from the hoped-for (own) self. The average proportion of self that was conditional (enmeshed) on the presence of pain was around 0.5 for each self aspect

Correlational analysis showed no relationship between the verbal fluency and the number of items generated or any of the measures derived from the possible selves test.

3.5. Regression analyses

A series of hierarchical regression models were developed to test the statistically predictive relationships of the self discrepancy and conditional self measures. Following the strategy reported by Morley et al., (2005) the self measures were entered as the fourth stage in the model after controlling for demographic factors (Step 1), pain (Step 2) and pain related interference (Step 3). To ensure against overparameterization of the model

we reduced the number of variables entered in steps 1 to 3 in comparison with Morley et al 2005)². Inspection of the correlations in Table 1 suggested that age (Step 1), pain intensity (Step 2) and the PDI (Step3) should be included in the model. In the final step the self-discrepancy and conditional self measures were entered concurrently. Table 3 shows the summary statistics for each analysis. The total Adjusted R² for the full model is given along with the critical statistics for the fourth step of each model. The rationale of this strategy is to demonstrate that measures of the self contribute to explaining variance in the adjustment measures over and above variance accounted for by measures relating to pain experience and the perceived degree of disability (behavioural interference attributed to pain). Both the discrepancy and enmeshment (conditionality) measures were entered. This replication sought to demonstrate that enmeshment contributed explanatory power independently of discrepancy

3.5.1. Replication

Panel (a) of Table 3 displays the predicted relationships between the self measures and the BDI and the CPAQ. In both equations the actual:hoped for self discrepancy and the conditional hoped-for self contributed additional significant predictive in the expected direction; greater discrepancy was associated with higher depression and conversely with lower acceptance of chronic pain; greater enmeshment was associated with higher depression scores and lower acceptance of chronic pain.

The analyses were repeated with the inclusion of the expectancy and efficacy measures entered in the fourth step along with the enmeshment (conditional self) measure. This analysis tested the hypothesis that the predictive power of the conditional

² We thank an anonymous referee for this suggestion.

hoped-for self is accounted for by hopelessness theory (Abramson et al., 1989), which in this context is assessed by the expectancy and efficacy variables. Inclusion of these two measures in the final step of the multiple regression model added no additional explanatory variance to the model and the β weights for each measure were small (Efficacy $\beta = -0.11$, *ns*; Expectancy $\beta = -0.04$, *ns*).

3.5.2. Extension

Panel (b) of Table 3 shows the summary data for the relevant analyses. In the first facet of the extension the HADS depression scale, which contains no somatic items, replaced the BDI as the predicted variable. The value of the Adjusted R^2 and β weights for the actual:hoped-for self discrepancy and the conditional hoped-for self were comparable to those reported when the BDI was entered into the model.

The second facet of the extension investigated the participants hoped-for (other) self; that is, the participants' constructions of what they think significant others hope for them. Multiple regression models were constructed with the BDI, HADS-D and CPAQ measures as the predicted variable and the participants actual:hoped-for (other) discrepancy and conditional hoped-for (other) self were entered in the fourth step of the model. The summaries of these models are shown in panel (b) of Table 3. The total variance explained in both models when depression was the predicted was similar (Adj $R^2 \geq 0.45$). The actual:hoped-for (other) self discrepancy and contributed significant variance to the final model (greater discrepancy associated with higher depression) but not the conditional hoped-for (other) self. This relationship was reversed for the CPAQ where the conditional hoped-for (other) self was a significant predictor of the CPAQ: such that greater acceptance was associated with of lower enmeshment (conditionality).

3.6. Anxiety

3.6.1. Anxiety and self-discrepancies

As a first step regression models were constructed to test the relationships between the three self domains (hoped-for (own); hoped-for (other); feared-for) and anxiety as assessed by the HADS-A scale. As before variables representing demographic, pain and pain-related interference (as above) were entered in three steps and the final step tested the contribution of the discrepancy between the actual self and the corresponding conditional self. The adjusted R^2 values of the final model for the three domains were all significant (hoped-for (own) = 0.21; hoped-for (other) = 0.22; feared-for = 0.29) but in no case did the final step involving the self domains produce an R^2 change statistic that was significant. It was also apparent that the final R^2 for these models was smaller than the values associated with those reported for the CPAQ and depression measures as the dependent variable (see Table 3).

