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“It’s just you’re battling with yourself”: How pain-related imagery impacts on functioning in chronic pain

Natalie T. Rooney

Doctorate in Clinical Psychology
The University of Edinburgh
August 2012
Dedication

This piece of work is dedicated in the memory of my father who suddenly passed away in March 2010. Thank you Dad for instilling within me the openness and curiousity to appreciate the daily miracles of life.

“Your pain is the breaking of the shell that encloses your understanding.
Even as the stone of the fruit must break, that its heart may stand in the sun, so must you know pain.
And could you keep your heart in wonder at the daily miracles of your life, your pain would not seem less wondrous than your joy;
And you would accept the seasons of your heart, even as you have always accepted the seasons that pass over your fields...”

Kahlil Gibran

The Prophet 1966, p. 52
Acknowledgements

There have been many folk without whom this project would not have seen fruition. The individuals who volunteered to participate in the research and gave their time generously in openly sharing their experiences, ultimately made the research not only possible but rewarding and a pleasure to conduct.

Dr David Gillanders, as academic supervisor, provided clarity of vision and a concrete idea on which to research. His guidance, encouragement and constructive criticism steered the direction of the project. Dr Rachel Atherton went beyond the call of duty as clinical supervisor in giving her time; valuable feedback; and support that helped keep all the balls juggling in the air! I am also grateful to the clinical team at the Chronic Pain Management Service for their assistance with recruitment, specifically Dr John MacLeod, Catherine Plant, Jackie Milburn, Linda Sones and Colette Barton.

Drs Jenny Munro and Ethel Quayle provided help and support when personal circumstances conspired against me, and gave me the breathing space when I needed it most. Drs Sheelagh Rodgers and Andrew MacDougall as line manager and local tutor who provided much needed extra time to maintain momentum. My trainee peers for their words of wisdom and inspiration over heart-warming cups of coffee. Last, but in no means least, my family who have walked the path with me and strengthened my resolve to carry this one through. Humour, love and perspective lightened the load and saw this journey to its end.
CONTENT AND FORMAT

Chapters 1 and 5 (systematic review and thesis journal article) adhere to the author guidelines issued by the journal series Pain Medicine (see Appendix 8)

Chapters 2, 3 and 4 adhere to guidelines issued by the Doctorate in Clinical Psychology handbook, The University of Edinburgh
Epigraph

“O, who can hold a fire in his hand
By thinking on the frosty caucasus?
Or cloy the hungry edge of appetite
By bare imagination of a feast?
Or wallow naked in December snow
By thinking on fantastic summer’s heat?

William Shakespeare: Richard II
(Quoted in Graham, 1995, p. 59)
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WORD COUNTS

Systematic review 5,942
Introductory bridging chapter 3,427
Methodology 8,767
Results & Discussion 10,985
Thesis Journal Article 5,703

Total thesis portfolio 34,824
Abstract

Background:

Psychological research has consistently demonstrated the importance of cognitions in the form of thoughts and images on an individual’s wellbeing. Having pain-related verbal cognitions has been shown to lead to poorer outcomes for patients (McCracken & Turk, 2002). Research in other conditions has shown mental images have a more powerful impact on emotion than verbal cognitions (Holmes & Matthews, 2005). To date however, little work has explored the role of mental imagery in adjustment to chronic pain.

Methods

Fourteen semi-structured interviews were conducted with individuals with chronic pain. Interview transcripts were analysed according to grounded theory methods to construct a substantive theory of the impact spontaneously-invoked images of pain have on functioning.

Results

Eight participants reported pain-related imagery and three reported mental images associated with related symptoms. In line with previous findings (Gillanders et al., 2012; Gosden, 2008) the frequency and intensity of pain-related images influenced the degree of distress experienced. There was a distinction made between intrusive mental images and visual descriptions or metaphors of pain. The former being conceptualised as a visual cognition and playing a role in the aetiology and maintenance of distress in chronic pain and therefore an adverse impact on functioning.

Conclusion

Enhancing our understanding of pain related imagery and its impact on functioning could inform the design of interventions in clinical practice. Working systematically with patients’ idiosyncratic pain related images and the beliefs that are associated with them could be a helpful specific target for therapy.

Keywords: Chronic pain; pain images; cognition; cognitive behavioural therapy
CHAPTER 1
Systematic Review
The effectiveness of guided imagery interventions for pain management among adults with chronic pain - A systematic review

Abstract
Guided imagery (GI) is a portable and self-administered technique that has been applied extensively with chronic pain populations. The aim of this systematic review is to identify the current clinical evidence for guided imagery and suggest areas for future development. A systematic search of the literature was conducted up until April 2012. Experimental and observational study designs were considered, including randomised controlled trials (RCTs), controlled clinical trials (CCTs), and cohort studies. Studies with participants with chronic pain over 18 years of age were included in the review. These studies underwent quality assessments using the Effective Public Health Practice Project (EPHPP) appraisal tool culminating in 12 studies included in the review. The methodological quality of many of the studies reported has been poor, with lack of randomisation, inadequate control groups, and potential investigator bias has been common, thereby limiting its generalisability. These studies indicate a promising effect on pain relief and psychosocial functioning in the favour of imagery interventions, at least in the short term. It is recommended that future clinical trials could seek to address which treatments are most effective for which patients and with which conditions.

Introduction
Cognitive behavioural therapy (CBT) is the treatment of choice for the management of chronic pain (NHS Quality Improvement Scotland, 2006). CBT which focuses on increasing functioning and decreasing pain-related distress through effecting change in cognitions and behaviour is the dominant theoretical model underpinning multidisciplinary approaches to managing chronic pain. These psychological treatments have been systematically reviewed (Morley et al., 1999; Eccleston et al., 2009). Eccleston et al. (2009) conclude that CBT has modest treatment effect sizes for improving pain, disability and mood. Moreover, due to insufficient reporting of data on quality or content of treatment, the influence of treatment modalities on outcome could not be assessed.

CBT comprises a vast range of cognitive, behavioural and combined interventions. Indeed Gatchel et al.’s (2007) definition of CBT (as cited in Morley, 2011) encapsulates its breadth, eclectic mix of techniques, aims and variability of context in which it is practised.

“The term CBT varies widely and may include self instructions ... relaxation or biofeedback, developing coping strategies, changing maladaptive beliefs about pain and goal setting...varying selection of these strategies... embedded in a more comprehensive pain management program that includes functional restoration, pharmacotherapy, and general medical management.”

In a recent paper reviewing the efficacy and effectiveness of CBT for chronic pain, Morley (2011) calls for a considered debate on some key questions underpinning the practice of psychological
treatment. Given the breadth of interventions within the CBT model, readers are challenged to consider whether it can be regarded as a unified treatment. Reviews of behavioural interventions for chronic pain have similarly clustered together interventions such as biofeedback, hypnosis, relaxation and imagery techniques.

Jensen’s (2011) review of psychosocial pain management interventions therefore provides a helpful framework in which to differentiate between the behavioural approaches with regard to the effectiveness for pain management. Given that hypnosis, relaxation and meditation techniques are underpinned by similar mechanisms they can be viewed as a cluster of hypnotic interventions. In a similar vein, Morone’s (2007) review uses the terms relaxation-based and concentration-based therapies to refer to progressive muscle relaxation (PMR) and biofeedback, hypnosis and guided imagery respectively.

Concentration-based therapies have been widely applied with chronic pain populations. However, there is variability in the outcome literature with regards to hypnosis and guided imagery techniques. Whilst there are isolated descriptions of imagery modification techniques, these tend to be employed and evaluated in the hypnosis literature. The effectiveness of these techniques have not been systematically evaluated. Thus, this paper seeks to review guided imagery interventions in pain management.

Guided imagery (GI) entails using the imagination to create images that bring about beneficial emotional and physical effects (Hart, 2008). It is a portable and self-administered technique that has been applied extensively in clinical practice. In the clinical setting, GI is delivered by a facilitated relaxation exercise to focus attention and relieve muscle tension followed by specific guided images. Van Kuiken’s (2004) meta-analysis identifies four main applications of GI interventions. These include; pleasant imagery that entails imagining a calm place; physiologically focused imagery that seeks to focus on the physiologic function that needs healing; mental rehearsal of imagining a specific task or performance before the event occurs, and receptive imagery that involves scanning the body for diagnostic or reflective purposes. Pleasant imagery has been the focus of empirical research assessing its efficacy in pain management. Physiologically focused imagery has been employed as a control condition in some studies. On the whole however, both physiologically and reflective imagery have not been examined extensively, although are frequently used in clinical practice.
The specific mechanisms underpinning GI are largely unknown. It has been postulated that GI may ameliorate chronic pain through various psychological and physiological mechanisms (Engel, 1977). For example, GI may initiate cognitive processes such as active coping or refocusing attention (Engel, 1977; Fernandez & Turk, 1989). Within the ‘gate control’ theory of chronic pain (Melzack & Wall, 1965), GI may affect higher neurological processes by blocking transmission of painful stimuli. Recent findings indicate that relaxation and positive imagery reduce psychoneuroimmunologic and hormonal pathways that affect the stress response (Van Kuiken, 2004; Weydert et al, 2006).

The effectiveness of guided imagery in relieving pain and pain-related distress has been studied under experimental conditions and with both naturally occurring acute and chronic pain. Fernandez and Turk’s (1989) meta-analysis of guided imagery interventions for experimental pain concluded that cognitive coping strategies were more effective in decreasing pain in comparison to either no-treatment or controls. Imagery techniques were highlighted as being superior to the self-talk strategies. There is modest evidence demonstrating the effectiveness of GI with acute pain conditions. For example, Interstitial Cystitis (Carrico et al, 2008), tension-type headache (Mannix et al, 1999), perioperative (Tusek et al, 1997) and postoperative (Huth et al, 2004) acute pain. Recent systematic reviews have reported the effectiveness of GI for managing pain associated with cancer (Sloman, 1995).

Recent systematic reviews and meta-analyses have highlighted the therapeutic value of GI for Fibromyalgia Syndrome (Bernardy et al., 2011) and musculoskeletal pain (Posadzki & Ernst, 2011), however the effectiveness for reducing distress associated with these conditions is encouraging but inconclusive. The aim of this systematic review is to identify the current clinical evidence for guided imagery and suggest areas for future development.
Method

Review objective

The effectiveness of guided imagery interventions for pain management among adults with chronic pain were reviewed.

Participants

Studies with participants with chronic pain over 18 years of age were included in the review. Reports of studies in headache or malignant pain were not included, neither were studies in acute pain conditions or laboratory experiments.

Interventions

It included studies of guided imagery, relaxation and meditation techniques if imagery was the primary component and any induction described as a simple relaxation technique.

Outcomes

The study reported at least one pain outcome measure and in the following domains: functioning and affect.

Language

Only English language studies were included due to lack of translation resources.

Study Design

Experimental and observational study designs were considered, including randomised controlled trials (RCTs), controlled clinical trials (CCTs), cohort studies.

Search Strategy

The following search terms were used in this study: ‘imagery (psychotherapy)’; ‘guided imagery’; ‘conceptual imagery’; ‘visualisation m.p.’; ‘hypnosis’; ‘relaxation’; ‘relaxation techniques’; ‘meditation.’; ‘pain’; ‘musculoskeletal pain’; ‘fibromyalgia syndrome’; ‘chronic pain m.p.’
Systematic searches of the following electronic databases were conducted in April 2012:

- Cochrane database of Systematic Reviews
- DARE (Database of Abstracts of Reviews of Effectiveness)
- CINAHL (from 1982)
- EMBASE (from 1980)
- Medline/PUBMED (from 1950)
- PsychINFO (from 1872)

All keywords were inputted in single and plural formation, and in both UK English and US English spelling form.

Searching other resources

A hand search of the bibliographies of each of the identified systematic reviews articles was conducted to identify additional articles not found during the database searching. Due to time constraints, prominent authors in the field were not contacted to ascertain any studies in the ‘grey literature.’

Study selection

All titles and abstracts were initially screened and irrelevant studies or purely theoretical studies were excluded, and the full text of all the remaining studies were obtained and read. Those studies that utilized data previously reported were removed to prevent duplication. A flowchart of the selection process can be seen in Figure 1.
Figure 1. Flow chart of the study selection process

Titles and abstracts screened
n = 281

Excluded n = 248
(using exclusion criteria)

Full copies obtained and assessed for eligibility
n = 33

2 additional studies retrieved from hand-searching
n = 35

Excluded n = 23
Pain modification techniques (n = 4)
Neurological disorders (n = 2)
Postoperative pain (n = 2)
Mindfulness-based stress reduction/meditation (n = 9)
Hypnosis only (n = 3)
Relaxation only (n = 2)
Mixed methods design (n = 1)

Publications to be reviewed
n = 12
Quality assessment criteria

There is a range of assessment tools to evaluate the methodological quality of randomised controlled trials (RCTs) in health research (Armijo-Olivo et al., 2008). The EPHPP quality assessment tool was used in the current review (see Appendix 1). It has been developed to assess the methodological quality of primary outcomes studies in public health (Thomas et al., 2004). It has good content validity (Deeks et al., 2003, West et al., 2002). The tool consists of six criteria which address selection bias, allocation bias, confounders, blinding, data collection methods, and withdrawals and drop-outs. Each item is rated as “strong,” “moderate,” or “weak.” Overall study quality is deemed strong if all items have strong ratings and no weak ratings; moderate if less than 4 strong ratings and 1 weak rating are found; and weak if 2 or more weak ratings are found.

Armijo-Olivo et al. (2012) analysed the inter-rater reliability and the concurrent validity of the recently developed Cochrane ‘risk of bias’ tool (CCRBT, 2008) and the Effective Public Health Practice Project (EPHPP) tool used to assess the methodological quality of research studies. They found that the EPHPP had fair inter-rater agreement in individual domain scoring and excellent agreement in final grade assigned to RCTs of the intervention review. Thus, the EPHPP appraisal tool was chosen to classify the quality of the included studies.

Post hoc power calculations

In systematically reviewing literature, post hoc analyses have been used to good effect by pooling the estimates of multiple studies and thereby gauging the prevalence of Type II errors across a set of studies. Weighing up the decision whether to conduct such analyses rested on a sufficient data-set extracted from the original studies. Insufficient data from the primary studies prevented such an analysis in the current review. There has been debate regarding the utility of conducting post hoc analyses, much of which seems to depend on the quality of the original reporting of data. Ellis (2010), for example argues that as a result of small sample sizes and therefore increased likelihood of bias by sampling error, the accuracy of effect size estimates cannot be relied upon and thus there is minimal value in calculating observed power. Effect sizes can be poor estimates of population effect sizes if derived from small samples. Ellis (2010) suggests an interpretation of the practical significance of research can provide an alternative to exclusively relying on Cohen’s d effect sizes. Findings can be grounded in a meaningful context or assessed by their contribution to knowledge.
Results

Literature search

The search strategy identified 12 reviews from DARE of which two pertained specifically to guided imagery interventions coupled with one Cochrane review on behavioural interventions of which imagery based interventions (respondent therapy) were evaluated. In terms of identifying primary studies, the search strategy generated 159 references from Medline, 337 from Embase, 77 from CINAHL, and 92 from PsychINFO. However, 384 publications were duplicated in more than one database, resulting in a total of 281 unique titles from the search, of which the titles and abstracts were screened using the relevance tool (Appendix 2). Thirty-three articles met the inclusion criteria and full texts were retrieved for further evaluation. Hand-searching of review articles identified a further two relevant trials. Extracted data from thirty-five articles were screened against the relevance tool, resulting in twenty-three trials being excluded.

Following this selection procedure, 12 clinical trials involving 514 patients were eligible for inclusion (see Table 1). The data are reported in a narrative format that includes information on the study design, the intervention and the outcomes. The sample sizes were relatively small with one exception that recruited more than one hundred participants. The majority of the studies were conducted in the United States (n = 7) with two from Australia, two from Norway and one from Belgium. The patient populations were heterogenous ranging from adults of working age with Fibromyalgia Syndrome, older adults with osteoarthritis to chronic pain patients. The control groups received treatment as usual, sham guided imagery intervention, pain-related counselling, wait list, or no intervention.
Table 1. Summary of included studies

<table>
<thead>
<tr>
<th>Study</th>
<th>Aim</th>
<th>Design</th>
<th>Intervention</th>
<th>Outcome measures</th>
<th>Results (Mean &amp; SD scores) Conclusions</th>
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<tbody>
<tr>
<td>Baird &amp; Sands, 2004</td>
<td>To compare the effects of GI with PMR in reducing chronic pain and mobility difficulties in 28 female patients with osteoarthritis in comparison to TAU control condition.</td>
<td>RCT</td>
<td>10-to-15 minute audiorecorded GI with PMR script twice per day over 12 week period</td>
<td>Pain scale from the Arthritis Impact Measures (AIMS2); mobility items on the AIMS2</td>
<td>No mean and standard deviation scores included. In comparison to TAU control group, participants in the GI with PMR intervention reported a significant reduction in pain and mobility difficulties. P= .04</td>
</tr>
<tr>
<td>Baird et al. 2010</td>
<td>To compare the effects of GI with a sham intervention for reducing reported pain levels, improving mobility and using less medication in 30 female older adult participants with osteoarthritis.</td>
<td>RCT</td>
<td>12-minute audiorecorded-guided GIR twice a day for 4 months; Sham intervention entailed planned rest for 12 minutes twice per day for 4 months</td>
<td>NRS - measures pain intensity in older adults; mobility items on the Arthritis Impact Measurement Scales 2, Short Form (AIMS2-SF); disability scales of the Western McMasters Osteoarthritis Scale (WOMAC); Medication usage was logged by participants over 9 time periods</td>
<td>Compared with the sham intervention, participants who used GIR reported significant decreases in pain. GIR led to significant improvement in mobility. GIR group reported significant decreases in medication use in comparison to participants in the control condition. P = .0284</td>
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<td>Chen &amp; Francis, 2008</td>
<td>To compare the effects of a combined PMR and GI intervention for reducing pain, and improving quality of life and mental health in 19 participants (6 male, 13 female) with chronic pain 7 weeks in total. 1 week to establish baseline (pre); mid-way at week 4 review technique &amp; assess outcome (mid); at completion of practice period, assess overall outcome (post)</td>
<td>RCT</td>
<td>Initial 45-minute session facilitated by investigator to train participants in PMR and GI method. Individualised GI scripts (9-12 minutes) were provided on audiotape. Participants required to practice twice or at least once per day over 6 weeks. Group session offered at week 4 to review technique.</td>
<td>MPQ; the Depression Anxiety and Stress 21 Scale (DASS-21); RAND 36-item Health Survey; daily diary; Individual Global Achievement Scales (GAS)</td>
<td>MPQ: Mid Tx: 2.55 (3.75) 18 (5.41) Co.: 23.75 (5.78) 22.71 (3.46) Post Tx: 18.75 (6.52) Co.: 24 (5.76) DASS: Pre: Mid Tx: 33.82 (6.02) 22 (5.76) Co.: 22 (4.16) 19.43 (6.57) Post: 27 (10.39) Co.: 31.14 (11.76)</td>
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<td>Fors et al., 2002</td>
<td>To compare imagery interventions (pleasant &amp; attention imagery) to TAU for pain management in 55 female participants with FMS</td>
<td>RCT</td>
<td>30-minute audiorecording of ‘pleasant GI’ once per day over 4 weeks. Compared to audiotape of ‘attention imagery’ &amp; ‘blank’ recording with no instructions. Conducted twice in lab. Amitriptyline or placebo were also monitored for impact on pain.</td>
<td>VAS; State-Trait Anxiety Inventory-Trait; BDI; Automatic negative thoughts questionnaire (ATQ-30)</td>
<td>AI: Pre: 52.0 (19.9) Post (intervention): 37.1 (23.6) Post (practice - 4 wks): 55.6 (21.8) PI: Pre: 48.5 (24.0) Post: 28.1 (19.2) Post (practice - 4 wks): 31.7 (22.35) Co: Pre: 51.2 (23.3) Post: 51.3 (23.9) Post (practice - 4 wks): 45.7 (45.6)</td>
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<td>Study</td>
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<td>Gay et al., 2002</td>
<td>To investigate the differential effectiveness of Erikson hypnosis and Jacobson relaxation (PMR) in comparison to a wait-list control condition for the reduction of osteoarthritis pain in a sample of 36 participants. To assess whether hypnosis effectiveness is modified by individual differences in hypnotic susceptibility and mental imagery.</td>
<td>RCT</td>
<td>30-minute weekly individual session over 8 weeks</td>
<td>VAS; medication reported at each assessment; Stanford Hypnotoc Susceptibility Scale, form C (SHSS:C); Sheehan’s Questionnaire of Mental Imagery; State Trait Anxiety Inventory</td>
<td>HYP: Pre: 4.16 (1.92) Post: 1.85 (1.65) 3 mth: 1.66 (1.49) 6 mth: 2.38 (2.47) PMR: Pre: 3.68 (1.58) Post: 2.37 (1.62) 3 mth: 2.75 (1.91) 6 mth: 2.80 (1.63) Co: Pre: 4.40 (1.60) Post: 4.23 (1.14) 3 mth: 4.29 (1.31) 6 mth: 4.31 (2.38)</td>
</tr>
<tr>
<td>Lewandowski, 2004</td>
<td>To compare the effectiveness of GI to wait-list control group for reducing pain in 42 participants with chronic pain.</td>
<td>RCT</td>
<td>7-minute GI technique for a minimum x 3 per day, over 4 day period</td>
<td>MPQ; Power as Knowing Participation in Change Tool (PKPCT); Imaging Ability Questionnaire (IAQ); Marlowe-Crowne Social Desirability Scale (MCSDS)</td>
<td>VAS: Tx: Pre: 55.86 (21.39) Post: 39.52 (28.46) Co: Pre: 45.95 (26.54) Post: 57.14 (30.07)</td>
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<td>Menzies et al., 2006</td>
<td>To investigate the effects of GI intervention on pain level, functional status, and self-efficacy in 48 participants with FMS in comparison to TAU control condition</td>
<td>RCT</td>
<td>20-minute GI audiorecording over 6-week treatment period and a 4-week follow-up</td>
<td>VAS; SF-MPQ; Arthritis Self Efficacy Scale (ASES); Fibromyalgia Impact Questionnaire (FIQ)</td>
<td>VAS: &lt;br&gt; GI: Pre: 5.79 (0.45) Post: 4.89 (0.55) F.U. 5.06 (0.46) &lt;br&gt; Co: Pre: 6.36 (0.44) Post: 6.20 (0.52) F.U. 5.79 (0.44) &lt;br&gt; FIQ: G.I. Pre: 53.69 (2.28) Post: 40.49 (3.25) F.U. 39.73 (3.03) &lt;br&gt; Co: Pre: 52.99 (2.18) Post: 48.83 (3.16) F.U. 49.17 (2.90)</td>
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<tr>
<td>Raft et al., 1986</td>
<td>To examine the effects of pleasant imagery and type of pleasant imagery on the relief of acute and chronic pain (39 acute and 13 chronic)</td>
<td>Cohort (pre-post design)</td>
<td>Interview with experimenter to obtain personal history and to identify pleasant images participants would find effective in relieving pain in a relaxation procedure. Taught PMR procedure and asked to practise 15-minute PMR with two pleasant images 3 times per day over 3 successive days.</td>
<td>VAS</td>
<td>Acute: &lt;br&gt; Pre: 80.56 (4.09) Post: 43.69 (16.89) &lt;br&gt; Chronic: &lt;br&gt; Pre: 79.75 (8.87) Post: 52.69 (15.37)</td>
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<tr>
<td>Turner, 1982</td>
<td>To compare the effects of group progressive-relaxation training and cognitive-behavioural group therapy in comparison to wait-list/attention control group in 36 participants (3 male and 33 female) with chronic low back pain</td>
<td>CCT</td>
<td>Five weekly 90-minute sessions for each treatment group. 5-7 patients in each group, replicated twice for a total of 3 groups within each treatment condition.</td>
<td>Sickness Impact Profile; Sickness Impact Profile - Significant Other; demographic questionnaire; BDI; VAS</td>
<td>In comparison to WL, PRT &amp; CBT with relaxation resulted in significant improvements in managing pain &amp; psychosocial outcomes.</td>
</tr>
<tr>
<td>Study</td>
<td>Aim</td>
<td>Design</td>
<td>Intervention</td>
<td>Outcome measures</td>
<td>Results (Mean &amp; SD scores)</td>
</tr>
<tr>
<td>-----------------------</td>
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<td>------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------</td>
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</tr>
</tbody>
</table>
Quality assessment

Eleven of the selected studies were experimental design of which ten were RCTs. One observational cohort (pre-post design) was identified. Using the EPHPP quality assessment tool, 4 were categorised as weak quality, 5 studies displayed moderate quality, and 3 studies demonstrated strong quality. In efforts to minimise bias in ratings, two researchers independently reviewed the quality of the included studies. Both researchers then met to discuss the final ratings and differences of opinion were discussed until a consensus was reached. Table 2 summarises the quality criteria ratings for this study.

TABLE 2: Quality assessment criteria based on the EPHPP guidelines

<table>
<thead>
<tr>
<th>Study</th>
<th>Design</th>
<th>Randomisation</th>
<th>Rep. of target pop</th>
<th>Confound</th>
<th>Blinding</th>
<th>Outcome</th>
<th>Retention</th>
<th>I.T. T.</th>
<th>Follow up</th>
<th>Quality rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baird &amp; Sands, 2004 (n=28)</td>
<td>RCT</td>
<td>Yes but lacks description</td>
<td>Weak</td>
<td>Strong</td>
<td>Mod</td>
<td>Strong</td>
<td>Strong</td>
<td>No</td>
<td>No</td>
<td>Mod</td>
</tr>
<tr>
<td>Baird et al. 2010 (n=30)</td>
<td>RCT</td>
<td>Yes but lacks description</td>
<td>Weak</td>
<td>Strong</td>
<td>Mod</td>
<td>Strong</td>
<td>Weak</td>
<td>CT</td>
<td>No</td>
<td>Weak</td>
</tr>
<tr>
<td>Chen &amp; Francis, 2008 (n=19)</td>
<td>RCT</td>
<td>Yes</td>
<td>Weak</td>
<td>Strong</td>
<td>Mod</td>
<td>Strong</td>
<td>Strong</td>
<td>Yes</td>
<td>No</td>
<td>Mod</td>
</tr>
<tr>
<td>Fors &amp; Gotestam, 2000 (n=58)</td>
<td>RCT</td>
<td>Yes but lacks description</td>
<td>Moderate</td>
<td>Strong</td>
<td>Mod</td>
<td>Weak</td>
<td>Weak</td>
<td>CT</td>
<td>No</td>
<td>Weak</td>
</tr>
<tr>
<td>Fors et al., 2002 (n=55)</td>
<td>RCT</td>
<td>Yes</td>
<td>Moderate</td>
<td>Strong</td>
<td>Mod</td>
<td>Strong</td>
<td>Strong</td>
<td>Yes</td>
<td>No</td>
<td>Strong</td>
</tr>
<tr>
<td>Gay et al., 2002 (n=36)</td>
<td>RCT</td>
<td>Yes but lacks description</td>
<td>Moderate</td>
<td>Strong</td>
<td>Weak</td>
<td>Strong</td>
<td>Strong</td>
<td>No</td>
<td>3 mths 6 mths</td>
<td>Mod</td>
</tr>
<tr>
<td>Study</td>
<td>Design</td>
<td>Randomisation</td>
<td>Rep. of target pop</td>
<td>Confound</td>
<td>Blinding</td>
<td>Outcome</td>
<td>Retention</td>
<td>I.T.T. follow-up</td>
<td>Quality rating</td>
<td></td>
</tr>
<tr>
<td>----------------------------</td>
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<td>---------------</td>
<td></td>
</tr>
<tr>
<td>Lewandowski, 2004 (n=44)</td>
<td>RCT</td>
<td>Yes but lacks description</td>
<td>Moderate</td>
<td>Strong</td>
<td>Mod</td>
<td>Strong</td>
<td>Strong</td>
<td>No</td>
<td>Strong</td>
<td></td>
</tr>
<tr>
<td>Menzies et al., 2006 (n=48)</td>
<td>RCT</td>
<td>Yes</td>
<td>Moderate</td>
<td>Strong</td>
<td>Mod</td>
<td>Strong</td>
<td>Weak</td>
<td>Yes 4 weeks</td>
<td>Mod</td>
<td></td>
</tr>
<tr>
<td>Raft et al., 1986 (acute=39 chronic = 13)</td>
<td>cohort pre/post design</td>
<td>NA</td>
<td>Strong</td>
<td>Strong</td>
<td>Mod</td>
<td>Weak</td>
<td>Strong</td>
<td>CT</td>
<td>Mod</td>
<td></td>
</tr>
<tr>
<td>Spence et al., 1995 (n=48)</td>
<td>RCT</td>
<td>Yes but lacks description</td>
<td>Moderate</td>
<td>Strong</td>
<td>Mod</td>
<td>Strong</td>
<td>Strong</td>
<td>CT 6 mths</td>
<td>Strong</td>
<td></td>
</tr>
<tr>
<td>Turner, 1982 (n=36)</td>
<td>CCT</td>
<td>NA</td>
<td>Weak</td>
<td>Strong</td>
<td>Mod</td>
<td>Strong</td>
<td>Weak</td>
<td>Yes 1 1/2 years</td>
<td>Weak</td>
<td></td>
</tr>
<tr>
<td>Turner &amp; Jensen, 1993 (n=102)</td>
<td>RCT</td>
<td>Yes but lacks description</td>
<td>Weak</td>
<td>Strong</td>
<td>Mod</td>
<td>Strong</td>
<td>Weak</td>
<td>CT 6 mths 12 mths</td>
<td>Weak</td>
<td></td>
</tr>
</tbody>
</table>

I.T.T. indicates Intention to Treat Analysis; FMS, fibromyalgia syndrome; GI, guided imagery; MPQ, McGill Pain Questionnaire; OA, osteoarthritis; RCT, randomised controlled trial; CCT, controlled clinical trial; VAS, visual analog scale; CT, can’t tell.
The studies rated as strong quality were devoid of any specific methodological bias. However, the methodological quality items were under-reported, specifically with regard to intention-to-treat analysis. Fors et al. (2002) was a robust study by incorporating double-blind procedures and intention-to-treat analysis. It is recognised that in psychosocial interventions blinding of the treatment providers and participants with regard to treatment allocation is usually not feasible (Fonnebo et al., 2007). Nevertheless, blinding of the outcome evaluators can ensure an unbiased comparison of the outcome assessment. One study rated as moderate quality (Gay et al., 2002) implemented measures to minimise systematic biasing effects from the experimenter by rotating the delivery of the intervention between the principal investigator and three facilitators (advanced psychology students).

The studies rated as weak quality had selection biases and poor retention rates. All low-quality studies reported a significant reduction in pain. However, taking into consideration the selection biases, the samples were not highly representative of the target population and thus the pre-treatment outcome scores may be relatively lower than patients typically seen in pain clinics. These studies did not use intention-to-treat analysis, in spite of the high attrition rates. Two of the studies in this category sought to investigate the long-term effects of GI interventions by collecting follow-up data at 12 months, one and half to two years. The authors report that the CBT interventions were superior to the imagery interventions at one-month follow-up, however at the one 1/2 to two year follow-up, there were no significant differences between the two conditions. The potential long-term effects of imagery interventions were highlighted and practice time to become skilled in the self-management techniques a possible effect modifier. The studies rated as moderate quality were similar to the low-quality studies in displaying selection biases. Studies differed in their use of adequate outcome measures and blinding procedures.

The poor reporting of a number of the methodological quality items led to several rating challenges. The selection bias criterion has two questions: likelihood that the individuals selected are representative of the target population and, percentage of the selected individuals who agree to participate. Recruitment of samples was frequently conducted through one or more of the following strategies; newspaper advertising, internet/ website advertising, flyers distributed in various settings where likely representative individuals would see them. If only one strategy was reported, the response for this item was that individuals were not likely to be representative of the population. If
more than one strategy was employed, subjects were likely to be representative of the population. Given that these were community samples, there was no denominator of selected individuals, so this item was rated as ‘can’t tell.’ Studies received an overall selection bias rating of moderate if participants were somewhat likely to be representative of the target population, and a weak rating if they were not likely to be representative.

Allocation bias was difficult to assess in these studies. Ten studies reported that they were randomised controlled trials (RCTs), however only 40% described the method of randomisation. Few studies commented on blinding of participants or outcome assessors. Given the type of intervention, it is unlikely participants could be blinded to the intervention, however outcome assessors could have been. One study employed measures to ensure participants and outcome assessors were blinded (Fors et al., 2002). An under-reporting of attrition rates was evident with only 58.3% of studies having described numbers and reasons for withdrawals (Gay et al., 2002, Fors et al., 2002, Chen & Francis, 2008, Lewandowski, 2004, Baird & Sands, 2004 & Spence et al., 1995) One study (Gay et al., 2002) reported measures to minimise systematic biasing effects from the experimenter by including graduate psychologists in the delivery of the intervention.

There were strengths and limitations in the analysis used in the studies. All but two of the studies (Fors & Gotestam, 2000 & Raft et al., 1986) used appropriate statistical procedures for analysis. However, only a quarter of trials reported using intention-to-treat analysis, in spite of the high withdrawal rates. Very few studies (16.6%) reported calculating a sample size. It is possible that some interventions for which there was no statistically significant difference between experimental and comparison groups had inadequate power to detect a difference if it was present (Type II error).

The consistency of the intervention was measured in the studies with only one exception (Fors & Gotestam, 2000). Intervention integrity was evidenced in the following ways. Participants in both experimental and control groups were required to keep a journal of their pain symptoms as well as how frequently they practised the imagery intervention or describe their own pain management coping strategies. Treatment manuals specifying the content of the intervention including the imagery scripts were prepared in advance and based on guidelines of previous studies. Co-intervention or contamination was deemed unlikely in these studies.
During the searching process a number of systematic reviews and meta-analyses were identified. Of the 13 reviews located, three were relevant to this review. Table 3 displays the results of assessing the three systematic reviews for methodological rigour using the AMSTAR tool (Shea et al., 2007). The Cochrane review on behavioural treatment for chronic low-back pain was the exception in meeting all 11 quality criteria. All reviews listed the included studies but only one listed the excluded studies. Posadzki & Arst’s (2011) review did not assess publication bias nor stating any conflict of interest. Strengths of the reviews included the use of two researchers to independently assess the articles, comprehensive literature searching, and outlining the characteristics of individual studies.

Table 3: Quality assessment criteria based on the AMSTAR tool

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A priori’ design</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Duplicate study selection and Data extraction</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Comprehensive literature search</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Status of publication use as an inclusion criteria</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>List of included/ excluded studies</td>
<td>P</td>
<td>P</td>
<td>Y</td>
</tr>
<tr>
<td>Characteristics of individual studies (aggregate)</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Scientific quality of the included studies assessed and documented</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Scientific quality of the included studies used appropriately in formatting conclusions</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Appropriate methods to combine studies</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Publication bias assessed and charted</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Conflict of interest stated</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

Legend: Y = Yes; N = No; P = Partial; NA = Not Applicable
Discussion

The purpose of this review was to critically evaluate the effectiveness of imagery interventions for the management of chronic pain. Eleven of 12 trials that met the eligibility criteria suggested that GI interventions are effective for reducing pain and associated distress. However, the evidence of the effectiveness of these interventions to reduce pain and distress was not robust against risks of methodological bias and associated with low to moderate methodological study quality. Moreover, with one exception (Menzies et al., 2006) the large variability in participant scores pre and post intervention suggest that there confounding variables in the effectiveness of guided imagery and therefore prevents generalising to other settings. Small sample sizes and low attrition rates further impacts on applicability beyond these specific clinical trials. Findings from Chen and Francis’ (2008) comparative study for example were inconclusive due to significant drop-out rates over the 6-week period. In spite of measures implemented to enhance retention such as a reinoculation of training at week four, participant numbers were insufficient to draw conclusive results. Thus, whilst the reviewed studies identified potentially effective psychosocial interventions to augment existing treatment for pain management, the reported findings are insufficient to conclude the effectiveness of guided imagery as a stand-alone evidence-based therapy.

The relative strengths of the primary studies will be outlined followed by an overview of the identified limitations. The consistency with which the interventions were monitored and delivered was a particular strength of the studies in this review. All studies with only one exception (Fors & Gotestam) incorporated measures to ensure intervention integrity. Dane and Schneider (1998), assert that assessing the degree to which interventions are implemented as planned is crucial in preventive interventions. They note that psychosocial interventions are often implemented in conditions that present numerous obstacles to complete delivery. By measuring the intervention against the domains of adherence, exposure, quality of delivery, participant responsiveness and programme differentiation (Dane & Schneider, 1998) can inform the analysis whether findings of ineffectiveness within primary studies are due to failure of implementation or failure of the intervention concept.
Limitations of primary studies

Akin to previous reviews assessing the effectiveness of imagery interventions in chronic pain, the applicability of findings expounded in the GI research are limited due to heterogeneous populations, interventions and outcome measures across studies (Wallace, 1997; Eller, 1999).

Interventions

There was variability in the length, frequency and details of the interventions investigated amongst the studies. There were inconsistencies in content and methods of delivery. For example, delivery varied between audiorecorded, personal interaction, individual sessions, and group sessions. The guided images within the interventions ranged from pleasant environment and memories to symbols and physiological processes. The length of interventions ran across a spectrum of a few days to four months.

Low methodological quality, and lack of knowledge about optimal timing and dose of treatment and individual differences have been consistent critiques of the pain management intervention literature (Eller, 1999, Kwekkeboom et al., 2003). Indeed, in the current review only four of the studies provided such data and are derived from low to moderate quality evidence. Van Kuiken’s (2004) meta-analysis therefore sought to investigate the frequency or duration of GI required to effect change. The meta-analysis evaluated studies that were consistent in the delivery method and initial instruction was accompanied by audiorecording for practice at home. Due to small sample sizes and variability of outcome measures, the results of the meta-analysis are not generalisable.

The results, however bear important implications for clinical practice. Van Kuiken concluded that immediate results from GI are possible and home practice increases the effectiveness of the intervention. The findings indicated an increase in effect size over the first 5 to 7 weeks, however the effect was decreased at 18 weeks. Such a finding prompts the question of sustainability. It has been argued that some programmes need a longer period of time to effect change in the participants (Green, 1977). Although the exact minimal dosing time for significant outcomes is difficult to determine, the evidence to date supports possible moderate to strong results at 4 weeks. However, the length of time that effectiveness can be maintained is unknown. Detailed reporting of imagery, practice, and outcomes measures is therefore needed in future research.
There is need to explicitly report the type of imagery conducted. The implications of this gap in the literature can be seen in the findings described in Fors et al.’s (2002) study. In their study comparing the content of imagery, they found that the effect derives from the content and not the process of engaging in imagery interventions. They reported that pleasant imagery can be effective in reducing fibromyalgia pain, however imagery that focused on the pain was detrimental. This corroborates results from Alden et al.’s (2001) experimental study which found that GI containing images with positive affect and external focus had the most significant effect. The authors theorised that GI interventions operate through emotional and physiological reactions to the image. The degree of impact on pain tolerance experienced as a result of GI depended upon the affective quality and directional focus of the image induced. Fernandez and Turk’s (1989) meta-analysis reported a similar phenomena that pleasant imagery provided a consistent reduction in experimental pain whereas focused imagery increased the pain in some studies. Thus, future studies are needed that are unambiguous in the type of imagery and the types of pain treated.

In recognition of the potential differential effect of the type of imagery intervention employed, Gay et al. (2002) measured the participants’ imaging ability. They contended that mental imagery could operate through different processes to alleviate pain. One active component of the treatment procedures may be the elicitation of more functional and adaptive visceral responses during mental imagery. Their study differentiated between the pleasant and attention focused imagery and imagery that was spontaneously activated during the relaxation procedure had the most significant effect. This is consistent with previous findings (Benson, 1983; Kokoszka, 1992) demonstrating that during standard relaxation procedures, the mental state of the participant was altered and mental imagery was spontaneously activated. They reported a differential effectiveness of pleasant imagery compared to attention focused imagery at the six-month follow up. Interestingly, they described individual differences in imaging ability as being a possible effect modifier.

**Outcome measures**

There was variability of behavioural outcomes measured by the included trials. The effect of treatment on pain behaviour, mood, functioning or self-efficacy were identified. The premise of behavioural treatment for chronic pain to target maladaptive behaviour, cognition or physiological responses (Vlaeyen, 1995) would suggest that significant changes in outcomes which measure one or more of these responses rather than pain intensity would indicate clinical effectiveness. There is often a misconception that reduction in pain will inevitably lead to improvement in function. Pain
and functioning are only modestly related (Turk et al., 2003) even though pain is typically considered the primary outcome in evaluating pain treatments.

Four of the included studies limited their evaluations of effectiveness on subjective pain outcome measures (visual analogue scale). The studies with ratings of strong quality incorporated measures of functioning and affect with observed improvements in both domains. The variability among clinical trials in outcome assessments has been a consistent finding from recent meta-analyses and systematic reviews. It has hindered meaningful comparisons and thereby limited evaluations of the efficacy and effectiveness of treatments for chronic pain. The Initiative on Methods, Measurement, and Pain Assessment in Clinical Trials (IMMPACT) (Turk et al., 2003) thus recommends measurement of particular domains, for example, physical and emotional functioning as well as specific measures appropriate to the intervention under investigation.

More recently, Foster (2010) has compared 20 psychological constructs in predicting chronic low-back pain outcome in primary care and found that four factors (personal control, acute/chronic timeline, illness identity, and pain self-efficacy) were strongly predictive of outcome after 6 months of follow up. These factors proved more sensitive predictors of disability than more common targets for behavioural treatment such as fear avoidance, catastrophising, and depression. By conceptualising the evaluation of intervention studies in this way can be helpful for assessing the applicability of findings to clinical settings. For example, Menzies et al. (2006) did not find an effect on pain in their randomised controlled trial, however did report significant improvements in functional status at 6 weeks and maintained at 10 weeks. Self-efficacy for managing pain and other symptoms also improved significantly in the GI group compared to the treatment as usual control condition. Similarly, Lewandowski et al. (2005) found that GI can impact positively on patients’ self-efficacy beliefs and in turn enhance pain management. They reported that GI helped change the language a person uses to describe their pain and the pain experience. For example, the pain descriptor of pain as ‘never-ending’ did not re-emerge in the treatment group. They posit that cognitive factors such as self-efficacy beliefs can play a role in effective pain management and is therefore a clinically relevant psychological construct to measure in outcome studies.

There has been recent debate on who defines what should be measured (Morley, 2011). Interestingly, research undertaken by IMMPACT report that improvements in sleep, cognitive
function, and social role engagement are considered important indicators of change by patients. While the latter is often measured, the former two are rarely incorporated in outcome measurement. A recent Cochrane review (Henschke et al., 2010) evaluated the effectiveness of behavioural interventions for the management of chronic pain. The Cochrane review identified moderate quality evidence that behavioural treatment is more effective than usual care for pain relief in the short-term, with no difference in the intermediate-term. Poor reporting of methodological quality items, small sample sizes and measurement of outcomes limited to short term were identified. Imagery interventions were not specifically included in their analysis of respondent therapy (incorporated EMG biodfeedback, progressive relaxation, and applied relaxation) and therefore not directly transferable to the current review. The review did include Turner’s (1982), Turner and Jensen’s (1983) studies in the analysis and similarly observed limitations in design, inconsistency and imprecision.

Implications of the systematic review

The results of this systematic review should be considered in the light of the following limitations. Whilst every effort was made to conduct a comprehensive and systematic search of the literature, it became apparent that specific terms overlapped, thereby suggesting that additional terms such as ‘image’ could have been included. As the use of ‘imagery’ and associated terms also sourced articles on such therapies in medical settings such as ‘graded motor imagery,’ incorporating Winterowd et al.’s (2003) taxonomy of ‘images of pain’ could enhance future reviews of the literature.

A further limitation may be attributed to adhering rigidly to the quality criteria tool. Whilst the EPHPP tool assesses criteria pertinent to quantitative studies in healthcare, the current review may have benefitted from tailoring questions specific to studies in group-based cognitive-behavioural interventions. For example, intervention integrity was included in the quality assessment as a descriptor rather than being incorporated into the overall rating of the studies. Given that the quality of the intervention is paramount in psychosocial research, assessing the extent to which an intervention has been consistently prepared and delivered can determine its clinical utility. By excluding a numerical rating for intervention fidelity in the current review may have compromised its rigour with regards to assessing quality of current practice. Tailored questions on intervention integrity would have identified more fully on how the intervention was conducted and subsequently assess its relevance to clinical practice. In spite of only one study with a sample of more than 100
participants, three studies were rated as ‘strong’ using the EPHPP assessment tool. Within these constraints, the current review nevertheless identified specific areas of strengths in the literature as well as areas for further research.

**Implications for clinical practice**

Within this context of inherent methodological flaws of psychosocial intervention studies, an assessment of the theoretical framework underpinning the trials can provide a means of informing clinical practice. Nutbeam & Harris (2004), for instance purport that the use of theory within systematic reviews may help to explicate the effective mechanisms in the different interventions. This can be achieved by identifying the key elements and highlighting the impact of discrepancies between theoretical premise and actual delivery of the intervention.

In a similar vein, Pincus et al. (2003) contend that the inconsistencies inherent in these studies may reveal significant aspects of pain phenomena and the potential clinical utility of imagery. A consistent feature of studies has been the large between subject variability in response to treatment. Holyroyd & Penzien’s (1986) meta analysis, for example reported variability of 13 – 94% improvement across studies and posited that the large variability was due to the idiosyncratic responses to imagery interventions. Findings from the laboratory-based pain experiments indicate that participants in the no-treatment control group generated their own imagery strategies (Tan, 1982). These findings are corroborated by Hackett and Horan (1980) in their assessment of subject-bias within their study and found that 25 out of 27 participants across 3 different coping groups (relaxation training, imagery, and coping self-talk) spontaneously used coping skills from all three categories at some point during the pain exposure, in spite of instruction and training to the contrary. They also reported that participants were naturally inclined to use imagery techniques aimed at regulating affect. Stevens (1985) and Stevens et al. (1987) employed formal manipulation checks in their studies as a means of assessing the rate of compliance in pain experiments. They found that 68% of participants trained in, and instructed to use specific imagery techniques generated their own strategies and 63% used multiple coping strategies across treatment groups, and only 72.5% of participants used their assigned strategy.

Pincus et al. (2003) assert that due to the idiosyncratic responses to treatment, the experimental study designs are ill-equipped to account for the large variability identified in the outcome literature. The authors hypothesise that the subject bias can be accounted for by the tendency for
people to have idiosyncratic and automatic styles of coping with painful stimuli. These styles are likely a reflection of the idiosyncracies in their underlying symbolic representations of pain in addition to the ways in which they relate to these representations. Pincus et al. (2003) argue that since these trials are limited by shallow and brief imagery techniques, the positive effects reported in the outcome literature may be an under estimation. Thus, there is a need to investigate patients’ own idiosyncratic images on pain management. They postulate that by moving beyond simple experiments to examine deeper and more comprehensive imagery work could provide more consistent treatment effects.

**Implications for research**

Jackson and Waters (2005) argue that the challenges associated with conducting systematic reviews of health interventions reflect the complexity inherent in the interventions. The focus on populations rather than individuals, multi-component interventions, an emphasis on processes of implementation, and the complexity and long-term nature of the interventions and outcomes all pose a challenge. Thus it has been argued that there are important aspects of evidence related to psychosocial and health interventions that are not covered by the established criteria for evaluating medically oriented evidence. There is a gap between published studies showing little or no efficacy of complementary and alternative medical treatments and reports of substantial clinical benefit from patients and clinicians (Fonnebo et al, 2007).

This ‘gap’ has been hypothesised as arising from the current emphasis on placebo-controlled randomised trials that are not readily amenable to evaluating the effectiveness of psychological treatments. Randomised controlled pragmatic trials have been proposed as a means of bridging this gap (Fonnebo et al, 2007). The pragmatic trial design has been used in the study of acupuncture of chronic pain as well as in dietary interventions within conventional medical research. In these trials, patients are randomly assigned to treatment alternatives, which may include alternative viable whole systems, conventional treatment or no treatment.
Conclusion

Guided imagery is a widely used intervention in current clinical practice that is incorporated into pain management programmes and received well by participants. In conclusion, these studies indicate a promising effect on pain relief and psychosocial functioning in the favour of the imagery interventions. The methodological quality of many of the studies reported has been poor, with lack of randomisation, inadequate control groups, and potential investigator bias effects being common, thereby limiting its generalisability. The use of imagery techniques has been frequently confounded with the use of muscular relaxation techniques, and the relative contributions of these two interventions are difficult to determine. Miller’s (1993) argument that treatment approaches should be viewed as complementary rather than competing could go some way to redressing the difficulties in extracting the active ingredients between these behavioural interventions. Given the evidence that suggests significant therapeutic effects may result from combination of treatments, clinical trials could seek to address which treatments are most effective for which patients and with which conditions.
Reference List:


CHAPTER 2
Introductory bridging chapter
2.1. Psychological factors in chronic pain

2.1.1. Definition of chronic pain

Pain is a universal human experience. Pain is phenomenological at its core as it remains within the subjective realm. It is a multi-faceted part of the human experience and as such the International Association for the Study of Pain defines pain as:

“An unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage...Pain is always subjective... Many people report pain in the absence of tissue damage or any likely pathophysiological cause; usually this happens for psychological reasons. There is usually no way to distinguish their experience from that due to tissue damage if we take the subjective report. If they regard their experience as pain, and if they report it in the same ways as pain caused by tissue damage, it should be accepted as pain. This definition avoids tying pain to the stimulus. Activity induced in the nociceptor and nociceptive pathways by a noxious stimulus is not pain, which is always a psychological state, even though we may well appreciate that pain most often has a proximate physical cause.”

(IAFP, 1994)

This definition acknowledges that pain is complex, subjective and personal with a significant impact on an individual’s psychological functioning. Pincus and Sheikh’s (2006, p.6) description of pain as being “…a familiar, emotionally-charged, meaning-laden, unwelcome yet inevitable visitor” elaborates on this theme of pain being a repetitive and inescapable part of life. Their metaphor suggests that the distinction between acute and chronic pain can be relatively arbitrary. It is theoretically classified as chronic beyond three months (Merskey & Bogduk, 1994), or beyond time expected for normal healing to occur (Bonica, 1990). However, when it comes to experiencing pain, the lines become blurred.

In the context of chronic pain, patients present to services with ongoing pain largely as a result of a chronic condition like musculoskeletal disorders or neuropathic pain. Pain can be classified along various dimensions; commonly temporal (acute, chronic), mechanism of transmission (nociceptive, neuropathic, central), disease state causing the pain (for example arthritis) and anatomical site (for example low back pain, headache) (Turk & Okifuji, 2001). However, such a medical focus on the condition has not been the most effective for patients struggling with pain management. Given that pain is intertwined with perception and immediate social situation, pain is not amenable to objective assessment. Indeed there are no objective tests for or physiological markers of pain, insight into an individual’s pain can only be gleaned from a subjective account (Field & Swarm, 2008).
2.1.2. Psychosocial management of chronic pain

Since Melzack & Wall’s (1965) *Gate Control Theory*, chronic pain has been conceptualised within within a biopsychosocial model that entails an interaction between physical, psychological and social factors in the pain experience as well as pain-related outcomes (Turk, 1996).

One of the core underlying assumptions of the cognitive-behavioural approach to chronic pain is that an individual’s emotional and behavioural response is determined by the cognitive appraisal and interpretation of their pain (Turk & Rudy, 1992). Patients with chronic pain are

“...viewed as active processors of information. They have negative expectations about their own ability and responsibility to exert any control over their pain. Moreover they often view themselves as helpless. Such negative, maladaptive appraisals about their situation and their personal efficacy may reinforce the experience of demoralisation, inactivity, and over reaction to noiceptive stimulation. Such cognitive appraisals and expectations are postulated as having an effect on behaviour, leading to reduced effort and activity and increased psychological distress.”