3.6.2. Anxiety, enmeshment and motivation

We next explored the hypothesis that the relationship between self-pain enmeshment and anxiety is moderated by individual differences in motivational preferences. We conjectured that there would be an interaction between autonomy and the extent to which the hoped-for (own) self is enmeshed, and a similar interaction for sociotropy and hoped-for (other) enmeshment. Thus individuals who more highly value autonomy were predicted to be more anxious if their hoped-for self is threatened by enmeshment with pain. In contrast individuals who place greater value on social activity will be more anxious if they believe that others' assessments of their hoped-for self is threatened by enmeshment with pain i.e., cannot meet others' expectations. We had no

specific hypotheses relating to the feared-for self and motivational preferences and therefore did not conduct any analysis of these data.

To test these hypotheses involving an interaction between autonomy, sociotropy, and hoped-for (own) and hoped-for (other) selves we centred the data and constructed a series of regression models (Aiken and West, 1991) using a strategy modified from the previous analyses. Pain, demographic and pain-related interference variables were entered first in a single block followed by a second block comprising a motivational preference measure (autonomy or sociotropy), the relevant conditional self measure (hoped-for (own) self and hoped-for (other) self respectively) and their interaction term. In the first analysis the introduction of the key variables (autonomy and conditional hoped-for (own)) produced an R^2 change = 0.16 ($P = .001$). The β value for the interaction was significant ($\beta = -0.25$, $P < 0.05$). There was also a significant main effect for the self measure ($\beta = -0.26$, $P < 0.05$). In the second analysis the introduction of sociotropy, conditional hoped-for (other) and their interaction term gave a significant R^2 change = 0.13 ($P = 0.005$). The interaction for sociotropy and conditional hoped-for (other) was significant ($\beta = -0.20$, $P < 0.05$) and there was a significant main effect for sociotropy ($\beta = 0.23$, $P < 0.05$). The pair of significant interaction terms lends provisional support to the hypothesis. The analyses are reported more fully in the upper panel, left hand side, of Table 4.

To confirm the specificity of the interaction we conducted two further sets of analyses. First, we interchanged the terms for motivational preference and enmeshment i.e. autonomy with conditional hoped-for (other) and sociotropy with conditional hoped-for (own) and regressed those onto the HADS-A score. The results of these analyses are

shown in the right hand side of the upper panel of Table 4. We surmised that if the specificity model was correct then neither of these interaction terms in these models was predicted to be significant: indeed in neither case was the interaction term significant, but there were significant main effect for the conditional hoped-for (own) self and sociotropy when they were considered together. Second, we examined the regressions of the motivational and conditional self variables on the two measures of depression. The interaction term therefore tested whether the interaction was specific to the anxiety measure; thus it was expected that if specificity was present there would be no significant interaction when the terms were regressed onto measures of depression. The lower part of Table 4 reports these analyses for both the BDI and HADS measures of depression. Note that in these models one might expect to observe a main effect for the motivational preference variables when the BDI is the dependent variable. Indeed these effects are observed and essentially serve as a replication of previous studies relating these variables to depression, incidentally providing a validation of this measure in this population (Robins et al., 1997; Sato and McCann, 2000; Bagby et al., 2001; Sato, 2003). The relationship between the PSI measures of autonomy, sociotropy and the HADS depression measure does not appear to have been reported previously. Furthermore, on the basis of the previous observations (reported in sections 3.5.1. and 3.5.2.) the main effect for the conditional hoped-for (own) self was expected but not for the conditional hoped-for (other) self. The significant main effect in the latter analysis compared with the equivalent one reported in Table 3 may be attributable to the fact that the discrepancy measure was not included thereby allocating more explanatory variance to the conditional hoped-for (other) self.