(Turk & Rudy, 1992, p. 103)

This definition implies that knowledge about patients’ idiosyncratic appraisals of their condition, their unique experience of pain, and their coping resources become critical for optimal assessment and subsequent treatment planning. Therefore, the role of cognitive factors has been extensively studied in the pain literature. Catastrophic thinking and fear of movement are two psychological variables that have been shown to be significant determinants of pain and disability associated with persistent pain conditions. The term catastrophising refers to a specific response to pain symptoms that includes elements of rumination, magnification and helplessness. There is a relative robust evidence base indicating links between pain catastrophising and pain and disability in patients with a variety of acute and chronic pain conditions (Quartana, Campbell, & Edwards, 2009). In samples of patients with chronic pain, catastrophising has been associated with heightened disability, predicting the risk of chronicity and the severity of disability better than illness-related variables or pain itself (Sullivan *et al.*, 2005).

Fear of pain has been defined as “highly specific negative emotional reaction to pain eliciting stimuli involving a high degree of mobilisation for escape/ avoidance behaviour” (McNeil *et al.*, 2001). Fear of movement is a type of pain-related fear characterised by avoidance of activity associated with pain, or premature termination (i.e. escape) of activity causing pain.
The negative impact of pain catastrophising and fear of movement has been interpreted primarily within the context of Vlaeyen et al.’s Fear-Avoidance Model of Pain. According to the fear avoidance model, individuals differ in the degree to which they interpret pain symptoms in a ‘catastrophic’ way. The model predicts that catastrophic thinking in response to the onset of pain will continue to heightened fear of movement. Consequently, fear is expected to lead to avoidance of activity that might be associated with pain (Vlaeyen & Linton, 2000). In turn prolonged inactivity is expected to contribute to depression and disability. As illustrated in figure 1, this becomes a cyclical process whereby increased pain symptoms, distress and disability become the input for further catastrophic thinking.

2.2. Imagery in context

From the outset of cognitive therapy, the psychiatrist Aaron T. Beck sought to harness the best of clinical art and science in the service of helping individuals to overcome the burden of maladaptive negative beliefs, biases in thinking and their emotional and behavioural consequences. (Beck, p. viii, Stott et al., 2010). His approach to develop a cognitive theory of psychopathology initially
relied on his patients’ ability to share their inner cognitions, a process that was aided by imagery (Beck, 1970). Despite the important role imagery played in elucidating the tenets of cognitive theory, it is only within the past decade that imagery-based research and practice have been critically examined.

It has recently been established that images are an analogous equivalent to verbal cognition. Kosslyn’s (2001) definition of mental imagery emphasises the link with perception:

“Mental imagery occurs when perceptual information is accessed from memory, giving rise to the experience of ‘seeing with the mind’s eye’, ‘hearing with the mind’s ear’ and so on... Mental images need not result simply from the recall of previously perceived objects or events; they can also be created by combining and modifying stored perceptual information in novel ways.”

(Kosslyn et al., 2001, p. 635)

A mental image may include any modality of sensory perception and therefore may comprise visual, olfactory, auditory, gustatory, proprioceptive or tactile (Power & Dalgleish, 2008). However, visually-based mental images have been the most extensively investigated (Kosslyn et al., 2001). Over the past decade, new experimental techniques and brain imaging studies have increased the credibility of mental imagery research. The findings from this research base has contributed significantly to furthering our understanding of psychopathology and in turn led to efficacious treatment. Whilst this section does not permit a comprehensive review, the salient points arising from this body of work will be summarised.

Holmes and Matthews (2010) recently reviewed the evidence that imagery invokes emotion more readily than verbal, language based processing and refer to a number of underpinning mechanisms. As outlined in Kosslyn’s (2001) ‘functional equivalence’ theory, imagery recruits similar brain regions as those involved in real perception which can lead to physiological responses associated with real emotion-arousing events. Further, Conway and Pleydell-Pearce’s (2000) autobiographical memory theory suggests that imagery may be the preferred form in which highly affective experiences related to the self are recalled (Conway, 2001). Therefore, engagement in imagery can produce emotive responses due to directly accessing emotional episodes stored in autobiographical memory.
Emily Holmes at the University of Oxford has spearheaded this programme of research and has reported some interesting and clinically useful results. Her team has demonstrated through experimental as well as clinical research that the impact of mental imagery on emotion being an important process in a range of mood and anxiety disorders. Studies which have indicated that individuals with anxiety disorders present with recurrent spontaneous imagery include; health anxiety (Wells & Hackmann, 1993), social phobia (Hackmann, Clark & McManus, 2000), obsessive-compulsive disorder (de Silva, 1986; Rachman, 2007; Speckens et al., 2007), agoraphobia (Day et al., 2004), and snake phobia (Hunt et al., 2006). Individuals presenting with depression (Brewin et al., 1996; Patel et al. 2007), body dysmorphic disorder (Osman et al., 2004), bulimia nervosa (Somerville et al., 2007), and bipolar disorder (Holmes et al., 2008) report intrusive mental images that amplifies emotion in these psychological disorders.

The elegant cognitive model for PTSD (Ehlers and Clark, 2000) include the centrality of vivid and intrusive negative images as being at the core of the disorder. Findings from the mental imagery research however, extends the importance of targeting problematic imagery in the other emotional disorders. For example, Hackmann et al. (2000) investigated the images of individuals with social phobia during anxiety-provoking situations. All reported recurrent, vivid, negative imagery of themselves, replicating earlier research (Hackmann et al., 1998). The images were linked in thematic and sensory detail to distressing memories that are clustered around the onset or escalation of the disorder. By means of incorporating these findings within conceptual frameworks has facilitated the transfer of research to practice. Clark and Well’s (1995) model of social phobia proposes that sufferers switch to processing observer-view distorted images of the self at the point of interpreting a specific situation as threatening. Furthermore, these distorted images of the self play a role in maintaining the disorder as avoidance behaviours prevent updating of the negative content of the image/ memory and its meaning (Hackmann et al., 2000).

Such innovative clinical models have led to novel imagery-based psychotherapeutic interventions that seek to work directly with these memories to help alleviate symptoms of social phobia. In particular, Wild et al. (2007), report findings on the use of imagery modification techniques in an uncontrolled trial with 14 patients with social phobia. Cognitive restructuring techniques were used to update the meaning of the distressed memory to invoke new perspectives and then these were linked with the memory employing imagery techniques. The intervention led to significant within session change in beliefs, imagery vividness and imagery distress. Immediate results at one-week
follow-up identified significant positive changes in a self-report measure of social anxiety. Although exploratory in nature, Wild et al.’s findings suggest that imagery can effect change in distress for individuals with social phobia. This attests to the value of incorporating research into clinical practice for increasing effectiveness of treatment.

The emerging evidence base regarding the links between imagery and emotion is paralleled by a long tradition of psychology models which differentiate between nonverbal/imaginal and verbal modes of information processing. As an evaluation of all of these are beyond the scope of this review, the models that are particularly relevant to CBT include Teasdale and Barnard’s (1995) Interacting Cognitive Subsystems model (ICS) and Power and Dalgleish’s (1997) Schematic, Propositional, Analogical, and Associative Representation Systems model (SPAARS) will be discussed. Within the clinical setting, it has been recognised that the verbal cognitions that are targeted by cognitive interventions may not access underpinning emotion. Bennett-Levy (2003), for example observes that verbal techniques such as cognitive restructuring can effect change at the rational, intellectual level, but less at the deeper, more intuitive level. The ICS and SPAARS models can account for this observed phenomenon. For a critical review of multi-level theories, refer to Teasdale (1999). The key concept underpinning these theories is that cognition exist on two levels: a propositional level consisting of those cognitions traditionally represented verbally and a schematic or implicational level in which cognitions are represented nonverbally. These multi-level theories propose that cognition invokes an emotional response depending on which level information is processed. The models can thus account for how information relating to emotional events can be processed in both a factual and emotive way.

SPAARS (Power & Dalgleish, 1997; 2008) model comprises of four levels of representation of information (see figure 2).
The analogical representational system stores information and memories in analogical form. This information includes visual, olfactory, auditory, gustatory, body state, and proprioceptive episodic or semantic 'images.' These can be either memories of specific events or actual representations of real world sensory input. Propositional representations are encodings of verbal information that include beliefs, ideas, objects and concepts and how they are interlinked in a form that is not specific to any language. Propositions refer to thoughts and beliefs that can be expressed verbally with explicit meaning. The schematic model level, however represents higher-order ideational content which cannot readily be expressed in natural language such as models of the self. Events and interpretations of events are processed at the schematic model level of meaning in the context of the individual’s valued goals. In this model, appraisal is shorthand for this process of filtering incoming information through the individualised lens of values, opinions, and beliefs. The current application of schemas is an enduring concept and echoes how Beck (1964) explicated its usage in his cognitive-affective model of depression. He referred to schemas as being a conceptual framework through which thought processes are governed and contains one’s ideas and judgements about the world and self (Beck, 1964, pp.562-663). The implication arising from these multi-level theories is that language-based cognitive therapy techniques at the propositional level have limited effect on emotion. Imagery techniques however, hold potential clinical utility for effecting emotional change at the schematic level.
Alongside the development of imagery interventions has been incorporating metaphors into clinical practice. Whilst the use of metaphors was employed in Beck’s (1971) cognitive therapy to facilitate acceptance of the patient’s experience, there is a lack of experimental evidence underpinning its utility. Nevertheless, as outlined in Stott et al.’s (2010) resource, metaphor can be used effectively in clinical practice. The authors state that metaphor can provide a conceptual bridge between the abstract experience of a patient’s distress to that of a concrete formulation of therapeutic work. As metaphor and meaning are inextricably linked it can serve as a means of understanding and communicating our experiences in a vivid and concrete way.

2.3. Mental imagery in chronic pain

Thus far, it is evident that having pain-related verbal cognitions can impact adversely on chronic pain outcomes. Given this recent awareness of the significant impact mental imagery can have on emotion and the potential clinical utility in manipulating these images to reduce distress would beg the question whether similar outcomes can be found in patients with chronic pain. The mental imagery research within the emotional disorders literature would suggest promising results. Negative images related to pain compared to negative verbal cognitions would be predicted to have a stronger impact on the pain experience, the emotions associated with it and the behavioural outcomes. Therefore, negative imagery, if it occurred, would be predicted to participate in a negative vicious cycle amplifying pain and negative outcomes.

Until recently, spontaneously-occurring mental imagery associated with pain problems was largely unexplored. The emphasis of imagery in pain has been through behavioural intervention techniques such as guided imagery. The systematic review preceding this empirical study provides an overview and evaluation of its effectiveness in pain management. A few isolated descriptions of imagery modification techniques have been published, primarily in the hypnosis literature (Appel & Bleiberg, 2006) and experimental acute pain literature (Alden, Dale, & DeGood, 2001), however these techniques have not yet received empirical evaluation as to their effectiveness. Cognitive interventions, however have been re-visited and these new insights from the emotional disorder literature can be applied in pain research for advancing assessment and treatment procedures. There is a growing body of evidence that indicates the potential role mental images play in the aetiology and maintenance of distress associated with chronic pain.
Within the last few years, clinical researchers have begun to redress this gap in the literature. A research programme at the University of Edinburgh under the direction of David Gillanders is currently investigating the phenomenon of mental imagery in chronic pain. Potter (2007) investigated images of the pain experience itself in participants who attended a pain clinic. The data were collected by a postal questionnaire that was returned by 24% of the 350 sample. Respondents who reported experiencing a mental image of their pain had significantly higher scores on measures of anxiety, depression, and catastrophising than those who reported not experiencing such images, after controlling for physical disability and pain intensity. Gosden’s (2008) project similarly employed a cross sectional design and identified a higher prevalence rate of 40% reporting frequent, stable, enduring pain-related images that interfered with daily living. Lonsdale’s (2010) study assessed the ratings of pain intensity and emotion state at baseline, after verbal processing of pain and then image processing of pain. Thirty-six participants completed an experiment interview which employed a repeated measures design. The findings indicated that those evoking pain-related mental images resulted in a temporary increase in pain intensity, sadness, anger and disgust and a decrease in happiness. However, these emotional responses were no different from those experienced when participants described their pain in single words. Whilst the imagery group reported temporary increases in pain intensity, participants in the verbal condition did not and therefore suggested a qualitatively different way of attending to pain.

Philips’ (2011) study scoped the prevalence of mental imagery amongst a chronic pain population. The pilot phase entailed interviewing 107 participants followed by an in-depth interview with 59 individuals. Findings suggested that pain-related imagery is prevalent but often ‘unobserved’ cogniton in pain sufferers, with 78% reporting one or more repetitive images when in pain. Furthermore, attending to their most potent image resulted in significant increases in negative cognitive appraisals, increased emotionality and pain levels. In a sub-group of participants with PTSD diagnoses, the index images elicited significantly higher levels of emotion and pain increment in comparison to those in the low/ no trauma group.

Berna et al. (2011) conducted an exploratory study with a sample of 10 patients with chronic pelvic pain. Negative pain-related images were reported by all participants, with the most significant image being intrusive and negative in valence. The emotional-behavioural response pattern of affective distress and avoidance behaviours were described within a classic cognitive-behavioural vicious cycle formulation, whereby the avoidance of negative imagery could amplify pain suffering.
The authors concluded that their findings provided encouraging support for the importance of this rarely considered type of thought process in pain suffering.

2.4. Aims of current study

Akin to recent studies on imagery and pain, pain-related mental images in this study are conceptualised as a form of cognition and will thus explore their impact on emotional and behavioural functioning. It is hypothesised that by undertaking an in-depth exploration of the phenomenology of patients’ imagery can lead to an increased understanding of the potential role specific problematic images play in the aetiology and maintenance of distress.

In their treatment manual on cognitive therapy for chronic pain, Winterowd et al., (2003) described four different images commonly reported by patients: images of pain itself (e.g. image of an electric short circuit), images of oneself in pain (e.g. image of oneself as a frail elderly person), images related to others’ interaction with the patient (e.g. image of oneself alone and isolated), and images of a future with pain (e.g. image of oneself in a wheel-chair). This study seeks to explore the phenomenology of the spontaneously evoked pain-related images with a specific focus on participants’ cognitive appraisals as means of ascertaining the impact of emotional and behavioural responses on patient functioning.
CHAPTER 3
METHODOLOGY
The first part of the chapter outlines the main features of grounded theory and provides a rationale for the selection of this research approach. The second part of the chapter describes the research design of the study including the ethical considerations related to researching a sensitive topic, sampling issues, data collection procedures, data analysis strategies and the quality processes of the research. The third person is used when describing some aspects of the method in particular relating to reflective processes.

### 3.1 Qualitative research: a brief overview

Historically, research into psychological issues was firmly embedded within the quantitative, positivist tradition. Relying on one single research paradigm for the generation of new knowledge seems the antithesis to scientific enquiry. However, it was recognised that scientific method entails more than theory testing, and that, therefore, there were gaps in psychology’s scientific credentials (Henwood & Pidgeon, 1992). Due to a dearth of robust qualitative methodologies, psychological researchers were not equipped to enquire into social processes that naturalistic, real-world and qualitative methods could provide (Lincoln & Guba, 1985; Robson, 1993; Henwood & Nicolson, 1995). An identified need, thus emerged for a paradigm that enabled research with the potential to generate theory. Accordingly, grounded theory was received well as it offered a methodology for theory generation that adopted both interpretivist and scientific traditions (Henwood, 2006). The introduction of grounded theory to British psychological settings in the early 1990s represented the move towards viewing qualitative methodologies as being on a par with its quantitative counterpart. Grounded theory provided resources to conduct qualitative studies that would augment the predominant positivist mode of empirical enquiry. As Mays and Pope (2000) assert:

> “the goal of qualitative research is the development of concepts which help us to understand social phenomena in natural settings giving due emphasis to the meanings, experiences and views of all the participants.” (p.252).

Over the past two decades, a wide range of qualitative methodologies have since been developed to enquire into issues that are pertinent to the social sciences.

One of the key differences between the qualitative and quantitative research paradigms is the extent to which the researcher’s interpretations inform the final analysis. Within the qualitative tradition, the researcher is an integral part of the process rather than an objective observer. Indeed it is a contentious issue and one which has constituted a criticism of the approach. Attacks have been...
leveled at qualitative research methodologies for lack of scientific rigour. The main premise underlying the criticisms entails inadequate validity and reliability strategies. However, interpretative research is generally idiographic as it seeks to describe aspects of the social world by offering a detailed account of specific social settings, processes or relationships. Denzin (1998) clearly describes what is entailed in such an interpretative endeavour as qualitative research.

“Interpretation is a productive process that sets forth the multiple meanings of an event, object, experience, or test ... meaning is not in a text, nor does interpretation precede experience, or its representation. Meaning, interpretation, and representation are deeply intertwined in one another” (p. 322).

Akin to quantitative research, the basic strategy to ensure rigour in qualitative research is systematic and self-conscious research design, data collection, interpretation and communication. Marshall & Rossman (2006) use the term ‘epistemological integrity’ when referring to the connections between the nature of the research, overall strategy, research questions, design and methods. Given the significant amount of inductive thinking required in qualitative methodologies, there is an increased need to incorporate measures that will make these processes explicit and therefore ensure its transparent accountability of the end product. Echoing Marshall & Rossman’s exhortation to apply safeguards, Henwood (2006) asserts that the methodological integrity of a study can be increased by adhering to a specific tradition of enquiry and its associated procedural logic. By employing strategies for developing and maintaining clear thinking about theoretical influences can ensure a consistency of approach at key stages of the research process.

Alongside the development of qualitative methodologies came a better understanding of the underpinning epistemological assumptions. This led to researchers postulating schemas as a means of informing decisions about how best to apply these methodologies to specific clinical questions. Chamberlain et al. (2004) refer to Marks and Yardley’s schema which describes grounded theory methodology as best suited to the ‘interpretive analysis of subjective meanings’ and, specifically, to the ‘content and structure of meanings that result from that process.’ Moreover, these authors assert that grounded theory provides specific methodological resources for the analysis of processes in health care settings. Their contention is based on the premise that analytic procedures inherent in the methodology offers ‘deep engagement with the meanings of the data’ while minimising the risk of researchers ‘offering a purely descriptive account.’ Consequently, authors such as Locke (2001) contends that grounded theory methodology is particularly well-suited for theorising ‘new’
substantive areas, and for practice-oriented studies, as well as for exploring situated processes and issues associated with individual or group behaviour.

The proliferation of qualitative studies employing grounded theory methodology in recent decades attest to the value and utility of its findings for the human sciences. Grounded theory has been employed for qualitative studies investigating the impact of living with a chronic illness (Charmaz, K., 1995; Werner & Steihaug, 2003; Ohmen). Indeed Howitt (2010) acknowledged that grounded theory has been applied to studies investigating medical illness and interpersonal relationships. Grounded theory therefore, provides social, health and clinical researchers with a systematic and yet creative methodology for broaching clinically relevant questions.

3.2. Grounded theory

Grounded Theory is a widely used qualitative method of research. It was initially conceived by the American sociologists Barney Glaser (1930- ) and Anselm Strauss (1916-1996) and documented in The Discovery of Grounded Theory: Strategies for Qualitative Research (1967). In this work, the authors made explicit the research approach they had developed in Awareness of Dying (Glaser & Strauss, 1965), a study of hospital staff’s care and management of dying patients. It was the first major attempt to codify and systematise implicit methodological strategies for analysing qualitative data and moving the analysis into explicit theoretical statements (Wertz et al., 2011, p. 57). In their seminal text, the grounded theory methodology was expounded as an inductive, theory-discovery methodology that equips the researcher with the resources to develop a theoretical account of the topic under investigation grounded within the empirical observations or data. The Discovery therefore provided a rationale for adopting qualitative research as a credible methodological approach in its own right rather than as a precursor for developing quantitative instruments. According to Denzin & Lincoln (1998) their work ignited the ‘qualitative revolution’ with explicit strategies and a call for developing theories from qualitative data.

According to Bryant & Charmaz (2007), grounded theory is the most widely cited qualitative research method in the social sciences. In spite of its wide spread application, there is a degree of ambiguity and debate regarding the procedures and methodological orientation of the approach (Greckhamer & Koro-Ljungberg, 2005) Given this variability in how the method is described, practised and taught, Bryant & Charmaz suggest that it should be considered a ‘family of methods claiming the Grounded Theory Method mantle’ which bear ‘family resemblances’ or similarities,
rather than as a distinct group of methods which share clear and precise common attributes (2007, p. 11). Glaser and Strauss’ original exposition of their methodology challenged the dominant view that a ‘grand theory’ which entailed uncovering pre-existing and universal explanations of social behaviour would only suffice in empirical research. In contrast, grounded theory within an interpretive framework sought to generate ‘middle range’ theories that consisted of “abstract renderings of specific social phenomena that were grounded in data” (Charmaz, 2006, p. 7). Theories are subsequently generated as a product of the research method. The emerging theory is, in effect, a framework that provides an explanation of the phenomena under investigation. Strauss and Corbin (1998) defined a theory generated by this process as being “a set of well developed concepts related through statements of relationship, which together constitute an integrated framework that can be used to explain or predict phenomena” (p. 15). Grounded Theory Methodology (GTM) was therefore suited for identifying patterns and connections within social and social-psychological processes that arose from the interactions between individuals, their contexts and interpretations of self and meaning (Charmaz, 2006). Given the complexity of the typical processes explored with this methodology, the final output of a grounded theory study is not likely to be considered the definitive word on the subject, rather viewed as “only a pause in the never-ending process of generating theory” (Glaser & Strauss, cited in Dey, 1999, p. 117).

The rationale underpinning Glaser and Strauss’ challenge was based on the American philosophical tradition of Pragmatism, specifically the work of Charles Saunders Peirce (1839-1914) and early Symbolic Interactionists, particularly George Herbert Mead (1863-1931) and Charles Cooley (1864-1929). These social philosophers informed the methodological position advocated by Glaser and Strauss in two ways. Firstly, Pragmatists rejected the notion of scientific truth being an objective independent reality and instead postulated that it is a co-construction of meaning. Secondly, the Pragmatist and the Symbolic Interaction traditions emphasised the symbolic and social character of human thought and behaviour. Within this framework therefore, any theoretical rendering offers an interpretive portrayal of the studied world, not an exact picture of it (Charmaz, 1995; 2000; Schwandt, 1998). This iterative process of qualitative enquiry into participants’ experiential views being analysed within a specific context thereby provides a construction of the studied phenomenon.

Grounded Theory’s epistemological positioning is a key arena of controversy. The dominant reading of The Discovery is that it rests upon a positivist empiricist philosophy in that it espouses an
inductivist view of the process of ‘discovering’ theory from data. This interpretation, however, affords only a fleeting glance over a significant tension in the Grounded Theory approach, and one that has been discussed more generally as the ‘dilemma of qualitative method’ (Hammersly, 1989). This tension arises from a simultaneous commitment, on the one hand, to science and realism by the claim to reflect the data objectively, and on the other hand, to a form of constructionism that recognises the multiple meanings and subjectivities involved in any research encounter that is critical to opening up new insights and generating theory. On philosophical grounds, theory cannot simply emerge from the data because interpretation and analysis are conducted within some conceptual framework. It therefore begs the question of ‘what grounds grounded theory?’

This issue is addressed in many of the classic and most influential writings on grounded theory which suggests that researchers must be able to retain their disciplinary knowledge base and utilise their ‘theoretical sensitivities’ (Glaser, 1978; Charmaz, 1990). This juxtaposition may derive from the integration of two contrasting research traditions that of Columbia University’s positivism with the Chicago school of Pragmatism and field research. Whilst Glaser imbued grounded theory with empiricism, rigorous coding methods and an emphasis on emergent discoveries, Strauss incorporated the pragmatist dictums of human agency and subjective meanings. By means of a shared interest in enquiring into social and psychological processes, these otherwise opposing research paradigms were successfully merged that brought about a new way of conducting qualitative investigations. Accordingly, the outcome from a grounded theory study can potentially explain the phenomenon in new theoretical terms by explicating its underpinning theoretical categories and demonstrating the causes and conditions under which the process emerges and varies (Charmaz, 2006).

The ‘dilemma of qualitative method’ carries through to current applications of grounded theory and is illustrated in the debate regarding the degree to which reflexivity should be employed. This relates to the value of reflective practice in ensuring the quality of research processes and the contribution it can make to the generation and analysis of data. First generation of grounded theorists were urged to adopt an objective stance (Glaser, 1978; Glaser & Strauss, 1967) by viewing the contributions of participants as simply being sources of data, thus they heeded a passing glance to how they engaged with their participants. As the method became applied more extensively, second generation theorists recognised the importance of the interaction in the generation of data. Strauss and Corbin (1994) termed it an ‘interplay’ between perspectives and required the
‘researcher...actively reacting to and working with the data’ (p.280). The latter applications of grounded theory therefore acknowledged the process of co-constructing new knowledge. This approach is representative of contemporary beliefs about grounded theory as a method of data generation. The data derived from engagement with participants are not “neutral and context-free as the interviews provide a site for an interplay between two individuals that leads to insights that are negotiated and contextual” (Birks & Mills, 2006, p. 56).

Bryant and Charmaz (2007) contend that whilst GTM was a profound methodological innovation, the initial formulation maintained a positivist, objectivist direction. They posit that the initial cloaking of traditional grounded theory methodology in positivist-orientated claims to ‘scientific rigour’ as reflected in the systematic analytic techniques, may have been due to a need to justify qualitative approaches against quantitative research. They argue for building on the pragmatist underpinnings in grounded theory and advancing analyses that acknowledge the complex process of the co-construction of new understandings. The constructivist viewpoint asserts that concepts and theories are constructed in the dialetical process of the participant making sense of their experience as they articulate these in the research process. ‘Systematic reflexivity’ (Birks & Mills, 2011) is therefore critical as a reference for assuring quality in a grounded theory study. Indeed, Clarke (2005) and Charmaz (2006) acknowledge an obligation for constructivist grounded theorists to incorporate reflexivity as a strategy in their research design.

This ‘dilemma of qualitative method‘ as articulated by Hammersely (1989) in striking a balance between seeking objectivity and subjectivity is resolved in a fuller explanation of ‘reflexivity.’ Birks and Mills (2011, p. 55) contend that incorporating a reflexive agenda that seeks to find subjective meanings and multiple vantage points is not exclusive to the constructivist or post modernist framework. On the contrary, the judicious process of reflexivity can ensure a mechanism for maintaining an objective stance by identifying any potential influence of idiosyncratic interpretations on the analytic endeavour. This is consistent with the post-positivist approach to reflexivity in qualitative research that is referred to as ‘bracketing’, a process that aims to sustain objectivity (Dowling, 2006). The GTM therefore is ‘an emergent process that relies on interacting with our participants, the data we gather, and how we develop our nascent ideas, as well as what we know and who we are’ (Charmaz, 2011, p. 172).
Within the constructivist tradition of grounded theory, Charmaz (2006) has applied postmodernist and post constructivist paradigms, thus taking up the challenge of Denzin (1994, p. 512) to move interpretative methods more deeply into the regions of post modern sensitivity. The constructivist version of grounded theory thereby offers another direction that takes into consideration methodological developments of the past 40 years. Constructivist Grounded Theory joins the fluidity and open-endedness of Strauss’s early approach to social psychology with the specific strategies for analysing data that Glaser developed (Wertz et al., 2001, p. 60). As such, third generation grounded theorists propose the Constructivist tradition as a more tenable methodological basis for the approach.

3.2: 1 Central features of Grounded Theory

Grounded theory adopts an iterative approach to the processes of enquiry. It is however, distinguished within the qualitative paradigm by its methodological rigour. This is essentially due to the key procedural techniques that pay due regard to ensuring the integrity of the data collected and analysed. According to Birks and Mills (2011, p. 73), it is a self-correcting approach to research. The consistent and correct employment of the essential grounded theory methods outlined below ensures that any errors in data collection and analysis will eventually be extinguished. Indeed the original exposition of the methodology emphasised the importance of applying the grounded theory methods in order to develop a theory that will be judged as a quality product (Glaser, 2004). Grounded theory is thus proposed as a practical research method as it is characterised by its logic of enquiry which translates into a specific set of principles and practices for collecting, analysing and interpreting data. Hood (2007) contends that GTM is differentiated from other qualitative methodologies by the following features. 1) the constant comparison of data to theoretical categories; 2) theoretical sampling; and 3) a focus on the development of theory through theoretical saturation of categories rather than substantive verifiable findings. The method therefore fundamentally challenged the positivist direction of theoretical development through the deductive testing of hypotheses (Hood, 2007). An iterative spiral of purposive data gathering and analysis lies at the heart of grounded theory methodology. However, for the purposes of clarity, these data gathering and analytic procedures will be addressed seperately.

The constant comparative method is a central feature of grounded theory. It involves constantly analysing and cross-comparing data, sensitising the researcher to the similarities and differences within and thereby facilitating the comprehension of the emerging data (Henwood & Pidgeon,
1994). This method is derived from Pierce’s (1958) concept of abductive reasoning that originated with the pragmatist tradition (cited in Charmaz, 2006, p.104 ). Essentially, researchers take their ideas derived from the data, form a follow up hypothesis, and then move back to check this hypothesis in experience. In the sense that hypotheses are generated from the initial development of analytic categories in the service of theory construction, Charmaz (2011) purports that GTM is a hypothesis-testing method (p. 294). However, it differs significantly from hypothesis-testing methods espoused in quantitative methodologies as it entails a a combination of inductive and deductive work. Hood (1983) describes it as inductively developing theory and then testing out ‘hunches’ continuously. Hypotheses are constructed in order to sort plausible interpretations or to develop and assess tentative emergent theoretical categories. Throughout the analytic process, grounded theorists explicitly invoke comparative methods. By exploring categories theoretically using the constant comparative method “each comparative step successively raises the level of abstraction of the analysis” (Charmaz, 2011, p. 172) whilst grounding the specific connections to the data.

Theoretical sampling is a method of data collection based on the concepts derived from the data (Strauss & Corbin, 2004). It can be differentiated from conventional methods of sampling in terms of a specified number of participants not being pre-determined prior to the research process. As concepts are being sampled rather than participants, this approach requires the sampling process being open and flexible with emerging concepts informing the subsequent stages of data collection. Contrary to traditional methods of sampling which seeks to test conceptual hypotheses, theoretical sampling is applied for exploring concepts pertinent to the data. In order to facilitate the clarification of these concepts, data is analysed from the outset and these in turn are used to inform further questioning and exploration of emerging concepts. This circular process of constantly comparing data guides decisions for determining the total sample size as collecting data reaches completion at the point of ‘saturation.’ Theoretical saturation refers to the point in the research when all the concepts are well defined and explained (Strauss & Corbin, 2008). A common misconception of theoretical saturation has been the simple repetition of themes. Charmaz’s (2006) definition, however, highlights the depth of clarity that is required to meet this requirement. Accordingly, “categories are ‘saturated’ when gathering fresh data no longer sparks new theoretical insights, nor reveals new properties of these core theoretical categories” (p. 113). This key strategy, once implemented robustly has the capacity to yield “conceptual density that when integrated into hypotheses make up the body of the generated grounded theory with theoretical completeness.
(Glaser, 2001, p. 191). The Glaserian perspective on saturation establishes the foundation for treating theoretical concepts in grounded theory.

Theoretical sampling is therefore less of an explicit procedure than a strategy to narrow focus on the emerging categories as well as a technique to develop and refine them. This method of sampling ensures that data is collected that sufficiently delineates the properties of a category. It is a valuable analytic tool for grappling with the intricate process of analysing qualitative data, hence its central place in the grounded theory methodology.

3.2.2 Methodological criticisms

One of the leading criticisms of grounded theory is that those purporting to use the method do not develop theory from data (Charmaz, 1995), rather, descriptions are offered of the topic under investigation. Strauss and Corbin (1994) refer to it as the diffusion of grounded theory methodology and can lead to insufficient data being generated and thereby compromise the quality of the theoretical output. Another major criticism of grounded theory research lies in the data being forced rather than allowing it emerge from the data (Strauss & Corbin, 1994). Often this can be an elusive concept, particularly to the novice researcher. The objective to find a single basic social process can often elicit a preconceived frame on the data analysis, however by adhering to the classic Glaserian (1978) rule that extant concepts must earn their way into the analysis can go some way in avoiding this faux pas. Glaser (2003) acknowledges that this quest to unearth a significant substantive theory in grounded theory research can indeed derail researchers. Adhering to the essential grounded theory methods can help construct theoretical renderings on new topics of enquiry.

As with methodology in general, the most effective counter to these criticisms lie in transparency. Mays and Pope (1996) refer to the importance of communicating the process of systematic and self-conscious qualitative research as a means of ensuring methodological rigour. The challenge then is the degree to which the outputs from qualitative research should be subjected to the reliability and validity criteria set forth within the quantitative paradigm. There has been recent developments in developing quality criteria by which qualitative research can be evaluated. The ‘Evolving Guidelines for Qualitative Studies in Psychology’ (Elliott et al., 1999) is a prime example. It is a relatively contentious issue and one that needs to be weighed up appropriately in order to avoid what Melia (1996, p. 376) refers to as “the technical tail wagging the theoretical dog.” These
guidelines however, as advocated by the British Psychological Society do give credence to the quality of work being produced within the rapidly evolving and rich qualitative research tradition. It can be helpful to bear in mind that the value of qualitative research lies in the specific description and themes developed in the context of the raw data and therefore requires an evaluation criteria appropriate to the aims of the approach. According to Green & Caracelli (1997) ‘particularity’ rather than ‘generalisability’ is the hallmark of qualitative research and as such have significant ramifications for the types of research questions for which the method is suited, and the evaluative criteria by which the finished product should be judged.

3.2.3. Ensuring quality in qualitative research

Theories produced by the GTM are not amenable to the traditional, positivist evaluative criteria of validity, generalisability, bias and reliability (Denzin & Lincoln, 2000). Thus, clinicians and academics alike have proposed alternative and method-appropriate criteria. In the original exposition of the GTM, Glaser (1978) proposed the evaluative criteria of: fit (the theory must fit the empirical context it seeks to analyse and firmly grounded in the data); workability (provide a workable understanding and explanation of the studied phenomenon); relevance (address problems and processes of importance to those experiencing a phenomenon); and modifiability (open to refinements to make the theory more parsimonious and endurable).

As a means of applying this criteria to the present study with a view to ensuring the integrity of the data and overall findings, Birks and Mills (2011) triad of quality criteria was adopted. These authors purport that a grounded theory study can be assessed by the degree to which the factors of researcher expertise; methodological congruence and procedural precision have been implemented (p. 152).
3.3 The present study - research procedure

The method of data collection, participant selection and general research design are detailed within this section.

3.3:1 Research design

Barbour (2008) suggested that qualitative research can ‘make visible and unpick the mechanisms which link particular variables, by looking at the explanations, or accounts by those involved’ (p. 11). For areas of study that are undefined and tentative hypotheses have been generated, there is a need for further, in-depth exploration. By virtue of delving into the lived experiences of individuals, qualitative methodologies can delineate the specific context and processes pertinent to further understanding the phenomenon under scrutiny. Given the early stages of research into mental imagery and chronic pain a qualitative investigation is warranted as a means of contributing further to this body of work. For the purposes of the present study, a mental image is conceptualised within a Cognitive Behavioural Therapy framework as being a form of cognition and has an impact on emotion and behaviour. Hackmann et al.’s (2011) micro-formulation of imagery serves as a useful heuristic for assessing this impact. By exploring the content of the image and its effects can help to understand the role of specific problematic images in the maintenance of distress.

The seminal findings generated in the research carried out to date (Gillanders et al., 2012; Lonsdale, 2010; Gosden, 2008; Potter, 2007) indicate pain-related imagery is prevalent but often ‘unobserved’ in pain sufferers and exposure to these images resulted in significant increases in negative emotions, negative cognitive appraisals and in pain levels. Philips (2011) contended that the relationship between image potency and appraisal requires further research. This prevalence study identified the need to employ direct methods of clarifying image appraisals. Moreover, a recommendation was advanced that idiosyncratic meanings were explored over a number of sessions as a means of attending to the reliability and validity of the findings. Thus, there is a need to enquire further into these underlying processes in order to determine whether the spontaneously invoked pain-related images have an emotional impact or are visual representations of the pain (Berna, 2011). Qualitative research is therefore a mode of enquiry that can provide context to this identified phenomenon by exploring the meanings ascribed to the experience of pain imagery. Whilst other qualitative methodologies, such as Interpretive Phenomenological Analysis (IPA), were considered for use in the current study, Grounded Theory was chosen to generate broad
theories or hypotheses about this observed phenomenon that can be amenable to later testing or further investigation in this case.

There are undoubtedly many similarities between Grounded Theory and IPA as both are premised on an inductive approach that seeks to explore the lived experiences of participants in order to derive the tacit meanings and actions underpinning the phenomena under investigation. Both approaches seek to explore how the phenomena is constituted, its implicit meanings and its underpinning contexts and conditions (Charmaz, 2011). The differences between the approaches are thereby best discerned in their analytic procedures. Whilst phenomenologists aim to present an analysis of the raw data in and of itself, grounded theorists adopt an interactionist approach by embedding the analysis within the social context of how the data is collected. Although both methodologies initially seek to enquire into the participants‘ worldview, their differing epistemological underpinnings inform how the subsequent data is collated and analysed. Grounded theory is based on the premise that realities are not given but are constructed through interaction, whereas phenomenology assumes that realities emerge from the data.

Thus the role of the researcher’s perspective is treated differently in these approaches. Whereas, phenomenology bracket the researcher’s view points in exploring the participants’ world, grounded theory seeks to make the researcher’s perspective explicit in order to strengthen reliability and validity of analyses. Indeed the reflexive process is a core component of a grounded theory study. Henwood (2006, p. 78) cautions against unreflective practice in conducting grounded theory studies as it poses a risk to it being poorly executed. Researchers are thus called on to explicitly state their epistemological choice for the ways in which they approach the research process and the claims that are made for the findings. Grounded Theory Methodology is distinguished for its stringent methodological strategies with an emphasis on the reflexive process of data collection and analysis with a view to constructing a theoretical explanation of a social process.

In selecting the most appropriate version of Grounded Theory to use in the current study, particular attention was given to how participants described their experiences of living with pain, and how they made sense of the spontaneously invoked pain related images that gave rise to distress. The meanings they attributed to these specific cognitions were especially important to elicit in order to ascertain the degree to which these mental images can impact on functioning. Another issue under consideration pertained to the potential interaction between the researcher’s interests and
perspectives with the participants' narratives. For these reasons, the present study employed the social constructionist version of Grounded Theory advocated by Kathy Charmaz (1990) as outlined in the previous section.

3.3:2 Ethical considerations

In undertaking qualitative research, there are theoretical and conceptual ethical understandings, alongside meeting the more functional demands. King & Horrocks (2010) advise adopting a critical stance towards the research process as the researcher is accountable for how it is conducted. They call for thoughtful ethical practice of qualitative interviewing in which care and respect are intertwined. Sieber & Stanley’s (1988) definition of ‘socially sensitive research’ in which “there are potential consequences or implications, either directly for the participants in the research or for the class of individuals represented by the research” (p. 49) highlights the importance of incorporating ethical practice into qualitative research. Interestingly, the notion of ‘sensitivity’ is attributed to the social context of the research rather than the topic itself. In the case of qualitative research, since interviews are the primary means of data collection, the process of how it is conducted becomes the focus of ensuring ethically appropriate research. The sensitive nature of a particular topic is therefore emergent as the sensitive nature of a piece of research arises less in the topic itself and more in the relationship between the topic and the social context within which the research is conducted. In delineating the areas in which research is more likely to pose a threat more than others, Renzetti & Lee (1993) highlighted the potential ethical ramifications of psychological studies that enquired into the personal lived experiences of participants. Sensitive research raises methodological, technical, ethical, political, and legal problems as well as having potential effects on the personal life of the researcher (Plummer, 1983).

In line with the British Psychological Society’s Code of Conduct, Ethical Principles and Guidelines (BPS, 1999), the present study adhered to the ethical considerations of informed consent; right to withdraw; debriefing and confidentiality.

In designing the study it was taken into consideration that the sensitive topic under investigation may invoke distress for the participants. It was also envisaged that participants may have questions or concerns about the implications that their involvement would have on their current or future treatment by health services. In the interest of ensuring that participants were sufficiently informed about the aims of the study and the potential implications of involvement, they were provided with
a Participant Information Sheet (see Appendix 2). Bearing in mind that participation in the study required a process of negotiation, potential participants were encouraged to discuss their decision with others and were provided with contact information of an individual external to the study.

It was communicated clearly to participants that taking part in the research would not constitute any treatment or counselling, and that, with some exceptions, confidentiality would be maintained in all contact with the researcher. The exceptions to breaching confidentiality included for example if participants were to reveal information that the researcher viewed as a risk to the participant or others. Explicit written consent was obtained before any participation in the research (see Appendix 2). Given that informed consent is a process, participants were given the right to withdraw at any stage of their participation. Owing to the emergent nature of grounded theory studies, the topics originally gained consent to focus on in the interview may change. Therefore, Ramos’ (1989) term of ‘process consent’ is applicable to indicate that obtaining informed consent in qualitative research is not a one-off conversation, rather it is ongoing which requires renegotiation and enabling participants to be aware of their right to withdraw throughout the process. Thus, each participant was informed prior to the beginning of interviews that, in the event that they became distressed, measures were in place to support them appropriately. For this study, it was agreed that should participants become unduly distressed, they could withdraw immediately and could meet with a trained health professional to debrief. The specific arrangements entailed meeting with a qualified clinical psychologist in the Chronic Pain Service. As highlighted in the Participant Information Sheet, should participants choose to withdraw from the study at any stage, there would be no implications for their ongoing or future treatment with the Chronic Pain Service or other health services. Participants were assured that, in such cases, all audio recordings related to the individual would be erased. As a means of facilitating ease of consenting to involvement, participants were invited to participate in the study at the end of their treatment which included the Pain Management Programme and individual sessions.

The management of distress is a key issue that can arise in sensitive research. It is vital that safeguards are put into place to ensure the safety of the participants. However, these must be tempered with the researcher’s skill in conducting interviews of a sensitive nature. For example, the right to withdraw can be deployed mistakingly when participants become emotional and distressed during an interview. King and Horrocks (2010) acknowledge that this can pose a challenge for novice interviewers who may assume that an individual’s distress necessitates the
termination of the interview. They recognise that it is vital to contain the emotional reactions of participants as the alternative of instinctively invoking a distressed participant’s right to withdraw from the process is often not the outcome the participant wants or needs. “Interviews aim to provide rich, detailed and in-depth information, and it is hard to imagine how this might be achieved without layers of emotional input” (King & Horrocks, 2010, p. 36) Utilising clinical skills in these instances to acknowledge distress and verbalising the emotions observed can facilitate participants to continue and indeed can be perceived as a cathartic experience.

All data was anonymised in order that participants comments were not attributable to them. Interviews were conducted on an individual basis thereby avoiding the need to disclose information to anyone other than the researcher. Participants were assured that the data generated was for a specific purpose and therefore no other use would be made unless this was renegotiated with them. Data was kept confidential by means of secure storage and transfer of transcribed interviews.

It was also considered reasonable that the researcher may experience distress as a result of listening to the participant’s experience of living with chronic pain, or hearing their descriptions of their life experiences. This was managed via the supervision arrangements that exist for all trainee clinical psychologists working in the NHS. The researcher received regular supervision from a Clinical Psychologist, and further support was available from an Academic Supervisor appointed by the University of Edinburgh for the purpose of supervising the research project.

3.3:2 a) Ethical approval process

Ethical approval was sought from the North of Scotland Regional Ethics Committee (REC reference: 11/AL/0283) using the standard application form that included examples of all the documentation referred to previously. It is often recognised that this process can enhance methodological rigour and pre-empt potential problems. Following the initial application for ethical approval, clarification was sought by the panel regarding the debriefing process and advised to simplify the wording on the Participant Information Sheet. Ethical approval was subsequently granted following the receipt of these amendements. The project was then registered with NHS Highland Research and Development Department (R&D), and approval for the project to proceed was henceforth granted (see Appendix 3). Within the host service itself, the researcher sought approval from the Lead Clinican (Pain Consultant) of the Chronic Pain Service for the project.
3.3.3 Participant recruitment

Following ethical, R&D and local management approval, the researcher met with the multi-disciplinary team of the Chronic Pain Management Service (CPMS), NHS Highland to discuss the aims of the study and seek support for recruitment. This took the form of a presentation describing the context, aims and proposed methodological approach. It was explained that the intake form includes a question on asking patients to describe their pain and therefore could be used to inform who could be invited to take part in the study. Potential participants were invited from individual psychology, physiotherapy and multi-disciplinary assessment clinics. Participant information packs (inclusive of Invitation letter; Participant Information Sheet; Reply slip) were given by the team’s Clinical Psychologist and Physiotherapist to individuals who met the inclusion criteria. Patients opting to be involved were invited to contact the researcher directly. Theoretical, purposeful sampling (Denzin & Lincoln, 2000) was used in this study as a means of selecting information-rich cases.

Following difficulties in recruiting sufficient numbers, advice and assistance was sought from the CPMS team. It was feedback that recruiting individuals at the multi-disciplinary clinic proved cumbersome given its fast through-put of assessment appointments. Consequently, few information packs were distributed of which no individuals opted in to the study. It was suggested to invite participants from the Pain Management Programme (PMP) upon completion of their treatment. The rational being that patients had established a rapport with staff and may increase the likelihood of participation. As the pain management programme is based on a cognitive-behavioural approach and addresses the impact of cognition and emotion on distress in chronic pain, interpretation of results would need to consider the potential suggestibility effects. Due consideration needs to be given to ascertaining whether mental imagery reported by participants is naturally-occurring or influenced by involvement with psychological interventions. With regards to the local pain management programme, there are two sessions on ‘thoughts and feelings’ that entails socialising patients to the CBT framework of managing distress associated with persistent pain. Pain-related images are not specifically mentioned nor examples given. Guided visualisation techniques are taught that involves facilitated relaxation through pleasant imagery of a calm scene (e.g. beach, forest). Imagery modification techniques of invoking pain-related images and imaginally manipulating sensory aspects of pain are not included on the local programme. Whilst mental imagery is not specifically addressed on the programme, nevertheless prior contact with psychological interventions is an important factor to consider in the interpretations of findings.
As a means of addressing the recruitment challenges, potential participants were sought from Pain Association Scotland. The researcher was invited to present an overview of the study aims to the local support group and distribute participant information packs. It was hypothesised that given participants from this population are accessing facilitator-led support groups implies that they may present with lower levels of psychological distress which may have an impact on reporting of mental imagery. Interpretation of findings will need to incorporate this variability in participant characteristics.

3.3.3 a) Participant characteristics

Adult participants with duration of pain for 12 months or more who report experiencing pain-related imagery were included in the study. Individuals presenting with chronic headache or chronic malignant pain with co-morbid significant mental health problems including active psychosis and acute suicidal risk were excluded.

Participants who came forward presented with a range of chronic pain conditions. As mentioned above, the recruitment process entailed an initial screening of informing potential participants of the study as well as to ascertain whether they experienced pain-related imagery. At the interview stage, it became apparent that a number of participants did not experience images related to their pain. In these cases, the interview was continued as a means of eliciting the participant’s perceptions of coping with chronic pain. However, for the purposes of the current study, only the narratives of the participants who reported experiencing pain-related imagery were included in the analysis. The following flow-chart illustrates how the inclusion and exclusion criteria were implemented.
Figure 3: Flow-chart illustrating the process of applying inclusion and exclusion criteria for the recruitment of participants

Participants who came forward
n = 14

→

Participants who did not report imagery
n = 4

→

Participants who reported imagery related to fatigue only
n = 1

→

Participants who reported imagery related to mental health problems
n = 2

Participants who met full inclusion criteria
n = 8
Participant demographic information is summarised in Table 1

<table>
<thead>
<tr>
<th>No</th>
<th>Gender</th>
<th>Age</th>
<th>Condition(s)</th>
<th>Duration of chronic pain</th>
<th>Co-morbid psychiatric diagnosis</th>
<th>Pain-related images</th>
<th>Mental images of other symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M</td>
<td>56</td>
<td>CLBP</td>
<td>20 years</td>
<td>None</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>2</td>
<td>M</td>
<td>62</td>
<td>Reiter’s syndrome</td>
<td>26 years</td>
<td>Recurrent depression</td>
<td>Y</td>
<td>Y (anxiety)</td>
</tr>
<tr>
<td>3</td>
<td>F</td>
<td>48</td>
<td>FMS/ ME</td>
<td>7 years</td>
<td>Recurrent depression</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>4</td>
<td>F</td>
<td>45</td>
<td>FMS/ Scoliosis</td>
<td>8 years &amp; 25 years</td>
<td>None</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>5</td>
<td>F</td>
<td>61</td>
<td>Rheumatoid Arthritis</td>
<td>8 years</td>
<td>None</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>6</td>
<td>F</td>
<td>60</td>
<td>Post Heptic Neuralgia</td>
<td>2 years</td>
<td>None</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>7</td>
<td>F</td>
<td>62</td>
<td>Peripheral Neuropathy</td>
<td>13 years</td>
<td>None</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>8</td>
<td>F</td>
<td>54</td>
<td>FMS</td>
<td>5 years</td>
<td>Depression/ anxiety</td>
<td>Y</td>
<td>N</td>
</tr>
</tbody>
</table>

Key:
FMS: Fibromyalgia Syndrome
CLBP: Chronic Low Back Pain

3.3:4 Procedure

In accordance with the Grounded Theory methodology, a semi-structured interview schedule was devised to conduct the initial interviews (see Appendix 4), however it was recognised that the content and focus of subsequent interviews would likely be altered in response to emerging ideas and themes from earlier interviews and initial coding. The interview schedule was designed with the aim of eliciting any spontaneously-invoked pain images and explore how these impact on participants’ functioning.

14 volunteers subsequently came forward. Individuals who volunteered to participate were initially contacted by the researcher to ensure that they a) met the inclusion and exclusion criteria; b) understood the requirements of the study; and c) had the opportunity to ask questions or seek
clarification about the study prior to committing to take part. A mutually convenient time at which to meet for the interview was agreed. All interviews took place in an NHS clinical setting with ready access to a clinician. In keeping with good practice of ensuring data confidentiality, no participant identifying information was stored once interviews had been completed. Prior to beginning the interviews, participants were informed about the nature of the questions and reminded about their rights to withdraw at any stage from the study. It was also explained that interviews would be audio recorded and transcribed by the researcher for subsequent analysis. Participants were asked to sign a written consent form and were given a copy for their retention (see Appendix 2).

Interviews initially adopted a broad focus, based on the first version of the semi-structured interview schedule (see Appendix 5) in order to obtain a diverse range of views. Three interviews were conducted using this initial schedule and were transcribed by the researcher. Once transcription was completed the audio recording of each interviews was destroyed (typed copies of transcribed notes, containing no identifiable participant information, were retained in accordance with the requirements of the North of Scotland Research Ethics Committee). Line-by-line coding was completed on each of the first two interviews.

These initial sets of codes were then compared that resulted in identifying common ideas and themes that incited further exploration. Researcher memos were written to document these thoughts and ideas related to the emerging themes, and were subsequently used to reflect on these initial interviews (see Appendix 5 for examples of memos). ‘Field notes’ (researcher observations from interviews) were written immediately following each interview to further facilitate reflection on the research process.

This early analysis led to identifying tentative themes and therefore were used to refine the interview schedule in order to focus on these topics in subsequent interviews. A revised interview schedule (see Appendix 4) was used to guide a further 12 participant interviews. The transcribed interviews were then subjected to grounded theory analysis as detailed in the section below.
3.3:4 a) Transcribing

All interviews were transcribed verbatim. During transcription all material that could identify the participant was removed. Occasionally certain words were not clear enough on the recording and where this occurred it was indicated within the transcript.