As predicted main effects were observed (Table 4 left hand side of bottom panel) for autonomy and conditional hoped-for (own) when regressed on to both the BDI (autonomy $\beta = 0.30$, $P < 0.001$; hoped-for (own) $\beta = 0.26$, $P < 0.01$; Interaction $\beta = -0.07$, *ns*) and HADS-D (autonomy $\beta = 0.15$, $P = 0.095$; hoped-for (own) $\beta = 0.33$, $P < 0.001$; Interaction $\beta = -0.03$, *ns*) and no interaction effects were observed. The main effects for the conditional hoped-for (own) term parallel the findings of the earlier analysis reported in 3.5.1. While the main effect for autonomy confirms the observed correlation between autonomy and depression in this and other samples.

Similarly in the analysis of sociotropy (Table 4 right hand side of bottom panel) the main effects confirmed the expected relationship between these measures (BDI, sociotropy $\beta = 0.254$, $P < 0.01$; HADS-D, sociotropy $\beta = 0.17$, $P = 0.066$). Given the prior analysis of the conditional hoped-for (other) self, reported in Table 3, any main effect might be expected to be marginal. Indeed the effect for the BDI was non-significant ($\beta = 0.16$, *ns*), but the effect for the HADS-D was significant ($\beta = 0.25$, $P < 0.05$). The larger β values observed in these analysis are attributable to the fact that the analyses do not include the discrepancy measure i.e., the variation attributable to the conditionality measure is increased. However the key test for the interaction term (predicted as not present) was confirmed for both the BDI ($\beta = -0.02$, *ns*) and HADS-D (Interaction $\beta = -0.03$, *ns*).

Having established the putative specificity of the interaction we examined the effects in more depth. Following Aiken and West (1991) we constructed regression lines for values +/- 1 SD for the enmeshment variables (conditional hoped-for (own) and conditional hoped-for (other)) in each case regressing the relevant motivational

preference score onto the HADS-A score. The resulting regression lines are plotted in Figure 1. Panel A of Figure 1 shows the relevant plots for autonomy. The regression line for high enmeshment was not significant ($\beta = 0.01$, $SE\beta = 0.04$) but there was a significant regression for low enmeshment ($\beta = 0.11$, $SE\beta = 0.04$, $t = 3.0$, $P = .004$). Panel B shows a similar pattern for sociotropy: high enmeshment ($\beta = 0.02$, $SE\beta = 0.04$, *ns*), low enmeshment ($\beta = 0.09$, $SE\beta = 0.04$, $t = 2.55$, $P = .013$). Inspection of Figure 1 suggests that a similar interaction occurs for both autonomy and sociotropy. In individuals who report that their self aspects as highly enmeshed their motivational preference has little impact on anxiety; whereas individuals with low levels of enmeshment report increased levels of anxiety *only* if they score highly on the relevant dimension of motivational preference.

4. Discussion

The main purpose of this study was to replicate and extend previous observations on the relationship between aspects of the self and adjustment to chronic pain (Morley et al., 2005). To this end the aims of the study were fulfilled. The data support the observation that both discrepancies between a person's actual and hoped-for (own) selves and the extent to which they regard themselves as enmeshed by the pain are related to depression and acceptance after other known predictors have been accounted for. In addition, the findings confirmed that the relationship between the conditional selves (enmeshed self) and measures of adjustment does not appear to be attributable to generalised hopelessness as neither measures of expectancy nor efficacy contributed to the final statistical models. The observations with regard to depression were corroborated by a second measure, the HADS, suggesting that the findings are not dependent on a

specific measure. As in the previous study the interview method that required participants to generate self-descriptive data did not appear to be biased by verbal fluency.

A novel aspect of the present study was the attempt to capture a social component of the self as represented by the hoped-for (other) self. We anticipated that asking participants to generate a view of the hoped-for (other) self from another's perspective might elicit more ought characteristics and that, in accord with Higgins's self discrepancy theory (Higgins 1987; 1997), this feature of the self would be associated with anxiety. However the content of the self descriptions with respect to their ideal and ought status indicated that, as expected, the hoped-for self (own) was relatively saturated with ideal characteristics (72% ideal vs. 28% ought) but that the hoped-for (other) self did not have significantly more ought characteristics (67% ideal vs. 33% ought) than the hoped-for (own) self. Similarly the feared-for self was saturated with characteristics that participants ideally did *not* want to possess. The relative preponderance of ideal characteristics in all aspects of the self may be one reason why in the main analyses the discrepancy measures were associated with the indices of depression rather than anxiety.