The first 4 interviews were transcribed by the researcher that facilitated initial analysis and informed subsequent data collection. Due to time constraints, a decision was made to arrange for the final 10 interviews to be transcribed by a paid secretary. Instructions were given prior to transcription and the final transcripts were checked by the researcher whilst listening to the interviews. There is no specific guidance in the grounded theory texts about outsourcing the tasks of transcribing other than it being a viable option for reducing the workload (Strauss & Corbin, 1998). However, the researcher decided that transcribing the initial interviews had sensitised her to the process and emergent data and therefore was a useful part of the analytic process.

3.4. Grounded theory analysis

Grounded theory emphasises the use of “procedural logic” (Burns, 1989, p. 49) as a means of collecting and generating robust data for the purpose of theory development. The degree to which the essential grounded theory methods are implemented will equate to the quality of data produced. The initial formulation of GTM as espoused by Glaser and Strauss (1967) placed an emphasis on developing ideas and theory generation through the creative and systematic investigation of a range of rich and meaningful sources of ‘real world’ data (Henwood & Pidgeon, 1992). The precision of application of these methods will safeguard the procedural logic thereby preventing credibility gaps in the research. Given that an iterative spiral of purposive data sampling and analysis lies at the core of the grounded theory methodology, it increases the likelihood of generating rich, in-depth data. It is one of its distinguishing features and differentiates it from other predominantly interpretive research designs. This spiral spurs a process whereby the researcher constructs, assesses and develops theoretical concepts from the data, up through increasingly higher levels of theoretical abstraction. This process of constantly comparing data, and the conceptual elements being developed is continued until a theory has been constructed which accounts for the variation in the data.
An integral part of this iterative process of conceptual development entails a step-wise progression of the analytic procedure from open-coding to focused coding that leads to theoretical integration. Conceptual ordering is a useful heuristic put forward by Strauss and Corbin (1990; 1998) to think about the essential grounded theory methods of data analysis (cited in Birks & Mills, 2006, p. 91). It involves generating and refining codes and categories in the course of data analysis, augmented by the use of memoing as a key strategy for shifting understanding to a more abstract or conceptual level (Henwood, 2006, p. 78).

3.4:1 Memo writing

Memoing is the most significant factor in ensuring quality in grounded theory studies. Stern (2007) highlighted the importance of memos by employing the metaphor of the mortar that binds the building blocks that comprise a grounded theory. It serves both concrete and abstract purposes as encapsulated in the mnemonic of “MEMO – mapping research and activities, extracting meaning from the data, maintaining momentum, and opening communication” (Birks, Chapman & Francis, 2008, p. ). For example, memos can be used at the minimal level of documenting activities in support of maintaining an audit trail. The utility of memos as a form of reflective writing is fundamental to raising the analysis of data to a conceptual level. Lempert’s (2008) description of the process elucidates how memo writing makes the researcher/data engagement explicit and which results in a ‘grounded’ theory.

“Memo writing is the methodological link, the distillation process, through which the researcher transforms data into theory. In the memo writing process, the researcher analytically interprets data. Through sorting, analyzing, and coding the ‘raw’ data in memos, the Grounded Theorist discovers emergent social patterns. By writing memos continuously throughout the research process, the researcher explores, explicates, and theorizes these emergent patterns...Ultimately it is the integration of these abstract analyses developed in memos that the researcher shares with a public audience.”

(Lempert, 2008, p. 245)

In this way, memo writing directs the analysis by deepening and extending it as part of the constant-comparative approach used in grounded theory. The iterative logic of the constant comparison method informs how to proceed with data collection in order to check out these initial interpretations. Lofland and Lofland (1995, p. 15) assert that by “(making) meaningful linkages between the personal and emotional on the one hand, and the stringent intellectual operations on the other,” allows the researcher to record ideas prompted by analysis of a transcript and to check
whether they re-occur in other transcripts. Thus, the majority of memo writing tends to be directed towards making comparisons and informs the theoretical sampling of data.

3.4.2 Coding

Similar to the first and second generation grounded theorists, Charmaz (1995; 1996; 2006) expounds at least two key phases of coding as a means of constructing substantive theory. The first analytic phase consists of coding the data line-by-line after the first interview has been completed. Charmaz (2011) contends that line-by-line coding can be viewed as a heuristic device for becoming involved in the analysis and facilitates “shedding (researchers) misconceptions and seeing the data anew” (p. 172). Essentially, it enables the researcher to distil the data and frame the enquiry from the outset of data collection and thereby move towards fulfilling two criteria for completing a grounded theory analysis: fit and relevance. Charmaz advocates the use of gerunds for depicting the codes in this initial phase. As a gerund (e.g. ‘negotiating’) is the noun form of the verb, it preserves action and equips the researcher with a technique to define what was happening in the data. In line with interpretive research, grounded theory relies on the researcher’s ability to grapple with the data and interpreting them. In the constructivist grounded theory application, line-by-line coding can illuminate processes and probing questions, thereby following the Glaserian mandate of studying the emerging data (Glaser, 1978). Employment of in vivo codes is a common strategy used at this stage of the analysis that condense meanings and thus capture the power and poignancy of participants’ perspectives within the setting. Line-by-line coding therefore, provides analytic directions for the subsequent stages of analysis (see Appendix 6 for examples of open coding applied to one interview transcript).

Focused coding builds on the initial codes to synthesise and explain larger segments of data (see Appendix 7 for the list of process codes generated). It aims to determine the codes that encapsulate the data with clarity and precision. Charmaz (2006, p. 59) depicts this step as being representative of grounded theory interpretive enquiry as it requires a concentrated, active involvement in the process. It entails efforts to connect specific data with theoretical interpretations by invoking comparisons between data sets that lead to focused codes. The initial descriptive account is progressed to a more analytical and conceptual one by identifying a set of categories through a process of constant comparison both within and between interviews with reference to additional memos and field notes. Consistent with the logic of grounded theory, coding is an emergent process and therefore coding can move back and forth between these two key stages of analysis.
3.4.3 Theory development

This is the process of integrating and refining categories into theory. The initial and focused codes generated the ‘bones’ of the analysis and are ultimately assembled into a ‘working skeleton’ (Charmaz, 2006, p. 45) through the process of theoretical integration. The properties of the specific categories remain implicit until theoretical sampling and interpretive rendering make them explicit. By using their ‘theoretical sensitivities’ researchers are enabled to make empirical and conceptual leaps. These categories are synthesised and theory development proceeds. Strauss and Corbin (1998) recognise that identifying core categories can be an elusive process and thus advise constructing a storyline or a descriptive narrative. In this way, the narrative, rather than explicit theoretical propositions can be used to assess whether it fits with the researcher’s understanding of the emergent data and thus can be operationalised as a core concept. This process of defining relationships between categories informs the degree to which depth of theory can be achieved (Urquart, 2008).
CHAPTER 4
Results and Discussion
The aim of the current study was to explore the phenomenology of mental imagery in chronic pain. Seminal research of mental imagery in chronic pain (Gillanders et al., 2012; Philips, 2011; Berna et al., 2011) conclude that in-depth studies are required to explore the relationship between image potency and appraisal. Furthermore, it was recommended to investigate the idiosyncratic meanings of pain-related images. Specifically, there is a need to enquire further into these underlying processes in order to determine whether the spontaneously invoked pain-related images have an emotional impact or are merely metaphorical representations of pain.

Knafl & Howard (1984) suggest that the purpose of qualitative studies are explicitly stated in reports as a means of enhancing rigour and validity of findings. Given that this piece of work formed part of an ongoing research programme being conducted in the University of Edinburgh regarding mental imagery in chronic pain, findings from the research would serve as an adjunct to these existing quantitative studies. As such the current qualitative data can be used as a sensitising device for the construct of pain-related mental images. By employing grounded theory methodology, rich and detailed data was collected and analysed in order to contribute to a conceptualisation of the phenomenon.

Akin to Berna et al.’s (2011) pilot study, this phenomenon was examined within a cognitive-behavioural therapy framework by considering mental images as a form of cognition and their impact on emotion and behaviour. As described in the methodology chapter, Hackmann, Holmes and Bennett-Levy’s (2011) micro-formulation informed the construction of the interview questions. Moreover, it serves as a useful heuristic for assessing the impact of imagery at the analysis stage. By exploring the content of the image and its effects can help to understand the role of specific problematic images in the aetiology and maintenance of distress.

This chapter will describe the data collected and outline the core categories that emerged and discussed in terms of the psychological literature. The findings of the pain-related imagery with the associated emotional-behavioural pattern will be described within a Cognitive-Behavioural Therapy (CBT) framework.
4.1. Summary of data

Fourteen interviews were conducted with participants referred from the Chronic Pain Management Service, NHS Highland and Pain Association Scotland. In accordance with grounded theory methodology, a target number of interviews was not specified from the outset, rather theoretical saturation was determined as data collection and analysis ensued. Saturation occurred after 12 interviews and an additional two were carried out to ensure prolonged engagement with the data.

In addition, tentative hypotheses were shared with medical, nursing and allied health professionals through two poster presentations at regional and national research events in the area of chronic pain. Dissemination of early findings through this format can be considered as meeting the ‘peer debriefing’ quality criterion as set out by Lincoln & Guba (1995) for increasing credibility in qualitative research. By presenting an overview of findings early on in the research process and engaging in discussion with colleagues facilitated opportunities to discuss working hypotheses. Discussion with two physiotherapists indicated that the presence of pain-related imagery and associated distress resonated with their clinical experience. In particular, a vignette was shared of a patient describing his pain as ‘tiny soldiers tramping across his chest and could feel the sentry’s boots digging in.’ The health professional stated that the patient was of Turkish origin and hypothesised that the mental image may have been a means of communicating his distress.

Out of the 14 participants interviewed, 8 reported pain-related imagery. The finding that 57% of the sample for this qualitative study reported spontaneously invoked pain imagery is in line with previous studies within our research group which has indicated a prevalence rate of 40% in chronic pain populations.

4.2. Overview of findings

Given that the data analysis was informed by a CBT perspective, the findings will be reported within this framework. The cognitive appraisals and subsequent behavioural responses were analysed using grounded theory coding methods to ascertain whether mental images play a role in the aetiology and maintenance of distress in chronic pain. Interview transcripts were subjected to three stages of coding and emerging codes were compared between data sets (see Appendix...). A sample of transcripts were coded independently by a second rater. The extent to which emerging
categories resonated with multiple participant experiences were discussed and consensus on the core category agreed. Analysis identified the over-arching category of “changing self” that entailed negotiating the limitations associated with living with chronic pain and the subsequent impact on how participants perceived themselves. As indicated by the following diagram (figure 4.), the pain-related imagery represented how participants relate to their pain and in turn how they perceive themselves with a chronic condition.

Figure 4: Diagrammatic representation of substantive theory

![Diagram of substantive theory]

- Changing Self
  - Relating to Pain
    - Externalising body
    - Being controlled
    - Feeling trapped
  - Self-perception
    - Interpersonal Self (Comparing to others; Social Roles)
    - Intrapersonal Self (Mourning for a life lost)
- Pain (trigger)
  - Spiralling Emotions (personalising; catastrophising)
  - Whirling Thoughts
- Avoidance (pulling back; cognitive avoidance)
All interview responses related to pain-related images were consistent with a classic CBT vicious cycle, whereby the negative imagery could amplify pain suffering. The higher order categories of ‘relating to pain’ and ‘self-perception’ encapsulated how participants responded to a changing self of being controlled and entrapped by pain and in turn underwent a process of coming to terms with living with an ongoing illness. The process of acceptance entailed facing the prospect of becoming a different person in the light of not being able to to what what they had previously carried out with relative ease. The extent to how they appraised their social role functioning and view of self determined their ability to carry on even in the presence of pain. Those who reported resisting this ‘changing self’ described more significant distress in comparison to the participants who related having resolved this inner conflict. As illustrated by the above diagram, the higher order categories represent the core beliefs underpinning the cycle of maladaptive cognitions, emotions and behaviours triggered by a pain episode.

The subsequent vicious cycle is based on previous formulations using imagery (Holmes et al., 2008). The appraisals of participants who reported distress associated with chronic pain were replete with cognitive distortions and dysfunctional beliefs (‘whirling thoughts’). Participants who appraised their condition in catastrophic and personalised ways were more likely to have low self-efficacy beliefs in coping with pain. Moreover, they perceived themselves as being enmeshed with their pain condition which formed the basis of their self-identity. Subsequently, they tended to engage in cognitive and behavioural avoidance behaviours (‘avoidance’). This was frequently illustrated by examples of socially withdrawing, decreasing or avoiding activity, and several participants reported attempts to suppress pain-related thoughts and images. Conceptualised within a CBT framework, the cluster of cognitive and behavioural avoidance responses could serve as maintaining factors in distress (‘spiralling emotions’) and may prevent adequate adjustment to chronic pain. Thus, the initial distorted appraisals led to a vicious cycle of increased emotionality and maladaptive ways of coping.

In contrast, those who related coping relatively well with their pain, continually sought to reframe their circumstances and instill confidence in managing their symptoms. They described being able to ‘compartmentalise’ their chronic pain from their sense of self. Consequently, they responded to triggers of pain in qualitatively different ways. Firstly, they attended to their negative automatic thoughts or pain-related images, and processed them. Secondly, they acknowledged their pain, accepted it and employed adaptive coping strategies.
The pain-related imagery reported by the participants will be outlined prior to delineating the core category and sub-categories described above that emerged from the data analysis.

4.3. Pain-related imagery:

This study investigated pain-related images as categorised by Winterowd et al. (2003) and images of pain itself coupled with images of oneself in pain were reported.

4.3:1 Images of pain itself:

Akin to Gosden’s (2008) study, images of the pain contained sensory information and primarily described in visual and tactile sensory terms reflecting sensations of burning, electricity, tightening, stabbing, tearing, numbness, expanding, and numbness.

Table 2: Description of reported pain-related mental images

<table>
<thead>
<tr>
<th>Burning</th>
<th>Electricity</th>
<th>Tightening</th>
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<tbody>
<tr>
<td>“If you imagine red hot, how would you, you know, if you were going to stick me under this scanner, that’s what you would see. It’s just red hot...it’s just the colour of raw flesh red hot”</td>
<td>“I had hot irons in my legs, it was shooting pieces, I could them myself, so it was electricity”</td>
<td>“tight band around my knee”</td>
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<tr>
<td>“if you imagine that when you cut yourself or eh scrap your skin and are left with raw flesh and you poke it, that’s it. That’s what it feels like.”</td>
<td>“it’s like a network of circuits, just an absolute network on fire”</td>
<td>“it’s as though someone is pulling a rope or something through my thigh”</td>
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<tr>
<td>“it’s like putting a red hot poker in the back of my knee”</td>
<td>“electric shocks or something like that, you know, when something fuses and you get a flash”</td>
<td>“I couldn’t walk very far at all. When I feel in my legs seemed to tighten and I saw my, I saw my skin, sometimes, it was as though my skin is tightening over my legs”</td>
</tr>
<tr>
<td>“If you imagine wire mesh and you imagine it red hot.”</td>
<td>“it was like an electric current, a hot electric current”</td>
<td>“You feel as if though there’s something drawing up from your feet again, almost like a puppet would do (laughs), can’t get my toes to move, you know, that feeling”</td>
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</tbody>
</table>
“A bad day is when it’ll just flare up and I get it’s just like...I describe it as fireworks just going off in your head...and it’s really just like all fireworks or you get hot burning pain going”

“when you want to stretch your skin, you can stretch, and you can do it, with your head, you can maybe put your eyebrows out and ehm well my skin is too tight for ehm my head if you like. There’s not enough skin (laughs), I can feel when I do that.”

“someone stabbing me in the back of my knee with eh a hot iron”

“someone stabbing me in the back of my knee with eh a hot iron”

“...or the other thing is if tearing the joint out. Literally just, you know, you would see the way a carcass getting torn, it’s as if just the joint is getting torn.”

“...or the other thing is if tearing the joint out. Literally just, you know, you would see the way a carcass getting torn, it’s as if just the joint is getting torn.”

“it’s like it’s just getting like a balloon and it’s getting bigger and bigger (takes sharp intake of breath) it’s going to burst in a minute.”

“it’s like it’s just getting like a balloon and it’s getting bigger and bigger (takes sharp intake of breath) it’s going to burst in a minute.”

“...under my foot there’s feeling missing. I feel like there’s a big lump of cotton wool under my toes”

“...under my foot there’s feeling missing. I feel like there’s a big lump of cotton wool under my toes”

“it’s ehm...around my neck and shoulders, it’s more black...my lower back and there is more grey, it’s just the shooting and stabbing pains that just go with that.”

“it’s ehm...around my neck and shoulders, it’s more black...my lower back and there is more grey, it’s just the shooting and stabbing pains that just go with that.”

“It’s stabbing pain, it’s like somebody sticking, I dunno what, like somebody sticking a knife in you, it’s like and it’s twisting”

“It’s stabbing pain, it’s like somebody sticking, I dunno what, like somebody sticking a knife in you, it’s like and it’s twisting”

4.3.2 Images of oneself in pain:

The images of oneself in pain were reported by the two participants with Fibromyalgia syndrome. These images encapsulated a sense of heaviness and/or weakness and incorporated a ‘felt sense’ of living with pain. It was noteworthy that these participants found it difficult to express how they experienced their pain.
Feelings of entrapment
Feelings of heaviness
Feelings of weakness

(as squeezing her hand against her chest) related her pain as being ‘darkness’ with associated images of being:

“...in a long hole, it just goes down onto the ground and it’s ..you’re falling into it because you can’t get going properly.”

“like lead boots, you know, a horrible sort of tiredness and acheness in my legs”

“like someone pulls a plug” “like a complete power failure within the body”

These descriptions relate how the participants experience the overlapping symptoms of pain and fatigue. Interestingly, one of the defining characteristics of fatigue in fibromyalgia is a feeling of weakness or heaviness as proposed by a conceptual model of fatigue outlined in a recent study by Humphrey et al. (2010).

4.4 Emerging categories

4.4:1 Relating to Pain

This category encapsulated how participants related to their bodies in the context of living with chronic pain. They consistently talked about the challenges of living with enttractable pain. They recognised that with ‘no off switch’ to persistent pain can result in feelings of a dual relationship with the body, viewing it as seperated from the self and therefore fearful of unexpected illnesses.

(62 yr, Male) “I actually now begin to wonder this period, that I’ve had ongoing, for ... for more than a year now and I’m saying ‘well is this a bad patch? is this a progression in the disease? and that is hugely depressing.”

The sub-categories of externalising body; being controlled and feeling trapped were key components of these relational aspects of managing a chronic condition. Several participants referred to their pain and affected body parts in objective terms that indicated they had an external locus of control in relating to their pain. Pain was externalised and viewed as a seperate entity, almost having a life of its own. Participants’ descriptions of their relationship to their pain portrayed an image of a lurking monster-type figure that followed their owners around. It was akin to a current advertisement of a green phlegm-like monster representing flu symptoms that patients struggled to go about their daily business. The externalising images may be attributed to dimensions of high perceived external locus of control over pain, a factor which has been found to contribute to poor psychological adjustment to chronic pain (McCracken. 1998).
As a consequence of such dominance of pain in their lives, participants talked about the knock-on effect to their resilience and ability to utilise their personal resources in managing day-to-day tasks. Themes in which they experience their self as entrapped and limited by pain emerged from the data. Participants’ appraisals related how they perceived pain as physically holding them back from doing day-to-day activities they had previously carried out with ease. All participants described the debilitating interruptive and interference effects of living with chronic pain and it has compromised their quality of life. They talked about living ‘one day at a time’ and avoiding making plans. Pain was perceived as controlling to the extent that intensity levels determined coping abilities. They described how regularly monitoring their pain levels influenced their mood and overall motivation for managing their day.

(54 yr, Female) “I can have really better spells. I don’t call them good spells but they are better spells. Where I am thinking this is much better than, say I was last week. So your mood immediately comes up and you’re positive and when you’re in that positive frame of mind you can dip for and it where I don’t understand where the dips come back and you know, the physical dips I’m talking about”

The associated difficulties of being dependent on medication was discussed at relative length by all participants and represented another feature of feeling being controlled by pain. One participant described the process of undergoing investigations and treatments as “feeling like a yoyo.”

They related a constant struggle of assessing their abilities in the context of fluctuating pain levels. Catastrophic interpretations of pain flare ups decreased individuals’ ability to withstand physical discomfort and willingness to carry on.

(48 yr, Female) “...you’re thinking of all these things and sometimes it just gets a bit too much and you can’t think, I can’t do that today. I just don’t have the energy and ehmm think ‘no, I don’t want to go out today’ and I just stay in.”

These themes of feeling controlled and entrapped by pain concurs with a body of qualitative literature describing chronic pain patients’ experience of living with pain (Hellstrom, 2001). This category underpinning the reported cognitive appraisals may be interpreted as relating to the personal meaning pain has for the individual, and may reflect the influence of schema-level beliefs about the self, others and the world on the individual’s relationship with their pain.
4.4.2 Self-Perception

Participants’ accounts of their daily challenges in coping with pain indicated an impact on their sense of self and in turn how they related to others. As illustrated by the diagram, living with chronic pain can pose a threat to their intrapersonal and interpersonal selves and the degree to which they were able to process and accept these changes influenced the extent to which pain flare-ups could trigger maladaptive emotional and behavioural responses. Several participants referred to the notion that their past healthy selves had been lost and were continually in the process of grieving:

(62 Yr, Male) “Because you’re mourning for a life lost, a life wasted...because it is, because you know, you know wasted. Well, everyone does that when they get to...because you know, that’s just how...because it is...if you look back.”

This category encapsulated several participants’ perceptions of how pain has resulted in a loss of control over their general health and abilities. Participant narratives highlighted continued frustration with their limited abilities and for some the onset of chronic pain signified a critical transition in their intrapersonal selves. One woman described the onset of her condition as being equivalent to meeting her life partner and perhaps indicated the degree to which she perceived pain had impacted on her sense of self.

(61 Yr, Female) “I don’t know, it’s just it’s always there. It changes your life. You know, I don’t know, like meeting your husband, your partner, it changes your life. Living with pain also does...I just feel it’s an alter-ego, you know, not quite though it’s part of me.”

Participants talked about feeling different and wanting that to be recognised. They referred to chronic pain as being an ‘invisible’ condition which presented its own challenges for interacting with others. It was apparent that some individuals were ambivalent with regards to struggling to be understood, yet reluctant to be seen with overt signs of disability, such as a wheelchair or crutches. Consequently, individuals described isolating themselves from others. One participant stated that a lack of understanding from others “felt like a kick in the stomach.” As participants went on to describe how their identities were projected and defined by others, it became apparent that their interpersonal selves were disrupted. The threat of not being affirmed by others was particularly reflected in interactions with the health service. They related being caught in a system that requires them ‘to sell your illness.’ They talked about the challenges of feeling vulnerable due to being reliant on others. Perceptions of not being self-sufficient impacted on their social roles as parents, spouses and friends.
P.5. (61 yr, Male) “You spend a lot of your time just ‘resting’ - just trying to keep it quiet, it eh...effects your social life, you don’t have one uhm...your relationships, what you, you know my daughter was 5 when I got it, I would have been a different parent even ...also the type of person you are because you’re in the...because as I say you have periods when you just withdraw because...and that makes you a different person.”

4.4:3 Core Category - ‘Changing Self’

Themes of loss of control and social roles that characterised participants’ cognitive distortions were indicative of low self-efficacy beliefs and an enmeshed self-schema that are encapsulated in the core category “changing self.” The more those who felt entrapped and limited by pain, the more pain appeared to impact on their sense of self. The complexity of how individuals relate to their pain was encapsulated in reports of identifying with pain and with being disabled. Data from this study suggests that exploration of the emotionally-laden images revealed the cognitive appraisals that contribute to the degree of distress. Further exploration of participants’ appraisals for example, led to discussion on the associated meaning of the pain-related images with regard to their view of self.

I. “I’m just wondering, that image is in relation to your pain. Just wondered in your mind’s eye of being in the black hole of how you’re thinking about yourself, what does that mean about you?”

(48 yr, Female) “I just sometimes think...not...ach how do you describe it not being able...when you’re not able to do the things you want to do and your body doesn’t let you, you just feel rubbish because you can’t physically do these things and you want to physically do them so it’s just you’re battling with yourself and ehmm you think why won’t my body let me do it? and it’s sometimes coming to terms with the illness hasn’t totally got there.”

A cognitive-behavioural formulation would predict that the content of a patient’s core beliefs and schemas can be obtained by examining the themes derived from their cognitive responses to specific experiences (Beck, 1964; 1971). Wells (1997) states that imagery techniques can be employed to elicit the content of underlying schemas. This is based on the premise derived from the emotional disorders research on links between cognition and emotion that meanings of events are represented in spontaneously occurring intrusive images and therefore can be explored as a means of eliciting underlying appraisals.

Stopa (2009) purported that the body of work exploring the relationship between emotional imagery and the self indicates that distorted self-images may have both a causal and a maintaining role in
disorders. She contends that self-imagery provides a potent form of self-representation. A cursory glance over the eating disorders whereby the visible self is associated with self worth, the links are clear. However, Stopa (2009) asserts that distorted self-images may be associated with specific images of feared situations, which range from vivid memories of traumatic situations to images of a feared object. Whilst the self may not be directly represented in these images, the individual’s beliefs about the meaning and consequences of these feared images often have negative consequences for the self. PTSD is the most striking example as the disorder is characterised by a stream of intrusive images related to the trauma that likely induces fear that the individual is going mad or losing control. Given the need for consistency and clarity about the self, a loss of control can represent a direct threat to the integrity of the self and therefore may trigger maladaptive management strategies. Recent studies (Hackmann et al., 2000; Wild et al., 2007) have demonstrated that recurrent and negative intrusive images about the self are also common in patients with social phobia. Clark and Wells (1995) therefore proposed a model that delineates a distorted image of one’s public self as being the core of social phobia.

This renewed emphasis on the role of imagery in the threatened self may bear particular relevance for patients with chronic pain. Whilst research suggests that chronic pain patients rarely endorse self-blame statements (Morley & Wilkinson, 1995; Williams et al., 1994), this is due to intact self-efficacy and cognitive distortions limited to specific pain-relevant situations (Pincus & Morley, 2001). Chronic pain however, is frequently associated with depression and anxiety (Bair et al., 2003; Keefe et al., 2004) and changes in the content of a person’s self-view are common in the emotional disorders. The participants in this study reporting significant levels of affective distress described the experience of having ‘lost the self’ before the onset of their condition, and in one instance related a process of grieving for the old self that had ‘died.’ Themes that emerged from the data relating to a process of ‘battling’ with the adjustment to an ongoing pain condition suggest that underlying appraisals of a threatened self may play a role in the maintenance of distress in this patient group.

The construct of self-pain enmeshment which denotes a measure of a person’s identity: their sense of who they are and what they might become - their possible selves (Morley & Eccleston, 2004) has been systematically investigated in recent years with regards to individuals with chronic pain (Morley, Davies, & Barton, 2005; Sutherland & Morley, 2008). Morley et al.’s (2005) study sought to establish the relationship between self-pain enmeshment, distress (depression) and acceptance
having accounted for variability in interruption and interference associated with chronic pain. They found that in patients who were focused on the elimination of pain, movement towards other goals is blocked and will lead to frustration, a sense of entrapment and depression (Morley et al., 2005). Frustration was the most intensely reported feeling in the study which corroborates with previous research (Harris et al., 2003; Price, 1999; Wade et al., 1990). The authors therefore suggest that the degree to which patients invest achievement of their future goals on the elimination of pain can compromise emotional adjustment and thus lead into a self-pain enmeshment.

The ‘changing self’ core category that emerged from the data on participants’ cognitive appraisals of their pain-related images is congruent with this notion of enmeshment between self and pain schemas. Furthermore, more in-depth exploration of these initial appraisals revealed schema-beliefs with regard to the self and others. The participants who related appraisals of catastrophising and personalising tended to attribute their coping according to pain intensity. They operationalised ‘good days’ based on decreased pain levels. They described an external locus of control towards managing intense episodes of pain. For example, they engaged in escape behaviours of socially withdrawing and excessive rest, and cognitive avoidance behaviours of suppressing negative automatic thoughts and images. Overall, they perceived pain being an integral component of who they are and how they manage their day-to-day living. Interestingly, Eccleston and Crombez’s (1999) cognitive-affective model of the interruptive function of pain re-defines coping with pain by the ability of switching attentional processes between pain and other demands in the environment. Whilst this is a constant challenge for all patients with chronic pain, the degree to which individuals catastrophise mediates the extent to which they are able to carry on even in the presence of pain. Indeed, this constitutes the defining features of the emerging concept of acceptance in chronic pain that individuals are willing to engage in ‘a course of action that is meaningful and satisfying even in the presence of pain’ (McCracken et al., 2004, p. 4).

There is an emerging research base that is investigating acceptance in chronic pain. It has consistently found that acceptance reduces the negative effects of pain on both mental and physical wellbeing (McCracken & Eccleston, 2005; Viane et al., 2003). A Q-methodological analysis on examining the constitute elements of this construct (Risdon et al., 2003) highlights that acceptance of chronic pain relates to social role functioning and appraisal of self and social worth, rather than on the sensory or experiential aspects of pain. Arising from the personal accounts of patients with chronic pain, the authors conclude that in order to be able to carry on with daily tasks even in the
presence of pain requires accepting a change in how they view themselves. From our understanding of the significant interruptive effects of chronic pain, this stimulus is fundamentally threatening and one that threatens the core sense of a coherent and valuable self (Eccleston & Crombez, 1999). Risdon et al.’s study indicates that the process of acceptance entails facing the prospect of becoming a different person. The struggle of ‘coming to terms’ with an ongoing illness partially arises from a resistance to this change. The participants who are in the process of ‘battling with yourself’ are continually negotiating this challenge.

4.5. Impact of pain-related imagery on emotional and behavioural functioning:

By means of exploring the appraisals associated with the images, the emotional and behavioural response pattern was ascertained and can be described within a CBT framework. In Table 3 the primary mental image described by each the 8 participants are summarised according to this framework.

Table 3: Description of primary pain-related mental images

<table>
<thead>
<tr>
<th>No.</th>
<th>Content of Image</th>
<th>Emotional response</th>
<th>Associated Meaning</th>
<th>Behavioural response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>“It’s as if tearing the joint out. Literally just, you know, you would see the way a carcass getting torn, it’s as if it’s just the joint is getting torn”</td>
<td>Anxiety; hopelessness</td>
<td>“So there’s damage or what damage has occurred to give me this pain? Have I got something that eh have I got a joint that’s so badly damaged that it’s never going to go away?”</td>
<td>Withdrawing “You kind of shut down”</td>
</tr>
<tr>
<td>2</td>
<td>“It was like an electric current, a hot electric current and there’s eh under my foot there’s feeling missing. I feel like there’s a big lump of cotton wool under my toes”</td>
<td>Anxiety</td>
<td>“I’ve done too much”</td>
<td>Reducing activity “I would wind it back a bit and wouldn’t do too much”</td>
</tr>
<tr>
<td>No.</td>
<td>Content of Image</td>
<td>Emotional response</td>
<td>Associated Meaning</td>
<td>Behavioural response</td>
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<tr>
<td>3</td>
<td>“...in a long hole, it just goes down onto the ground and it’s...you’re falling into it because you can’t get going properly.”</td>
<td>Anxiety; depression</td>
<td>“Because you’re trying to be positive and you’re trying to keep going but your body doesn’t want you to keep going because of the pain and the tiredness and your body is just controlling you”</td>
<td>Withdrawing; suppressing images &amp; thoughts “push to the back of my mind”</td>
</tr>
<tr>
<td>4</td>
<td>“I just feel like it’s an alter-ego”</td>
<td>Depression</td>
<td>“Not quite, though it’s a part of me, I’m not quite pain...yet”</td>
<td>Suppressing image “takes a lot to keep it down;” avoid making plans</td>
</tr>
<tr>
<td>5</td>
<td>“...it’s really like all fireworks or you just get hot burning pain going”</td>
<td>Acknowledge pain; acceptance</td>
<td>“This is the way it is”</td>
<td>Rest; distraction</td>
</tr>
<tr>
<td>6</td>
<td>“feels like lead boots”</td>
<td>Acknowledge pain; acceptance</td>
<td>“It’s like I’m pushing against something all the time, or there’s something holding me back all the time”</td>
<td>Processing thoughts &amp; images; slowing down; increasing activity on an incremental basis</td>
</tr>
<tr>
<td>7</td>
<td>“It’s like it’s just becoming a balloon and it’s getting bigger and bigger (takes sharp intake of breath) it’s going to burst in a minute”</td>
<td>Acknowledge pain; acceptance</td>
<td>“If I walk I just seem to be able to keep at it, you know, at a more gentle level”</td>
<td>Modify activity; alter posture</td>
</tr>
<tr>
<td>8</td>
<td>“Like a complete power failure within the body”</td>
<td>Frustrated; powerless</td>
<td>“I can feel that ‘awful plug pulling’ and I just know that I’ll have to lie down”</td>
<td>Socially withdraw; excessive rest</td>
</tr>
</tbody>
</table>
4.6. Spiralling emotions

As discussion continued to centre on the associated meaning of the images, the participants who reported distress in their day-to-day lives became visibly distressed. Participants related a range of emotional responses they experience in response to intense episodes of pain. They attributed the interruptive and interference effects of living with pain as key triggers to distress. The emotional responses reflected anxiety, depression, frustrated and feeling vulnerable.

(48 Yr, Female) “and you do feel crap sometimes and it’s just makes you feel rubbish and you just start worrying about everything then because you’re...because of this darkness.”

(45 Yr, Female) “takes you down...” (welling up with tears)

(62 Yr, Male) “I just have to be able to ...have a portion. If you’re going to take that away from me, you can shut the curtains.”

(56 Yr, Male) “So that is..uhm.. that is a ...that was down to a basic thing, you don’t feel self sufficient, you feel vulnerable because everything..that comes up is a crisis..every wee job that comes up is a crisis.”

Observations made regarding participants' initial responses to being asked whether they experience any mental images in response to their pain suggest that they typically are not aware or attend to these images. Philips (2011) contends that pain-related imagery is an 'unobserved' cognition in patients with chronic pain. Similar to Philip’s (2011) study, participants readily described their pain thoughts without affect. However, experienced difficulty in describing the content of the image, initially gesturing to effected body parts, and they were frequently accompanied by an emotional response. For example, one participant in describing the image had eyes cast downward, twitching and took a sharp intake of breath. Two other participants became tearful. In addition, another participant noticeably made a concerted effort to switch from talking about the impact of her pain-related images to that of how she manages in a practical way. It was noted in the researcher’s reflective journal whether this avoidance tactic was indicative of that individual’s typical respose to pain and emotional distress.

Similar affective responses to invoking negative pain-related images have been reported elsewhere. Potter (2007) identified significant correlations between mental images and measures of anxiety, depression and catastrophising in comparison to those who reported not experiencing such images. Gosden (2008) found that participants reported experiencing increased physiological arousal and negative emotional reactivity while being in contact with their image.
There are a number of possibilities that may account for the observed emotive responses in recalling the image and eliciting its detail. Eccleston and Crombez’s (1999) cognitive-affective model of the interruptive function of pain suggests that the interplay between the pain-related characteristics and the environment in which pain emerges determines how pain disrupts and demands attention. The pain-related characteristics of intensity, novelty, and predictability of a threatening pain stimulus coupled with the extent to which an individual catastrophises about the pain and has a high somatic awareness can influence the degree of selective processing of sensory-intensity information. As the interview questions were focused on participants’ experience of pain and whether it invoked any spontaneous imagery, a by-product of heightened awareness may have influenced attentional bias towards pain and hence a trigger for increased emotionality.

Previous research has investigated potential links between experiencing pain-related images and pain-intensity levels. Gosden (2008) found that those experiencing images reported higher levels of sensory and affective pain unpleasantness as measured by the McGill Pain Questionnaire Short-form. This effect occurred in the absence of a difference in ratings of current pain intensity. Furthermore, half of the sample described increased self-reported pain intensity levels whilst processing the image. This was borne out in Lonsdale’s (2010) experimental study that in comparison to participants describing their pain verbally, engaging with pain-related images resulted in a temporary increase in pain intensity, sadness, anger, disgust and a decrease in happiness.

Alternatively, coming into contact with their idiosyncratic pain-related images invoked emotive responses pertinent to their lived experiences. The experimental evidence from cognitive psychology suggests that imagery invokes emotion more readily than verbal, language-based processing (Holmes & Matthews, 2010).

The observed emotional responses to pain-related imagery coupled with existing evidence indicate that pain-related mental images can elicit physiological and emotional arousal independent of sensory pain. It therefore could be speculated that occurrence of these images might lead to an exacerbation of physiological and emotional reactivity to sensory pain. If images frequently activate physiological and emotional reactivity, working with patients’ spontaneously occurring images in therapy may provide access by which links between pain (as a stimulus) and such responses can be loosened using imaginal exposure and imagery modification techniques.
Interestingly, in an incident of exploring a participant’s image in the interview setting led to an impromptu imaginal exposure task. One of the participants acknowledged that she found it uncomfortable coming into contact with the pain-related images in situ. Permission was sought to explore the associated meaning further, thereby potentially leading to uncovering more in-depth information of underlying schema. The participant reflected on the experience and described it as a ‘release’ to talk about the image instead of trying to keep it in. Throughout the process of eliciting the image and exploring pertinent appraisals, the participant spontaneously invoked coping imagery “hold onto the branches on the top so you don’t go down” that appeared to enable her attend to the image and associated distress. Subsequently, she was able to differentiate between tolerable and intolerable pain levels reflected in the imagery:

(48 Yr, Female) “sometimes you’re beside it (long dark hole) and sometimes you’re in it. If you’re in it, your pain’s worse...if you’re just not quite in it, then you’re controlling it more.”

4.7. Avoidance and Whirling Thoughts

As predicted by a CBT vicious cycle formulation, the participants who reported experiencing distress described reacting in avoidant ways. These included; immediately halting activity, socially withdrawing, and attempts to ignore or suppress the image. Such maladaptive ways of responding to pain-related images was reported in recent previous studies (Gosden, 2008; Berna, 2011).

(62 Yr, Male) You shut down and you withdraw. You withdraw from conversation, because you’ve little tolerance for...I mean, you’ve little tolerance for other people (sigh), really yeah, you’ve probably little tolerance for other people, it’s even things like...things that give you pleasure, not particularly interested in. You’re just really...because the only real release is sleep.

In addition to behavioural avoidance, participants described employing cognitive avoidance by way of attempting to suppress their pain-related verbal and imaginal cognitions.

(60 Yr, Female) “I try to hide from it myself, that sounds silly.”

I. “Is that like not think about it?

“Yeah, don’t think about it, if you don’t think about it, it’ll go away, ehm.. but it doesn’t, but at times you lose control. I have lost a lot of control of my own life through pain...ehm...I knew I had it, but I didn’t want to know. I didn’t want to know anything.”
This led to rumination and unwanted thoughts and an adverse impact on mood thereby perpetuating pain, disability and suffering.

(48 Yr, Female) ‘..you just keep saying ‘right, I’ve got to put these things to the back of my mind and just keep going and do what needs to be done…but then sometimes I just go to bed and shut my eyes on it…sometimes by shutting my eyes makes it more real because it’s dark…ehm just trying to get other thoughts into your head to stop thinking about it.”

(45 Yr, Female) ‘..it’s in your head and it’s all these thoughts, it’s just everything becomes difficult to deal with because you’re in this dark place.”

This illustrates how those who have more avoidant reactions and coping strategies experience greater emotional and pain reactivity when they make contact with their image. It is likely that driven by catastrophic thoughts, these individuals seek to employ mental control strategies as a means to prevent distress, however exacerbates the emotive content as a consequence.

‘Changing self’ category revealed surface-level cognitive distortions such as catastrophising and personalising pain. There is a wealth of literature highlighting the links between pain catastrophising and pain and disability in patients with a variety of acute and chronic pain conditions (Quartana et al., 2009). Catastrophising has been associated with heightened disability, predicting the risk of chronicity and the severity of disability better than illness-related variables or pain itself. (Sullivan et al., 2005). Wade et al.’s (2011) recent study investigating the impact of pain intensity on coping with pain found that pain unpleasantness and catastrophising were directly driven by pain sensation intensity, however, both constructs determined the extent of suffering in different ways. Sensory features of pain that included spatial, temporal, and intrusive characteristics may serve as cues for meanings related to future negative consequences associated with pain. Wade et al. (2011) conceptualised catastrophising as being an interpretative activity that requires higher order cognitive appraisals of the meaning of pain, and the extent to which someone engages in this distorted thinking style is informed by their life history. Therefore, individuals will differ on how they interpret the sensory cues and in turn influence whether they magnify, ruminate and project future predictions of helplessness. As such, catastrophising makes a unique contribution to suffering that is largely independent of immediate unpleasantness.

Eccleston & Crombez’s (1999) cognitive affective model of the interruptive function of pain offers a helpful explanation of how the impoverished social environments patients with chronic pain inhabit lends them to ruminate about pain and disability and employ maladaptive ways of coping.
By re-defining chronic pain as chronic interruption on attentional processes (Eccleson & Crombez, 1999), it would be expected that all patients with pain selectively process sensory-intensity information (Pincus & Morley, 2001). Indeed, the consequences of chronic interruption for many individuals with chronic pain is the development of a clinical pattern of high symptom reporting (Bacon et al., 1994), depression (Turk et al., 1995), pervasive avoidance of pain and movement (Crombez et al., 1998; Vlaeyen et al., 1995) and social withdrawal (Asmundson et al., 1996). This clinical pattern subsequently leaves patients inhabiting an impoverished and restricted environment that is dominated by pain, disability and the fear of more pain (Eccleston & Crombez, 1999). Such environmental factors can leave patients vulnerable to processing pain as threatening and thereby can become caught up in cycles of threat-related rumination about pain, disability and its consequences. Eccleston & Crombez’s (1999) cognitive-affective model proposes that rumination leads chronic pain patients to perseverate on problem-solving attempts at the removal of pain. Persistent failure to achieve this results in perpetuation of distress and disability. The authors suggest that re-directing attentional processes between pain and other demands in the environment can contribute to breaking this cycle. In effect, coping with chronic pain can be conceptualised as the “ongoing attempt to recover from chronic interruption by repeatedly switching between pain and other demands in the environment” (p. 363).

Avoidance of distressing thoughts, images, and physiological sensations has been well documented in the literature as being a maintaining factor of distress in many cognitive behavioural models of anxiety disorders. Jamani and Clyde’s (2008) stimulating paper on a proposed refinement of Vlaeyen & Linton’s (2000)’s fear-avoidance model can account for the potential role of pain-related images in maintaining distress in chronic pain. By conceptualising these responses as safety-seeking behaviours (Salkovskis, 1991; Clark, 1999) may contribute to an increased understanding whether these cognitive processes are maintaining factors in distress. They argue that the emotional disorders literature with its focus on the role of cognitive processes in maintaining emotional distress can be applicable to pain-related fear. According to Salkovski et al.’s (2006) classification of safety-seeking behaviours (‘direct avoidance,’ ‘escape,’ and ‘subtle avoidance’) can be applied to the behaviours associated with pain-related fear. Whilst the former two are frequently reported and readily identified, subtle avoidance behaviours are more difficult to identify and idiosyncratic in nature. Examples from the current study include; “I can hold onto my husband’s arm so that I am protected,” “I have to use my wheelchair when I’m going shopping, when I can’t walk that distance without being in terrible pain and get exhausted,” and using walking aids to “prevent me from
falling and damaging my leg.” In accordance with the role of negative appraisals in Vlaeyen & Linton’s (2000) model, these safety-seeking behaviours are intended to prevent a feared catastrophe, however prevent any disconfirmation of the catastrophic cognition, thereby serving to maintain, or even strengthen it.

Tang et al.’s (2007) study that investigated safety-seeking behaviours and health anxiety in patients with chronic pain suggest that subtle safety-seeking behaviours, rather than complete avoidance of activity are more prevalent in this population. Tang et al.’s (2007) findings highlight the role of safety-seeking behaviours as a way of understanding catastrophising thoughts and beliefs and their role in maintaining chronic pain. Targeting and reducing safety-seeking behaviours therefore holds clinical utility in two key ways. Firstly, by enabling individuals to reduce behaviours that interfere with daily functioning. Secondly, to challenge catastrophic appraisals with a view to restructuring more adaptive cognitive and behavioural responses.

The experiences related by the participants in responding to pain-related images suggest that cognitive avoidance strategies such as suppressing cognitions and their links with physiological and emotional reactivity, can strengthen maintenance cycles and increases vulnerability to affective distress for some individuals who experience a mental image of their pain.

4.8. Coping imagery:

Two participants reported a qualitatively different behavioural response to their pain-related images. They described engaging with their image, processing it and trying to manipulate it as a means of managing their pain levels. These individuals related managing their pain relatively well and therefore such responses of attending to images may have implications for ameliorating self-management strategies. Such spontaneous coping imagery was also reported by participants in Gosden’s (2008) and Berna et al.’s (2011) studies.

The few examples provided meant that it was not amenable to categorising them into discrete themes. The idiosyncratic coping imagery reflected the use of imagining a supportive person as well pain management strategies:

(54 Yr, Female) “Yeah, I think that’s what I’m doing at the moment is pushing them away. emmm..Sometimes it’s quite difficult. ‘Why me?’ I talk to my mum..she died last year so I’ve got a picture of her on the mantle piece so I’ll go over to that and talk to
Purposeful invoking mental images was the other form of coping imagery reported. This appeared to enable the participant to attend to and process the image. One participant for example, described ‘pulling herself through’ by holding onto a “mental crow bar.” Another participant discussed how engaging with her image of pain expanding like a balloon has been used for facilitating coping.

(62 Yr, Female) “If I keep the leg moving, it’s sore but it’s not as sore as this just standing but then I seem to (crringes and laughs) and my thoughts again, it’s like it’s just getting like a balloon and it’s getting bigger and bigger (sharp intake of breath) it’s going to burst in a minute. If I walk I just seem to be able to keep it at, you know, a more gentle level. It’s still sore but more even.”

Utility of such coping strategies is reported as pain modification techniques in the pain literature. However, as a cluster of behavioural interventions, they have not been systematically evaluated in the outcome literature. Encouragingly, participants reported reduced affective distress as a result of employing these cognitive strategies. The participant quoted above related how processing this image increased perceived control over pain as by imagining it visually facilitated monitoring and employing adaptive strategies. Given the underpinning mechanisms are as yet unknown, it is unclear whether such strategies are adaptative or maladaptive in the management of chronic pain. This form of coping imagery therefore, warrants further investigation.

4.9. Are pain-related images intrusive cognitions or metaphorical descriptions of pain?

The mental imagery in chronic pain research (Gillanders et al., 2012; Berna, 2011; Lonsdale, 2010, Gosden, 2008) suggest that images may be a potent cognitive process in pain-related suffering which akin to negative and catastrophic thoughts, play a role in the maintenance of threat. Tentative hypotheses from this body of work has centred on the potential impact these images being of an intrusive nature and thus adversely effect functioning. This study has sought to further examine mental images with a view to differentiating between metaphorical descriptions and intrusive images.

In the original exposition of his cognitive-affective model of depression, Beck (1964) states that cognitions are characterised by three distinct qualities, that of being automatic, plausible and involuntary. Intrusive or ‘relentless’ cognitions are conceptualised as being invasive and can have an adverse impact on functioning as they “continuously invade the phenomenal field and the patient
has little power to ward them off or focus his attention on something else.” (p.568). This definition implies that the level of perceived control over the mental image determines whether it is of an intrusive nature or merely a visual cognition without affect.

Participants in this study were directly questioned on whether their pain-related images indicated a sense of their lived experience of pain or functioned as a metaphorical description of their pain.

Individuals differentially responded to their mental images in accordance with how they perceived them:

(62 Yr, Male) “you’ve seen these bells at the fairground, there’s a bell there and some guy hits it with a hammer, it hits the, like the bottom of the hammer and away it shoots up, it hits the bell and you know, it rings and that’s what it’s like. The pain, you just feel like your head’s exploding”

J. “Right, okay. So are you saying that’s how you describe it so that others can understand rather than how it is to live with it?

“That’s how I describe it because that is happening, it is exploding in your head”

In contrast, a participant with osteo-arthritis pain stated she did not experience distress. On the contrary, the images functioned to bridge understanding with others as well as to facilitate coping.

(62 Yr, Female) “I can picture them and I can sort of describe them to somebody and I can deal with them myself. It’s just you can say ‘I don’t feel very good in my pins today’ okay, ‘do you want to take my arm?’ and I do...I can see it so clearly in my mind what’s happening, in my own way so I just eh right, if I do this, I’ll make it.”

Whilst imagery vividness and emotional and pain reactivity was not explored in the current study, participants’ accounts suggest that there are no clear links. Gosden (2008) reported correlations between imagery vividness and lower levels of emotional and pain reactivity along with greater levels of perceived control over imagery and greater levels of pain reactivity. This was contrary to what had been hypothesised and furthermore seemed counter-intuitive that high levels of perceived control did not reduce psychological distress. The use of mental control strategies was suggested of mediating the effects observed.

Data obtained in this study that incorporated detailed information on participants’ cognitive appraisals of their imagery found that individuals can report vivid imagery without significant
distress due to how they perceived the function of the imagery. For example, as illustrated with the quotation above, participants who appraised their images as being metaphorical representations did not report emotional reactivity. This would suggest that presence of vivid and frequent images does not necessitate the onset of emotionality. By ascertaining this distinction in a clinical context can provide further insight as to why individuals differ in their behavioural responses to the pain-related imagery and understood within a CBT framework, the emotional-behavioural response pattern derives from the individual’s appraisal of the pain-related image.

Use of metaphors to communicate pain experience has been reported in a recent study by Clarke et al. (in press). Their qualitative study explored older adults’ accounts of living with pain and found that participants used stories and metaphors to relate their experiences. Similar to the pain-related imagery reported by the participants in the current study, the descriptions contained sensory detail and connotations of how pain effects them. For example, “Well it’s excruciatingly sore. I thought it was torture and I was thinking of Bloody Mary in the Sixteenth century, and I though in this day and age we shouldn’t have to suffer like this.” The authors posit that a narrative approach helped facilitate the participant’s conceptualisation of pain and the impact on their life. Indeed, as highlighted by Jamani and Clyde (2008), clinical anecdotes indicate that patients frequently describe their pain and pain site in graphic terms, often involving metaphor and imagery. Research has shown that metaphor has been used by patients with chronic pain as a means of communicating an ‘invisible’ condition (Schott, 2004). However, differentiating between intrusive images and metaphorical descriptions of pain can be helpful for a cognitive conceptualisation of assessing and treating psychological distress associated with chronic pain.

4.10 Substantive theory

Findings from this study indicate that ascertaining patients’ idiosyncratic appraisals to their pain-related image(s) can facilitate this process of differentiating between these phenomena. Consequently, the emerging substantive theory regarding pain-related imagery indicates that this phenomenon can play a role in the aetiology and maintenance of distress in managing chronic pain. Individuals that experience intrusive images related to their pain and themselves in pain and interpret these in catastrophic ways seems to have an adverse impact on their functioning. Intrusive naturally-occurring images of pain can represent underlying appraisals of a threatened self and can
contribute to the maintenance of distress. Identification and exploration of this potent form of cognition therefore warrants closer attention in clinical assessment and intervention.

4.11. Limitations

4.11:1 Sample characteristics

The participants represented a sample that had either been engaged with the Chronic Pain Management Service and as such had completed a group-based cognitive-behavioural intervention or were not in receipt of services and were accessing group support from Pain Association Scotland. The potential influential effect of suggestibility on participants' reports of mental imagery as a result of having completed a PMP was raised in the methodology section. The results indicate that four participants who reported experiencing pain-related imagery had completed a PMP. Whilst previous involvement in the CBT programme may have influenced these participants in reporting pain-related imagery, two participants initially reported not experiencing mental imagery and observations made regarding the process of invoking imagery (eyes closed; visible signs of distress) suggest that these images were naturally-occurring. The other two participants readily reported pain-related images without increased emotionality and were aware of its occurrence in their daily lives.