Considered as a whole, measures of both actual:hoped-for self-discrepancy and enmeshment i.e., the conditional self, were associated with measures of depression. The association of the self-discrepancy measure that is composed of ideal self characteristics with depression is predicted by self-discrepancy theory and it has been previously observed in chronic pain patients (Waters et al., 2004). The association of the measure of self-pain enmeshment is however not predicted by self-discrepancy theory but its presence confirms the basic proposition of the self-pain enmeshment model (Pincus and Morley, 2001) and indicates that the concept of enmeshment has additional explanatory

value. It is also compatible with ideas expressed in applications of acceptance and commitment theory which places emphasis on the functional nature of thought and cognitive representation in chronic pain (McCracken et al., 2004a; McCracken, 2005; Hayes et al., 2006). In the context of acceptance and commitment therapy the hoped-for self would appear to correspond with the notion of values. The extent to which these characteristics of the self are independent of the presence of pain i.e., accepted, is directly assessed by the participant's judgement of conditionality. The present observations indicate that the conditional self measure (enmeshment) is relatively more strongly related to the CPAQ than the self-discrepancy measure, again replicating previous published observations (Morley et al., 2005).

The final aim of this study was to explore a conjecture that a person's motivational preferences would interact with enmeshment within specific aspects of the self to determine their affective state. The relevant analyses provided some support for this conjecture for autonomy and sociotropy with regard to anxiety. The effect was not observed for depression but the analyses confirmed a main effect for the impact of the measure of enmeshment and depression. The current observations suggest that high levels of enmeshment in both hoped-for (own) and hoped-for (other) self aspects are associated with higher levels of anxiety irrespective of the level of motivational preference. In contrast, low levels of enmeshment and the matching motivational preference (hoped-for (self) X autonomy and hoped-for (other) X sociotropy) is associated with low levels of anxiety. These data suggest that the relationship between enmeshment and anxiety is more complex than it is for depression and this is supported by the relative lack of association between aspects of the feared-for self (discrepancy and

conditional) and depression or acceptance. The present study also indicated that the feared self was not significantly related to a measure of anxiety after adjusting for pain and disability. Although fear processes have been widely investigated in pain (Asmundson et al., 2004) much of this work has been specifically related to fear of pain (McNeil and Vowles, 2004) or of movement associated with pain (Vlaeyen and Linton, 2000). Attention to the feared-self, the fear of what one might become (Markus and Nurius, 1986), appears to have been relatively infrequently investigated (Carver et al. 1999) and is neglected within the field of pain (Morley and Eccleston, 2004). This is surprising given the extensive literature on catastrophizing, the cognitive process associated with projecting anticipated futures, and the general prominence of health related fears in middle and old age, in studies of the feared self (Hooker and Kaus, 1994; Frazier et al., 2000; Dark-Freudeman et al., 2006). The absence of a strong relationship between anxiety and the feared-for self suggests a more complex relationship such as that observed by (Carver et al. 1999) who observed a subtle interaction between ought and feared-for selves in determining agitation related affects that included anxiety.

The current study cannot be used to provide a causal account of the relationship between aspects of the self, specifically enmeshment, and affect. This is precluded by the cross-sectional design. At present it seems unlikely that enmeshment could be subject to experimental manipulation and the directional influence of the enmeshment pain relationship might be profitably examined by observational studies relating change in both variables across time (Vangronsveld et al., in preparation). An additional limitation of the current study is that the sample used was a diagnostically heterogeneous mix of chronic pain patients. While this is consistent with the stance of the self-pain

enmeshment model which focuses on the experience and consequences of chronic pain, the heterogeneity of the sample might contribute unwanted variance to the measures. Finally, the sample size was smaller than desired. In an attempt to compensate for this we reduced the number of control variables entered in the first steps of the hierarchical analyses (c.f. Morley et al., 2005). However the multiple regression models were marginally overparameterized (actual N = 82, ideal N = 96 for the analyses reported in Table 4). However the values obtained using the reduced data sets were not markedly different from those obtained when all the control variables used by Morley et al. (2005) were entered.