This observational information coupled with the data obtained on participants' pain-related imagery supports the existence of naturally-occurring mental images among patients with chronic pain and therefore unlikely that the reported findings could be accounted for by the effects of suggestion. However, participants' awareness of their own idiosyncratic imagery may have increased as a result of being involved in the research process. Indeed, participants commented at the end of their interviews that a likely consequence of may be a resurgence of ‘whirring thoughts’ associated with their pain.

The sample size of 14 participants was not extensive in comparison to similar studies (e.g. Clarke et al., in press; Humphrey et al., 2010). Time and resource constraints limited the breadth and depth of data collated. Nevertheless, Strauss and Corbin (1998) advise that at least ten interviews or observations with detailed coding are required for building a grounded theory.
4.11:2 Social desirability

The perspectives shared during interviews may have been due to social desirability effects (King & Horrocks, 2010; Hollway & Jefferson, 2000). In an attempt to redress this, the researcher spent some time rapport-building with participants before commencing the interviews. They were reminded that there were no ‘right’ or ‘wrong’ answers and the researcher was interested in listening to their views of their lived experience with chronic pain.

Several participants became visibly upset when relating their pain-related images. As a means of ensuring their safety and wellbeing, participants were asked whether they wished to withdraw from the interview. Given that qualitative research is not a one-off conversation, it requires renegotiation with participants to ensure they consent to continuing in the research process (Ramos, 1989).

4.11:3 Respondent validity

Respondent validation is achieved by returning to the initial sample to enable clarification and validate data interpretation; a technique referred to as ‘member checking.’ (Lincoln & Guba, 1985). The study was therefore limited by the omission of substantiation. Whilst efforts were made to communicate to participants the summarised points raised in their respective interviews in written form, time constraints prevented a thorough follow-up by means of face-to-face contact. Encouragingly, several participants expressed an interest in being involved in subsequent interviews and/ or meetings. However, by using the constant comparative method of continually following up on tentative hypotheses with participants as the research process ensued may contribute to increasing respondent validity.

4.12. Theoretical implications

4.12:1 Imagery as a form of pain-related cognition

The phenomenon of pain-related imagery has been systematically investigated within the past 5 years. It is a growing area and one that bears important implications for enhancing our understanding of psychological distress associated with chronic pain. The body of work to date (Potter, 2007; Gosden, 2008; Lonsdale, 2010; Berna et al., 2011; Philips, 2011) suggests that images of pain are spontaneously invoked by patients in response to triggers of pain. Data gleaned
from this grounded theory study corroborates these findings of pain-related images as being a theoretical construct relevant to a psychological formulation of distress in chronic pain. By employing grounded theory methods of “support(ing) the interviewees in developing their meanings” (Kvale, 1996, p. 226)” strengthens the face validity of the construct. Moreover, with tentative hypotheses resonating with the clinical experience of medical, nursing and allied health professionals indicates its potential clinical utility.

Findings from the current study extends existing knowledge of this phenomenon by providing working hypotheses about differentiating between intrusive mental images and metaphorical descriptions of pain. A distinction between the two constructs expands our understanding of the potential impact on patient functioning.

4.12: 2 Impact on emotional and behavioural functioning

Participants reported mental images of the pain itself (“hot electric current”) and images of oneself in pain (“lead boots”). The cognitive appraisals elicited suggest that these negative pain-related images can be functionally equivalent to negative, automatic thoughts as a vital cognitive process in the aetiology and maintenance of distress. Jamani and Clyde (2008) hypothesed that intrusive images can have explanatory value in pain-related fear. They assert that owing to the threatening content, images may elicit an anxiety response, including a physiological reaction. Subsequent safety-seeking behaviours, such as avoidance or early termination of an activity, may prevent the distorted image being updated (Hackmann et al., 2000) thereby maintaining pain associated suffering. Participants’ accounts depicted frequent avoidant reactions to painful episodes as well as to subsequent pain-related thoughts and images. Unsuccessful attempts at suppressing their verbal and imaginal cognitions attest to the potency of safety-seeking behaviours in vicious maintenance cycles of psychological distress associated with chronic pain. These findings therefore add weight to Jamani and Clyde’s (2008) argument that a more cognitively-oriented approach focused on cognitive change may ameliorate treatment efficacy for patients with persistent pain.

Such a renewed emphasis on cognitive factors is also seen in Crombez et al.’s (2012) call for a reformulation and expansion of the fear-avoidance model to adopt a motivational and self-regulatory perspective on pain and disability. By redefining pain-related fear as “misdirected problem solving” that may result from the extent to which pain directly or indirectly interferes with valued personal strivings (p. 479) leads to a less perjorative way of viewing patients’ difficulties in
coping with pain. The findings from this study that participants’ appraisals of pain derive from their views of self and the world corroborate with this standpoint. The example of the participant with fibromyaglia who related self images of being controlled by pain described feeling frustrated at not being able to do the activities she previously carried out with relative ease. Formulating her difficulties within the motivational-oriented fear-avoidance model may inform how interventions could focus on ways of enabling her to dis-engage from the unattainable goal of absolute pain relief and re-engage in other valuable goals less affected by pain. Similar new ways of working with chronic pain patients have been put forward by the acceptance research. An intriguing observation, for example arising from Morley et al.’s (2005) study found that participants were absorbed in the possible selves task and subsequently informed the suggestion that incorporating personal growth work in clinical interventions may be a useful addition. Essentially patients may benefit from discussing ways of retaining personal characteristics whilst developing new ones even in the presence of continued pain.

4.13. Clinical implications

4.13:1 Assesment of mental imagery

The results of this study suggest that pain-related imagery is a potent form of cognition and as such warrants specific enquiry during assessment. As predicted by the emotion/ cognition model of ICS and SPAARS, invoking mental images associated with the participants’ pain experience was found to increase emotionality. Furthermore, mental images may provide a direct and efficient route by which emotion and schema-level beliefs can be readily accessed. Given that patients are often unaware of experiencing this form of cognition and/ or are apprehensive about the implications of having mental images of their pain, clinicians need to enquire directly and in a sensitive manner. Hackmann et al.’s (2011) resource book on the use of imagery in cognitive therapy outlines their micro-formulation that can serve as a useful heuristic for assessing and formulating the role of problematic images in psychological distress.

4.13:2 Imagery interventions

Findings indicate that carrying out a micro-formulation (Hackmann et al., 2011) of a patient’s pain-related image can elicit underlying core beliefs pertinent to the aetiology and maintenance of affective distress. Participants’ related experiencing recurrent and intrusive negative mental images that contained themes of an enmeshed self with pain. Novel therapeutic interventions that have
been developed in the emotional disorders can be readily applied to chronic pain populations. Employing imagery modification techniques in Wild et al.’s (2007) study revealed promising results in effecting change in beliefs, imagery vividness and imagery distress. Moreover, the findings from the outcome literature in guided imagery techniques conclude that individuals with high imagery ability fared better in employing the techniques. The example cited earlier of the participant with fibromyalgia that described benefit from attending to her image of the “long dark hole” therefore suggests that imagery modification and rescripting techniques may contribute to treatment efficacy.

Whilst the current study was incorporated into a CBT model, the findings pertaining to the recurrent emotionally-laden self images indicate that Acceptance and Commitment Therapy (Hayes et al., 2004) and mindfulness based therapeutic approaches could offer a valuable contribution toward the goal of helping to alleviate pain-related suffering. Informed by cognitively-focused formulations, ACT and mindfulness approaches could enable patients increase their quality of life by striving to live according to their values alongside their pain.

4.14. Future research directions

This study forms part of an ongoing research programme being conducted in the University of Edinburgh regarding mental imagery in chronic pain. Two cross-sectional studies (Potter, 2007; Gosden, 2008) investigated the prevalence and characteristics of pain-related images in a chronic pain population. Their findings indicate prevalence rates between 24 - 40% and that negative pain-related imagery is associated with increased emotionality and catastrophising compared to individuals without images. An experimental design study was subsequently conducted to ascertain any differential effects between verbal and imagery processing of pain. Londsale (2010) concluded that imaginal pain processing led to increases in pain, relative to verbal processing pain. A single case multiple baseline experimental design case series is currently being conducted (Brodie, 2012) with 8 patients of varying classifications of chronic pain. Participants met initially with the researcher to describe their pain and related imagery, then collaboratively designed an imagery manipulation exercise with the aim of decreasing the threat value of the imagery. Participants subsequently met to engage in the procedure that entailed neutral imagery, pain imagery exposure, and pain imagery manipulation. The design was repeated three times during the single experimental therapeutic sessions and assessed whether the variables of pain intensity, distress and imagery vividness influenced outcome.
The current findings has contributed to the clinical discussion on the phenomenological demarcation between an intrusive mental image of pain and a metaphorical description. Further work could investigate the role of pain-related images and the threatened self in psychological distress associated with chronic pain. Embedding such research questions within the renewed emphasis on cognitively oriented frameworks could contribute significantly to the psychosocial understanding and management of entractable pain.

4.15. Dissemination of Findings

In the interest of disseminating findings to a non-health service audience, participants were informed at interview that the final report of the study would be made available to them on request. It was hoped that by ensuring access to the outcomes of this research would also contribute to the methodological rigour of the project.

Preliminary findings of the research were presented to a range of allied health and medical professionals at the NHS Highland Department of Psychological Services Conference in August 2011. In addition, tentative hypotheses were summarised and discussed with pain colleagues via poster presentations at the Scottish Pain and Research Community (SPaRC) and North British Pain Society (NBPA) regional meetings in 2012 (see Appendix 8). These provided opportunities to discuss the initial findings and obtain feedback from clinicians regarding its utility in practice. The poster presentation at the NBPA Spring Scientific Meeting (14 May 2012) was awarded a prize and an invitation to present an overview of the findings at the Winter Scientific Meeting (30 November 2012). It is hoped that by presenting to this forum will afford opportunities to foster collaboration with colleagues working in the field and thereby seek to further substantiate the clinical utility of pain-related imagery.

Finally, as partial fulfillment for the Doctorate in Clinical Psychology, the study has been written up as an abridged version and will be submitted to a peer-reviewed journal. This will facilitate the dissemination of findings to a wider health professional and medical audience.
4.16. Conclusion

In conclusion, the findings of this study indicate that where individuals with chronic pain experience frequent and intrusive images of their pain there can be an adverse impact on their emotional and behavioural functioning. As indicated by previous studies, pain-related imagery is a potent form of cognition contributing to the aetiology and maintenance of distress in individuals with chronic pain. Targeting such imagery has led to interesting treatment innovation in the emotional disorders. Thus, spontaneously-invoked mental images of pain so far largely neglected in the pain literature could provide a novel target for cognitive behavioural formulations and interventions for chronic pain.
CHAPTER 5

Thesis Journal Article
“It’s just you’re battling with yourself”: How pain-related imagery impacts on functioning in chronic pain

Background: Psychological research has consistently demonstrated the importance of cognitions in the form of thoughts and images on an individual’s wellbeing. Having pain-related verbal cognitions has been shown to lead to poorer outcomes for patients (McCracken & Turk, 2002). Research in other conditions has shown mental images have a more powerful impact on emotion than verbal cognitions (Holmes & Matthews, 2005). To date however, little work has explored the role of mental imagery in adjustment to chronic pain. Methods: Fourteen semi-structured interviews were conducted with individuals with chronic pain. Interview transcripts were analysed according to grounded theory methods to construct a substantive theory of the impact spontaneously-invoked images of pain have on functioning. Results: Eight participants reported pain-related imagery and three reported mental images associated with related symptoms. In line with previous findings (Gillanders et al., 2012; Gosden, 2008) the frequency and intensity of pain-related images influenced the degree of distress experienced. There was a distinction made between intrusive mental images and visual descriptions or metaphors of pain. The former being conceptualised as a visual cognition and playing a role in the aetiology and maintenance of distress in chronic pain and therefore an adverse impact on functioning. Conclusion: Enhancing our understanding of pain related imagery and its impact on functioning could inform the design of interventions in clinical practice. Working systematically with patients’ idiosyncratic pain related images and the beliefs that are associated with them could be a helpful specific target for therapy.

Keywords: Chronic pain; pain images; cognition; cognitive behavioural therapy

Introduction

Psychological research has consistently demonstrated the importance of cognitions in the form of thoughts and images on an individual’s wellbeing. The cognitive-behavioural approach to chronic pain is based on the premise that an individual’s emotional and behavioural response is determined by the cognitive appraisal and interpretation of their pain (Turk & Rudy, 1992). Patients’ idiosyncratic appraisals of their condition, their unique experience of pain, and their coping resources therefore become critical for optimal assessment and subsequent treatment planning. Over the past twenty-years, pain research has investigated cognitive processes (Eccleston et al., 1997; Eccleston, 2001; Aldrich et al., 2000; Sullivan et al., 1995), however these studies have not differentiated between cognition in the verbal or imaginal form. This stands in stark contrast to research in the emotional disorders whereby a renewed interest investigating the extent to which images can play a role in the development and maintenance of psychological distress has emerged.

Mental images have been shown to have a more powerful impact on emotion that verbal cognitions (Holmes & Mathews, 2005; Hackmann et al, 2011). Imagery therefore is an important process in a range of mood and anxiety disorders. For example, health anxiety (Wells & Hackmann, 1993),
social phobia (Hackmann et al., 2000), obsessive-compulsive disorder (de Silva, 1986; Rachman, 2007; Speckens et al., 2007), agoraphobia (Day et al., 2004), depression (Brewin et al., 1996; Patel et al., 2007), and bipolar disorder (Holmes et al., 2008). Studies have indicated that patients who report intrusive mental images results in emotion being amplified in these psychological disorders.

Translating these findings to the pain literature would suggest that negative images related to pain compared to negative verbal cognitions could be predicted to have a stronger impact on the pain experience, the emotions associated with it and the behavioural outcomes. Therefore, negative imagery, if it occurred, would be predicted to participate in a negative vicious cycle amplifying pain and negative outcomes.

Until recently, spontaneously-occurring mental imagery associated with pain problems was largely unexplored. The emphasis of imagery in pain has been through behavioural intervention techniques such as guided imagery. There is a growing body of evidence that indicates the potential role mental images play in the aetiology and maintenance of distress associated with chronic pain. Our research group has undertaken a range of cross sectional and experimental design studies which have found that after controlling for physical disability and pain intensity, experiencing pain-related images are associated with increase emotionality (Potter, 2007; Gosden, 2010; Lonsdale, 2010). Moreover, 40% prevalence rate of negative mental imagery associated with pain symptoms indicates the importance of this rarely considered type of thought process in pain suffering.

Philips’s (2011) recent study reported 78% of participants experiencing one or more repetitive images when in pain. Furthermore, attending to their most potent image resulted in significant increases in negative cognitive appraisals, increased emotionality and pain levels. Berna et al. (2011) conducted an exploratory study with a sample of 10 patients with chronic pelvic pain. Negative pain-related images were reported by all participants, with the most significant image being intrusive and negative in valence. The emotional-behavioural response pattern of affective distress and avoidance behaviours were described within a classic cognitive-behavioural vicious cycle formulation, whereby the avoidance of negative imagery could amplify pain suffering.

It is hypothesised that by undertaking an in-depth exploration of the phenomenology of patients’ imagery can lead to an increased understanding of the potential role specific problematic images play in the aetiology and maintenance of distress. This study seeks to explore the phenomenology
of the spontaneously evoked pain-related images with a specific focus on participants’ cognitive appraisals as means of ascertaining the impact of emotional and behavioural responses on patient functioning.

**Methods**

*Research design*

This qualitative study was conducted according to Grounded Theory Methodology (GTM). It has been applied to studies investigating medical illness and interpersonal relationships (Howitt, 2010) as illustrated in the qualitative studies investigating the impact of living with a chronic illness (e.g. Charmaz, 1995; Werner & Steihaug, 2003; Ohmen *et al.*, 2003). The social constructionist version of Grounded Theory (Charmaz, 1990; 2006) was selected as a means of giving primacy to participants’ perspectives. Particular attention was given to how participants described their experiences of living with pain, and how they made sense of the spontaneously invoked pain related images that gave rise to distress. The meanings they attributed to these specific cognitions were especially important to elicit in order to ascertain the degree to which these mental images can impact on functioning.

*Ethical approval*

Ethical approval was granted by the North of Scotland Regional Ethics Committee (REC reference: 11/AL/0283) and registered with NHS Highland Research and Development Department.

*Participants*

Following ethical, R&D and local management approval, participants were recruited from a multi-disciplinary pain clinic and voluntary organisation for individuals with chronic pain. Fourteen participants with a range of pain conditions came forward and were interviewed, with eight participant narratives being included in the analysis. Participant demographic information is summarised in Table 1.
<table>
<thead>
<tr>
<th>No</th>
<th>Gender</th>
<th>Age</th>
<th>Condition(s)</th>
<th>Duration of chronic pain</th>
<th>Co-morbid psychiatric diagnosis</th>
<th>Pain-related images</th>
<th>Mental images of other symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M</td>
<td>56</td>
<td>CLBP</td>
<td>20 years</td>
<td>None</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>2</td>
<td>M</td>
<td>62</td>
<td>Reiter’s syndrome</td>
<td>26 years</td>
<td>Recurrent depression</td>
<td>Y</td>
<td>Y (anxiety)</td>
</tr>
<tr>
<td>3</td>
<td>F</td>
<td>48</td>
<td>FMS/ ME</td>
<td>7 years</td>
<td>Recurrent depression</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>4</td>
<td>F</td>
<td>45</td>
<td>FMS/ Scoliosis</td>
<td>8 years &amp; 25 years</td>
<td>None</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>5</td>
<td>F</td>
<td>61</td>
<td>Rheumatoid Arthritis</td>
<td>8 years</td>
<td>None</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>6</td>
<td>F</td>
<td>60</td>
<td>Post Heptic Neuralgia</td>
<td>2 years</td>
<td>None</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>7</td>
<td>F</td>
<td>62</td>
<td>Peripheral Neuropathy</td>
<td>13 years</td>
<td>None</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>8</td>
<td>F</td>
<td>54</td>
<td>FMS</td>
<td>5 years</td>
<td>Depression/ Anxiety</td>
<td>Y</td>
<td>N</td>
</tr>
</tbody>
</table>

**Key:**
FMS: Fibromyalgia Syndrome  
CLBP: Chronic Low Back Pain

**Procedure**

Individuals who volunteered to participate were initially contacted by the researcher to ensure that they a) met the inclusion and exclusion criteria; b) understood the requirements of the study; and c) had the opportunity to ask questions or seek clarification about the study prior to committing to take part. A mutually convenient time at which to meet for the interview was agreed. All interviews took place in an NHS clinical setting with ready access to a clinician.

Interviews initially adopted a broad focus, based on the first version of the semi-structured interview schedule in order to obtain a diverse range of views. Three interviews were conducted using this initial schedule and were transcribed by the researcher. This early analysis led to identifying tentative themes and therefore were used to refine the interview schedule in order to
focus on these topics in subsequent interviews. All interviews were recorded and transcribed verbatim. Typed transcripts were analysed according to grounded theory methods.

In addition, tentative hypotheses were shared with medical, nursing and allied health professionals through two poster presentations at regional and national research events in the area of chronic pain. Dissemination of early findings through this format can be considered as meeting the ‘peer debriefing’ quality criterion as set out by Lincoln & Guba (1995) for increasing credibility in qualitative research. By presenting an overview of findings early on in the research process and engaging in discussion with colleagues facilitated opportunities to discuss working hypotheses.

Results

Out of the 14 participants interviewed, 8 reported pain-related imagery. The finding that 57% of the sample for this qualitative study reported spontaneously-evoked pain imagery is in line with previous studies within our research group which has indicated a prevalence rate of 40% in chronic pain populations.

Arising from the poster presentations on the preliminary findings (March, 2012; May, 2012), pain-related imagery and associated distress resonated with health professionals’ clinical experience. In particular, a vignette was shared of a patient describing his pain as ‘tiny soldiers tramping across his chest and could feel the sentry’s boots digging in.’ The health professional stated that the patient was of Turkish origin and hypothesised that the mental image may have been a means of communicating his distress.

The pain-related imagery reported by the participants will be outlined prior to delineating the core category and sub-categories described above that emerged from the data analysis.

Pain-related imagery:

Participants described images of the pain itself, of oneself in pain and how others interact with them. Akin to Gosden’s (2008) study, images of the pain contained sensory information and primarily described in visual and tactile sensory terms reflecting sensations of burning, electricity, tightening, stabbing, tearing, numbness, expanding, and numbness. For example, “it’s like putting a red hot poker in the back of my knee” or “it’s like a network of circuits, just an absolute network on
Images of oneself in pain were reported by the two participants with Fibromyalgia syndrome. These images encapsulated a sense of heaviness (e.g. “like lead boots, you know, a horrible sort of tiredness and acheness in my legs”), weakness (e.g. “like someone pulls a plug”) and incorporated a ‘felt sense’ of living with pain. It was noteworthy that these participants found it difficult to express how they experienced their pain. As one participant related her pain as being ‘darkness’ with associated images of being (as squeezing her hand against her chest):

(48 Yr, Female) “...in a long hole, it just goes down onto the ground and it's ..you’re falling into it because you can’t get going properly.”

These descriptions relate how the participants experience the overlapping symptoms of pain and fatigue. Interestingly, one of the defining characteristics of fatigue in fibromyalgia is a feeling of weakness or heaviness as proposed by a conceptual model of fatigue outlined in a recent study by Humphrey et al. (2010).

Similar to Philip’s (2011) study, participants readily described their pain thoughts without affect. However, experienced difficulty in describing the content of the image, initially gesturing to effected body parts, and they were frequently accompanied by an emotional response. For example, one participant in describing the image had eyes cast downward, twitching and took a sharp intake of breath. Two other participants became tearful.

All interview responses related to pain-related images were consistent with a classic CBT vicious cycle, whereby the negative imagery could amplify pain suffering. The higher order categories of ‘relating to pain’ and ‘self-perception’ encapsulated how participants responded to a changing self of being controlled and entrapped by pain and in turn underwent a process of coming to terms with living with an ongoing illness. The process of acceptance entailed facing the prospect of becoming a different person in the light of not being able to to what what they had previously carried out with relative ease. The extent to how they appraised their social role functioning and view of self determined their ability to carry on even in the presence of pain. Those who reported resisting this ‘changing self’ described more significant distress in comparison to the participants who related having resolved this inner conflict. As illustrated by the following diagram, the higher order categories represent the core beliefs underpinning the cycle of maladaptive cognitions, emotions and behaviours triggered by a pain episode.
Figure 4: Diagrammatic representation of substantive theory

Changing Self

Relating to Pain
- Externalising body
- Being controlled
- Feeling trapped

Self-perception
- Interpersonal Self
  (Comparing to others; Social Roles)
- Intrapersonal Self
  (Mourning for a life lost)

Pain (trigger)

Spiralling Emotions

Whirling Thoughts
(personalising; catastrophising)

Avoidance
(pulling back; cognitive avoidance)
Emerging categories

Relating to Pain

This category encapsulated how participants’ related to their bodies in the context of living with chronic pain. They consistently talked about the challenges of living with enttractable pain. They recognised that with ‘no off switch’ to persistent pain can result in feelings of a dual relationship with the body, viewing it as seperated from the self and therefore fearfyl of unexpected illnesses.

(62 yr, Male) “I actually now begin to wonder this period, that I’ve had ongoing, for ... for more than a year now and I’m saying ‘well is this a bad patch? is this a progression in the disease? and that is hugely depressing.”

The sub-categories of externalising body; being controlled and feeling trapped were key components of these relational aspects of managing a chronic condition. Several participants referred to their pain and affected body parts in objective terms that indicated they had an external locus of control in relating to their pain. Pain was externalised and viewed as a seperate entity, almost having a life of its own. Participants’ descriptions of their relationship to their pain portrayed an image of a lurking monster-type figure that followed their owners around. It was akin to a current advertisement of a green phlegm-like monster representing flu symptoms that patients struggled to go about their daily business. The externalising images may be attributed to dimensions of high perceived external locus of control over pain, a factor which has been found to contribute to poor psychological adjustment to chronic pain (McCracken. 1998).

Self-Perception

Participants’ accounts of their daily challenges in coping with pain indicated an impact on their sense of self and in turn how they related to others. As illustrated by the diagram, living with chronic pain can pose a threat to their intrapersonal and interpersonal selves and the degree to which they were able to process and accept these changes influenced the extent to which pain flare-ups could trigger maladaptive emotional and behavioural responses. Several participants referred to the notion that their past healthy selves had been lost and were continually in the process of grieving:

(62 Yr, Male) “Because you’re mourning for a life lost, a life wasted...because it is, because you know, you know wasted. Well, everyone does that when they get to...because you know, that’s just how...because it is...if you look back.”
This category encapsulated several participants’ perceptions of how pain has resulted in a loss of control over their general health and abilities. Participant narratives highlighted continued frustration with their limited abilities and for some the onset of chronic pain signified a critical transition in their intrapersonal selves.

Participants talked about feeling different and wanting that to be recognised. They referred to chronic pain as being an ‘invisible’ condition which presented its own challenges for interacting with others. It was apparent that some individuals were ambivalent with regards to struggling to be understood, yet reluctant to be seen with overt signs of disability, such as a wheelchair or crutches. Consequently, individuals described isolating themselves from others. One participant stated that a lack of understanding from others “felt like a kick in the stomach.” As participants went on to describe how their identities were projected and defined by others, it became apparent that their interpersonal selves were disrupted. The threat of not being affirmed by others was particularly reflected in interactions with the health service. They related being caught in a system that requires them ‘to sell your illness.’ They talked about the challenges of feeling vulnerable due to being reliant on others. Perceptions of not being self-sufficient impacted on their social roles as parents, spouses and friends.