Notwithstanding these limitations the study was able to replicate the methodology reported in Morley et al., (2005) using a different interviewer. The present sample generated a similar number of characteristics for the actual, hoped-for and feared-for selves and the extent to which the future selves were conditional on pain were broadly similar. The current sample reported a slightly higher level of their conditional hoped-for self this was matched by a slightly higher mean depression score in the sample (26.5 vs. 21.7) which is in the predicted direction. The sample obtained in the present study was typical of those obtained from the same clinical setting in over a number of years with regard to age, gender, clinical case mix and their level of disability.

The clinical applications of self-pain enmeshment also correspond with ideas of acceptance. The possible-selves interview is readily transferable to a clinical context to identify aspects of the hoped-for self. When individual aspects are identified as being conditional on the absence of pain i.e., enmeshed, these become a focus for investigation and problem solving. For example, a patient who states that 'healthy' is a hoped-for

aspect of the self that is conditional on the absence of pain might be invited to consider many aspects of healthy that are actually not pain dependent, such as diet, oral hygiene, moderate alcohol use, and not smoking. This clinical application indicates a constraint of the present methodology in that it asks participants to describe their hoped-for self in relatively high level language corresponding to traits or more general self aspects. Clinically it may be more useful to obtain information about behaviour that relates to or expresses each trait. Carver and Scheier' (1998) self regulatory model captures this relationship in a hierarchical manner by distinguishing between principles and programmes: principles corresponding to future hoped-for characteristics and programmes to the behavioural activities necessary to realise the principles. The current analysis of chronic pain sufferers does not make this distinction and at present it is unclear whether enmeshment at the principle level is driven by enmeshment at the programme level.

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9. HADS-D	9.99	4.38	82	-0.01	0.04	0.20	-0.06	-0.12	0.60	0.74	0.61									
10. CPAQ	46.99	17.94	82	0.07	-0.09	-0.29	0.17	0.14	-0.45	-0.64	-0.51	-0.67								
11. PSI Sociotropy	98.54	16.99	82	0.01	0.15	0.06	-0.01	-0.12	-0.06	0.23	0.25	0.15	-0.15							
12. PSI Autonomy	89.96	16.87	82	-0.02	0.08	0.22	0.01	-0.29	0.16	0.47	0.33	0.32	-0.34	0.59						
13. Conditional Hoped-for (Own)	0.50	0.31	82	0.02	0.07	0.12	-0.12	-0.19	0.37	0.50	0.39	0.53	-0.60	0.12	0.28					
14. Conditional Hoped-for (Other)	0.55	0.30	81	-0.06	0.26	0.15	0.00	-0.10	0.42	0.42	0.33	0.48	-0.51	0.07	0.25	0.61				
15. Conditional feared-for	0.58	0.35	82	0.19	0.10	0.12	0.20	0.00	0.26	0.22	0.14	0.33	-0.17	-0.08	0.10	0.24	0.26			
16. Discrepancy Actual:Hoped-for (Own)	0.00	2.35	82	-0.29	0.05	0.20	-0.20	-0.06	0.30	0.58	0.37	0.51	-0.56	0.15	0.42	0.49	0.47	0.01		
17. Discrepancy Actual:Hoped-for (Other)	0.18	2.28	82	-0.21	0.19	0.24	-0.13	-0.19	0.28	0.51	0.36	0.46	-0.47	0.20	0.39	0.38	0.49	0.18	0.65	
18. Discrepancy Actual:Feared-for	-0.57	1.49	82	0.17	-0.11	-0.08	0.08	0.09	-0.29	-0.47	-0.33	-0.48	0.52	-0.21	-0.29	-0.18	-0.29	-0.13	-0.51	-0.54

Table 2

Summary statistics for the self data

	Actual-self (a)	Hoped-for (own) (b)	Feared-for (own) (c)	Hoped-for (Other) (d)	Statistical comparisons
Number of characteristics generated	8.59 (1.63)	7.52 (2.07)	6.22 (2.57)	6.33 (2.47)	$F_{3,243} = 46.55, P = 0.001, a>b>c=d$
Expectation	na	4.28 (1.53)	3.65 (1.76)	4.23 (1.47)	$F_{2,158} = 4.23, P = 0.026$
Efficacy	na	4.23 (1.62)	3.83 (1.90)	4.16 (1.49)	$F_{2,158} = 2.79, P = ns$
Proportion of ideal characteristics in self	na	0.72 (0.25)	0.81 (0.24)	0.67 (0.30)	$F_{2,160} = 9.10, P = 0.001, c>b=d$
Proportion of self conditional on pain self	na	0.50 (0.31)	0.58 (0.35)	0.55 (0.30)	$F_{2,160} = 2.55, P = ns$
Discrepancy	na	0.00 (2.35)	-0.57 (1.49)	0.18 (2.28)	$F_{2,162} = 2.93, P = ns$

Table 3

Summary of multiple regression analyses: * $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$.

	sr	β	R ² Change	Fchange
<i>(a) Replication</i>				
BDI AdjR ² = 0.53				
Actual:Hoped discrepancy	0.19	0.22*	0.13	11.15**
Conditional Hoped-for self	0.21	0.24*		
CPAQ AdjR ² = 0.46				
Actual:Hoped discrepancy	-0.18	-0.20*	0.25	18.92***
Conditional Hoped-for self	-0.36	-0.42***		
<i>(b) Extension</i>				
HADS-D AdjR ² = 0.45				
Actual:Hoped discrepancy	0.23	0.26**	0.17	13.29***
Conditional Hoped-for self	0.22	0.25**		
BDI AdjR ² = 0.47				
Actual:Hoped (Other) discrepancy	0.22	0.268*	0.08	5.78**
Conditional Hoped-for (Other) self	0.08	0.07		

	sr	β	R ² Change	Fchange
HADS-D AdjR ² = 0.47				
Actual:Hoped (Other) discrepancy	0.29	0.33***	0.14	10.75***
Conditional Hoped-for (Other) self	0.11	0.13		
CPAQ AdjR ² = 0.36				
Actual:Hoped (Other) discrepancy	-0.17	-0.20	0.15	9.24**
Conditional Hoped-for (Other) self	-0.24	-0.29**		

Table 4 Summary of multiple regression models testing the interaction between enmeshment and motivational preferences.* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$.

Anxiety HADS-A											
AdjR ² (model)	.29		.26		.26		.27				
R ² chg (last step)	.16***		.13**		.13*		.14**				
	β	<i>sr</i>	β	<i>sr</i>	β	<i>sr</i>	β	<i>sr</i>	β	<i>sr</i>	
HF(own)	.26*	.24	HF(other)	.19	.14	HF(own)	-.26*	-.24	HF(other)	-.21	-.18
Autonomy	.17	.15	Sociotropy	.23*	.22	Sociotropy	.22*	.21	Autonomy	.19	.18
Interaction	-.25*	-.24	Interaction	-.20*	-.19	Interaction	.10	.10	Interaction	.16	.14
Depression											
	BDI		HADS-D		BDI		HADS-D				
AdjR ² (model)	.58		.46		.48		.40				
R ² chg (last step)	.18**		.13***		.09**		.09**				
	β	<i>sr</i>	β	<i>sr</i>	β	<i>sr</i>	β	<i>sr</i>	β	<i>sr</i>	
HF(own)	.26**	.23	HF(own)	.33***	.29	HF(other)	.16	.14	HF(other)	.25*	.23
Autonomy	.30***	.27	Autonomy	.15	.14	Sociotropy	.24**	.24	Sociotropy	.17	.16
Interaction	-.07	-.07	Interaction	-.03	-.03	Interaction	-.02	-.02	Interaction	-.03	-.03

Note: AdjR² (model), adjusted R² value for full model; R²chg (last step), R² for the final block of variables; HF(own), enmeshment of Hoped-
for (own) self; HF(other), enmeshment for Hoped- for (other) self.

Figure 1

Regression lines constructed to illustrate the interaction effects for self-pain enmeshment and motivational preference for the dependent variable of anxiety (HADS Anxiety). The high and low enmeshment lines are shown for values of ± 1 SD units and plotted over the range of ± 1 SD units for autonomy and sociotropy. The left hand panel shows the expected interaction for enmeshment of the hoped-for (own) self and autonomy. The right hand panel shows the interaction for enmeshment of the hoped-for (other) self and sociotropy.