**Core Category - ‘Changing Self’**

Themes of loss of control and social roles that characterised participants’ cognitive distortions were indicative of low self-efficacy beliefs and an enmeshed self-schema that are encapsulated in the core category “changing self.” The more those who felt entrapped and limited by pain, the more pain appeared to impact on their sense of self. The complexity of how individuals relate to their pain was encapsulated in reports of identifying with pain and with being disabled. Data from this study suggests that exploration of the emotionally-laden images revealed the cognitive appraisals that contribute to the degree of distress. Further exploration of participants’ appraisals for example, led to discussion on the associated meaning of the pain-related images with regard to their view of self.

*I. “I’m just wondering, that image is in relation to your pain. Just wondered in your mind’s eye of being in the black hole of how you’re thinking about yourself, what does that mean about you?”*
(48 yr, Female) “I just sometimes think...not...ach how do you describe it not being able...when you’re not able to do the things you want to do and your body doesn’t let you, you just feel rubbish because you can’t physically do these things and you want to physically do them so it’s just you’re battling with yourself and ehhh you think why won’t my body let me do it? and it’s sometimes coming to terms with the illness hasn’t totally got there.”

The participants in this study reporting significant levels of affective distress described the experience of having ‘lost the self’ before the onset of their condition, and in one instance related a process of grieving for the old self that had ‘died.’ Themes that emerged from the data relating to a process of ‘battling’ with the adjustment to an ongoing pain condition suggest that underlying appraisals of a threatened self may play a role in the maintenance of distress in this patient group.

**Impact of mental images on emotional and behavioural functioning:**

By means of exploring the appraisals associated with the images, the emotional and behavioural response pattern was ascertained and can be described within a CBT framework. In Table 2 the primary mental image described by each the 8 participants are summarised according to this framework.

<table>
<thead>
<tr>
<th>No.</th>
<th>Content of Image</th>
<th>Emotional response</th>
<th>Associated Meaning</th>
<th>Behavioural response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>“It’s as if tearing the joint out. Literally just, you know, you would see the way a carcass getting torn, it’s as if it’s just the joint is getting torn”</td>
<td>Anxiety; hopelessness</td>
<td>“So there’s damage or what damage has occurred to give me this pain? Have I got something that eh have I got a joint that’s so badly damaged that it’s never going to go away?”</td>
<td>Withdrawing “You kind of shut down”</td>
</tr>
<tr>
<td>2</td>
<td>“It was like an electric current, a hot electric current and there’s eh under my foot there’s feeling missing. I feel like there’s a big lump of cotton wool under my toes”</td>
<td>Anxiety</td>
<td>“I’ve done too much”</td>
<td>Reducing activity “I would wind it back a bit and wouldn’t do too much”</td>
</tr>
<tr>
<td>No.</td>
<td>Content of Image</td>
<td>Emotional response</td>
<td>Associated Meaning</td>
<td>Behavioural response</td>
</tr>
<tr>
<td>-----</td>
<td>------------------</td>
<td>--------------------</td>
<td>--------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>3</td>
<td>“...in a long hole, it just goes down onto the ground and it’s . . . you’re falling into it because you can’t get going properly.”</td>
<td>Anxiety; depression</td>
<td>“Because you’re trying to be positive and you’re trying to keep going but your body doesn’t want you to keep going because of the pain and the tiredness and your body is just controlling you”</td>
<td>Withdrawing; suppressing images &amp; thoughts “push to the back of my mind”</td>
</tr>
<tr>
<td>4</td>
<td>“I just feel like it’s an alter-ego”</td>
<td>Depression</td>
<td>“Not quite, though it’s a part of me, I’m not quite pain...yet”</td>
<td>Suppressing image “takes a lot to keep it down;” avoid making plans</td>
</tr>
<tr>
<td>5</td>
<td>“it’s really like all fireworks or you just get hot burning pain going”</td>
<td>Acknowledge pain; acceptance</td>
<td>“This is the way it is”</td>
<td>Rest; distraction</td>
</tr>
<tr>
<td>6</td>
<td>“feels like lead boots”</td>
<td>Acknowledge pain; acceptance</td>
<td>“It’s like I’m pushing against something all the time, or there’s something holding me back all the time”</td>
<td>Processing thoughts &amp; images; slowing down; increasing activity on an incremental basis</td>
</tr>
<tr>
<td>7</td>
<td>“It’s like it’s just becoming a balloon and it’s getting bigger and bigger (takes sharp intake of breath) it’s going to burst in a minute”</td>
<td>Acknowledge pain; acceptance</td>
<td>“If I walk I just seem to be able to keep at it, you know, at a more gentle level”</td>
<td>Modify activity; alter posture</td>
</tr>
<tr>
<td>8</td>
<td>“Like a complete power failure within the body”</td>
<td>Frustrated; powerless</td>
<td>“I can feel that ‘awful plug pulling’ and I just know that I’ll have to lie down”</td>
<td>Socially withdraw; excessive rest</td>
</tr>
</tbody>
</table>
Spiralling emotions

As discussion continued to centre on the associated meaning of the images, the participants who reported distress in their day-to-day lives became visibly distressed. Participants related a range of emotional responses they experience in response to intense episodes of pain. They attributed the interruptive and interference effects of living with pain as key triggers to distress. The emotional responses reflected anxiety, depression, frustrated and feeling vulnerable.

(48 Yr, Female) “and you do feel crap sometimes and it’s just makes you feel rubbish and you just start worrying about everything then because you’re...because of this darkness.”

(45 Yr, Female) “takes you down...” (welling up with tears)

(62 Yr, Male) “I just have to be able to ...have a portion. If you’re going to take that away from me, you can shut the curtains.”

(56 Yr, Male) “So that is...uhm... that is a ...that was down to a basic thing, you don’t feel self sufficient, you feel vulnerable because everything...that comes up is a crisis..every wee job that comes up is a crisis.”

Interestingly, in an incident of exploring a participant’s image in the interview setting led to an impromptu imaginal exposure task. One of the participants acknowledged that she found it uncomfortable coming into contact with the pain-related images in situ. Permission was sought to explore the associated meaning further, thereby potentially leading to uncovering more in-depth information of underlying schema. The participant reflected on the experience and described it as a ‘release’ to talk about the image instead of trying to keep it in. Throughout the process of eliciting the image and exploring pertinent appraisals, the participant spontaneously invoked coping imagery “hold onto the branches on the top so you don’t go down” that appeared to enable her attend to the image and associated distress. Subsequently, she was able to differentiate between tolerable and intolerable pain levels reflected in the imagery:

(48 Yr, Female) “sometimes you’re beside it (long dark hole) and sometimes you’re in it. If you’re in it, your pain’s worse...if you’re just not quite in it, then you’re controlling it more.”

Avoidance and Whirling Thoughts

As predicted by a CBT vicious cycle formulation, the participants who reported experiencing distress described reacting in avoidant ways. These included; immediately halting activity, socially
withdrawing, and attempts to ignore or suppress the image. Such maladaptive ways of responding to pain-related images was reported in recent previous studies (Gosden, 2008; Berna, 2011).

(62 Yr, Male) You shut down and you withdraw. You withdraw from conversation, because you’ve little tolerance for...I mean, you’ve little tolerance for other people (sigh), really yeah, you’ve probably little tolerance for other people, it’s even things like..things that give you pleasure, not particularly interested in. You’re just really..because the only real release is sleep.

In addition to behavioural avoidance, participants described employing cognitive avoidance by way of attempting to suppress their pain-related verbal and imaginal cognitions.

(60 Yr, Female) “I try to hide from it myself, that sounds silly.”

I. “Is that like not think about it?

“Yeah, don’t think about it, if you don’t think about it, it’ll go away, ehm.. but it doesn’t, but at times you lose control. I have lost a lot of control of my own life through pain..ehm..I knew I had it, but I didn’t want to know. I didn’t want to know anything.”

This led to rumination and unwanted thoughts and an adverse impact on mood thereby perpetuating pain, disability and suffering.

(48 Yr, Female) “..you just keep saying ‘right, I’ve got to put these things to the back of my mind and just keep going and do what needs to be done...but then sometimes I just go to bed and shut my eyes on it...sometimes by shutting my eyes makes it more real because it’s dark...ehm just trying to get other thoughts into your head to stop thinking about it.”

This illustrates how those who have more avoidant reactions and coping strategies experience greater emotional and pain reactivity when they make contact with their image. It is likely that driven by catastrophic thoughts, these individuals seek to employ mental control strategies as a means to prevent distress, however exacerbates the emotive content as a consequence.

Coping imagery:

Two participants reported a qualitatively different behavioural response to their pain-related images. They described engaging with their image, processing it and trying to manipulate it as a means of managing their pain levels. These individuals related managing their pain relatively well and therefore such responses of attending to images may have implications for ameliorating self-
management strategies. Such spontaneous coping imagery was also reported by participants in Gosden’s (2008) and Berna et al.’s (2011) studies.

The few examples provided meant that it was not amenable to categorising them into discrete themes. The idiosyncratic coping imagery reflected the use of imagining a supportive person as well pain management strategies. Utility of such coping strategies is reported as pain modification techniques in the pain literature. However, as a cluster of behavioural interventions, they have not been systematically evaluated in the outcome literature. Encouragingly, participants reported reduced affective distress as a result of employing these cognitive strategies. The participant quoted above related how processing this image increased perceived control over pain as by imagining it visually facilitated monitoring and employing adaptive strategies. Given the underpinning mechanisms are as yet unknown, it is unclear whether such strategies are adaptative or maladaptive in the management of chronic pain. This form of coping imagery therefore, warrants further investigation.

**Are pain-related images intrusive cognitions or metaphorical descriptions of pain?**

The mental imagery in chronic pain research (Gillanders et al., 2012; Berna, 2011; Lonsdale, 2010, Gosden, 2008) suggest that images may be a potent cognitive process in pain-related suffering which akin to negative and catastrophic thoughts, play a role in the maintenance of threat. Tentative hypotheses from this body of work has centred on the potential impact these images being of an intrusive nature and thus adversely effect functioning. This study has sought to further examine mental images with a view to differentiating between metaphorical descriptions and intrusive images.

Participants in this study were directly questioned on whether their pain-related images indicated a sense of their lived experience of pain or functioned as a metaphorical description of their pain.

Individuals differentially responded to their mental images in accordance with how they perceived them:

(62 Yr, Male) “you’ve seen these bells at the fairground, there’s a bell there and some guy hits it with a hammer, it hits the, like the bottom of the hammer and away it shoots up, it hits the bell and you know, it rings and that’s what it’s like. The pain, you just feel like your head’s exploding”
"Right, okay. So are you saying that’s how you describe it so that others can understand rather than how it is to live with it?

“That’s how I describe it because that is happening, it is exploding in your head”

In contrast, a participant with osteo-arthritis stated she did not experience distress. On the contrary, the images functioned to bridge understanding with others as well as to facilitate coping.

(62 Yr, Female) ‘I can picture them and I can sort of describe them to somebody and I can deal with them myself. It’s just you can say ‘I don’t feel very good in my pins today’ okay, ‘do you want to take my arm?’ and I do...I can see it so clearly in my mind what’s happening, in my own way so I just eh right, if I do this, I’ll make it.’

Whilst imagery vividness and emotional and pain reactivity was not explored in the current study, participants’ accounts suggest that there are no clear links. Data obtained in this study that incorporated detailed information on participants’ cognitive appraisals of their imagery found that individuals can report vivid imagery without significant distress due to how they perceived the function of the imagery. For example, as illustrated with the quotation above, participants who appraised their images as being metaphorical representations did not report emotional reactivity. This would suggest that presence of vivid and frequent images does not necessitate the onset of emotionality. By ascertaining this distinction in a clinical context can provide further insight as to why individuals differ in their behavioural responses to the pain-related imagery and understood within a CBT framework, the emotional-behavioural response pattern derives from the individual’s appraisal of the pain-related image. Findings from this study indicate that ascertaining patients’ idiosyncratic appraisals to their pain-related image(s) can facilitate this process of differentiating between these phenomena. Consequently, the emerging substantive theory regarding pain-related imagery indicates that this phenomenon can play a role in the aetiology and maintenance of distress in managing chronic pain. Individuals that experience intrusive images related to their pain and themselves in pain and interpret these in catastrophic ways seems to have an adverse impact on their functioning. Intrusive naturally-occurring images of pain can represent underlying appraisals of a threatened self and can contribute to the maintenance of distress. Identification and exploration of this potent form of cognition therefore warrants closer attention in clinical assessment and intervention.
Discussion

This exploratory study represents an adjunct to the previously published quantitative studies on mental imagery in chronic pain (Gillanders et al., 2012; Philips, 2011). All interview responses related to pain-related images were consistent with a classic CBT vicious cycle, whereby the negative imagery could amplify pain suffering. The proposed vicious cycle is based on previous formulations using imagery (Holmes et al., 2008). The appraisals of participants who reported distress associated with chronic pain were replete with cognitive distortions and dysfunctional beliefs. Participants who appraised their condition in catastrophic and personalised ways were more likely to have low self-efficacy beliefs in coping with pain. Moreover, they perceived themselves as being enmeshed with their pain condition which formed the basis of their self-identity. Subsequently, they tended to engage in cognitive and behavioural avoidance behaviours. This was frequently illustrated by examples of socially withdrawing, decreasing or avoiding activity, and several participants reported attempts to suppress pain-related thoughts and images.

In contrast, those who related coping relatively well with their pain, continually sought to reframe their circumstances and instill confidence in managing their symptoms. They described being able to ‘compartmentalise’ their chronic pain from their sense of self. Consequently, they responded to triggers of pain in qualitative different ways. Firstly, they attended to their negative automatic thoughts or pain-related images, and processed them. Secondly, they acknowledged their pain, accepted it and employed adaptive coping strategies.

The observed emotional responses to pain-related imagery coupled with existing evidence (Potter, 2007; Gosden, 2008; Lonsdale, 2010) indicate that pain-related mental images can elicit physiological and emotional arousal independent of sensory pain. It therefore could be speculated that occurrence of these images might lead to an exacerbation of physiological and emotional reactivity to sensory pain. If images frequently activate physiological and emotional reactivity, working with patients’ spontaneously occurring images in therapy may provide access by which links between pain (as a stimulus) and such responses can be loosened using imaginal exposure and imagery modification techniques.

As predicted by a CBT vicious cycle formulation, those experiencing negative pain-related images reacted in avoidant ways. Avoidance of distressing thoughts, images, and physiological sensations has been well documented in the literature as being a maintaining factor of distress in many
cognitive behavioural models of anxiety disorders. The experiences related by the participants in responding to pain-related images suggest that cognitive avoidance strategies such as suppressing cognitions and their links with physiological and emotional reactivity, can strengthen maintenance cycles (Jamani & Clyde, 2008) and increases vulnerability to affective distress for some individuals who experience a mental image of their pain.

Findings from the current study indicate that exploration of pain-related images and associated appraisals can reveal schema-related beliefs underpinning psychological distress. A recent body of work suggests that distorted self-images may have both a causal and a maintaining role in disorders (Stopa, 2009). The role of imagery in the threatened self may bear particular relevance for patients with chronic pain. Whilst research suggests that chronic pain patients rarely endorse self-blame statements (Morley & Wilkinson, 1995; Williams et al., 1994), this is due to intact self-efficacy and cognitive distortions limited to specific pain-relevant situations (Pincus & Morley, 2001). Chronic pain however, is frequently associated with depression and anxiety (Bair et al., 2003; Keefe et al., 2004) and changes in the content of a person’s self-view are common in the emotional disorders. For example, in this study one participant with fibromyaglia related self images of “being down a long dark hole” and thus being controlled by pain. Her initial description of feeling frustrated at not being able to do the activities she previously carried out with relative ease led to more in-depth discussion on how her self-perception was enmeshed with pain and illness.

The construct of self-pain enmeshment which denotes a measure of a person’s identity: their sense of who they are and what they might become - their possible selves (Morley & Eccleston, 2004) has been systematically investigated in recent years with regards to individuals with chronic pain Morley et al., 2005; Sutherland & Morley, 2008). Morley et al.’s (2005) study found that in patients who were focused on the elimination of pain, movement towards other goals is blocked and will lead to frustration, a sense of entrapment and depression (Morley et al., 2005). Frustration was the most intensely reported feeling in the study which corroborates with previous research (Harris et al., 2003; Price, 1999; Wade et al., 1990). The authors therefore suggest that the degree to which patients invest achievement of their future goals on the elimination of pain can compromise emotional adjustment and thus lead into a self-pain enmeshment.

Cognitive-behavioural management of chronic pain would therefore benefit from further research regarding the role of pain-related self-imagery in affective distress. The finding that initial
exploration of participants' cognitive appraisals led to emotionally-laden self-images provides further support for the importance of this form of cognition in pain suffering.

In summary, data from this qualitative study is in line with earlier findings of pain-related images being a theoretical construct relevant to a psychological formulation of distress in chronic pain. It has contributed to the clinical discussion on the phenomenological demarcation between an intrusive mental image of pain and a metaphorical description. A distinction between the two constructs can expand our understanding of the potential impact on patient functioning. Further work could thus investigate the role of pain-related images and the threatened self in psychological distress associated with chronic pain.

This study is limited by its relatively small sample size and a discrete group of chronic pain participants that were referred from a source in a systematic manner. Nevertheless, findings from the current study indicate that the assessment of pain-related images may provide a direct and efficient route by which emotion and schema-level beliefs can be readily accessed. Given that patients are often unaware of experiencing this form of cognition and/or are apprehensive about the implications of having mental images of their pain, clinicians need to enquire directly and in a sensitive manner. Akin to the emotional disorders literature whereby novel therapeutic interventions have been developed (Wild et al., 2007), imagery modification and rescripting techniques could augment extant CBT interventions and contribute to treatment efficacy.

In conclusion, the findings of this study indicate that where individuals with chronic pain experience frequent and intrusive images of their pain there can be an adverse impact on their emotional and behavioural functioning. As indicated by previous studies, pain-related imagery is a potent form of cognition contributing to the aetiology and maintenance of distress in individuals with chronic pain. Targeting such imagery has led to interesting treatment innovation in the emotional disorders. Thus, spontaneously-invoked mental images of pain so far largely neglected in the pain literature could provide a novel target for cognitive behavioural formulations and interventions for chronic pain.
Funding

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Acknowledgements

The individuals who volunteered to participate in the research and gave their time generously in openly sharing their experiences, ultimately made the research not only possible but rewarding and a pleasure to conduct.


Appendix 1 - Quality Assessment Tool

QUALITY ASSESSMENT TOOL FOR QUANTITATIVE STUDIES

COMPONENT RATINGS

A) SELECTION BIAS

Q1 Are the individuals selected to participate in the study likely to be representative of the target population?

1. Very likely
2. Somewhat likely
3. Not likely
4. Can’t tell

Q2 What percentage of selected individuals agreed to participate?

1. 90-100% agreement
2. 60-79% agreement
3. Less than 60% agreement
4. Not applicable
5. Can’t tell

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B) STUDY DESIGN

Indicate the study design

1. Randomized controlled trial
2. Controlled clinical trial
3. Cohort analytic (two group pre + post)
4. Case-control
5. Cohort (one group pre + post; before and after)
6. interrupted time series
7. Other specify
8. Can’t tell

Was the study described as randomized? If NO, go to Component C.

No | Yes

If Yes, was the method of randomization described? (See dictionary)

No | Yes

If Yes, was the method appropriate? (See dictionary)

No | Yes

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Appendix 2 - Participant Information Pack
Appendix 3 - Ethical approval
Appendix 4 - Interview Schedule(s)
Appendix 5 - Examples of researcher memos

Memo: 16th August 2011

B described her pain as an image of hole which she feels is holding her back. She used the expression ‘battling’ with her body as she feels she has no control over what she can and cannot do. Does this image represents this unresolved conflict? I would be interested in finding out how others have responded to this challenge of not being able to do things which previously they had carried out with relative ease?

What do their pain images represent about how they relate to their pain and how they perceive themselves with a chronic illness?

This emerging concept of ‘battling with yourself’ and issues around acceptance of living with chronic pain. I would like to explore this concept further in subsequent interviews and enquire about possible catastrophic images on feelings of self-worth and self-identity. It would be interesting to find out from participants to what extent they feel enmeshed with their pain. Theories of self-enmeshment in chronic pain would predict that the more individuals perceive their pain as being an integral part of them, the more distressed they will be.

Memo: 5th March 2012

Like a couple of other participants, D related his pain as being externalised and a separate entity, almost having a life on its own. When I’m reflecting on how he describes his relationship to his pain, and some of the others, the image springs to mind of a lurking monster type figure that follows their owners around. A current advert of a green phlegm-like monster representing flu symptoms that patients struggle to be free from and go about their daily business.

I would like to enquire further how these images impact on participants’ in terms of their personal resources and coping with day-to-day life.
Appendix 6 - Example of open coding
Appendix 7 - List of process codes generated in analysis

Relationship to pain: - features of chronic pain being intractible and invisible to others

Externalising body
* external factors influencing pain levels (e.g. weather)
* objectifying body parts (e.g. they (muscles) don’t like the cold)
* objectifying pain (e.g. something that’s constantly with you)
* seeing pain as a separate entity
* invasion of pain

-flip side to this entails that those who cope well talk about ‘knowing my body’ that they tune into their symptoms, accept them and adapt activity accordingly.

* recognising flux of pain

Comparing to others
* ‘I’m worse off than them’
* they don’t understand me
* others can be worse off
* didn’t think ‘poor me’

The Social Me
* would have been a different parent
* feel vulnerable
* not being self-sufficient
* relying on others
* intolerable for people
* getting others to understand the ‘changed me’
* being perceived as the person before pain
* reaching out
* not being believed

Being controlled
* ‘it’s controlling me’ (e.g. lacking energy)
* ‘taking one day at a time’
* it’s holding me back
* can’t get going properly
* lacking personal resources to cope
* ‘feel like a yoyo’
* loss of former abilities
* no off-switch
* feeling less resilient
* good days are by chance
* hopelessness means disabling and debilitating
* feeling inadequate
* pushing against something all the time
* effortful walking
* feelings of heaviness
* being left in the dark by doctors
Functioning well
* communicating pain to others
* facilitating coping
- images of how she experiences pain, a sense of judging how it is and then do things to ease it, e.g. walking to bring down the ‘balloon. “..it’s like it’s just getting like a balloon and it’s getting bigger and bigger euph (sharp intake of breath) it’s going to burst in a minute. If I walk I just seem to be able to keep at it, you know, a more gentle level. It’s still sore but more even”
* accommodating my pains (are there for me and they help..they kind of accommodate my pains)
* operationalising help
* eliciting coping imagery
* processing pain-related imagery
* recognising positives
* accepting limitations
* personal growth experience
* using sense of humour
* releasing of emotion

- aware of images, working in their mind’s eye, doing something to ease the pain - use it to try and find a solution. contrasted with those who try to push it to the back of their minds.

as pain is invisible and people don’t understand ‘oh you look fine’ and people don’t get it and that can cause frustration so using imagery can increase understanding - bridges that lack of understanding

Whirling thoughts
* personalising pain - ‘why me? ‘why did I get it?’
* catastrophising pain
* ruminating

Cognitive avoidance
* keeping worries to herself
* being ambivalent about seeking treatment
* not thinking about prognosis
* ‘try to hide it from myself’
* didn’t want to know more

Feeling trapped
* being dragged down
* ‘crying inside’
* comparing present with past
* feeling clastrophic
* feeling panic
* removing options
* no escape
* dependent on medication
* slippery slope of medication taking
* restricting life (It really made my world smaller for a wee while)

Mourning for a life lost
* ‘just to be your old self again’ (B)
* a life wasted
* frustrated with limited abilities
* resolving loss of abilities

Pulling back
* withdrawing from others
* ‘pull back into myself’
* shutting down
* intolerable for people
* avoiding activity
* wind it back
* back off

Processing my diagnosis
* receiving a diagnosis
* shattering hopes
* facing up to the diagnosis
* acknowledging pain’s permanence
* coming to terms: - (entailed): - slow, difficult transition due to chronicity, powerlessness, lack of treatment. Accepting loss of abilities, loss of work
* tolerating uncertainty

Taking control
* understanding increases coping
* keeping sense of humour
* compartmentalising - used this word to describe how she is able to accept FMS and not allow the symptoms to become a pervasive part of who she us. recognised that this was a gradual process and not a completed one, but described adopting a problem-solving approach to manage bad days. another P described as ‘put things in boxes’ and acknowledged that this was a new way of perceiving how to manage her pain and health problems
* living alongside pain
* carrying on anyway
* thinking myself round
* acknowledging pain
* engaging in positive self talk
* acknowledging temporality of pain flare ups
* negotiating abilities & limitations - a challenging part of the adjustment process - difficult in getting others to see that they need to adapt activity levels.
* increasing activity incrementally
* acknowledging progress
* feeling confident
* responding proactively
* using problem solving
* weighing up pros and cons
* researching the condition
* reconceptualising symptoms (relief not an illness; ‘something that happens’)
* processing feelings (‘thinking about it’) ‘sort it out in my own mind’
* managing uncertainty
* being self-contained (‘I get on quite well with myself’)
* not personalising
* recognising helplessness
* being proactive
* levels of disclosure
The Role of Mental Imagery in Chronic Pain: An Exploratory Study

Background

Psychological assessment has consistently demonstrated the importance of cognitions in the form of thoughts and images on an individual's well-being. Having negative pain-related verbal cognitions has been shown to lead to poorer outcomes for patients (McCracken & Turk, 1997). Research on other conditions has shown mental imagery has a measurable impact on anxiety and stress. Patients who engage in mental imagery techniques to reduce their mental stress experience less pain-related distress (Kline, 2005; Kline & Mccracken, 2000). However, it is not clear how mental imagery might impact chronic pain.

Preliminary research indicated that spontaneously-activated pain-related imagery was reported by around 40% of pain patients. Pain-related imagery is associated with negative emotions such as distress, depression, and anxiety (Gilliland, Peterson & Mann, 2012; Leventhal, M., 1990; Gruenert, 2006).

Gosden's (2008) thematic analysis of participants' image descriptions suggested that pain-related mental imagery is constructed of three major components:
1. Sensory qualities of the pain.
3. Emotional meaning of the pain.

Thus, these early findings suggest that spontaneously-activated pain images may provide a means by which to elicit appraisals pertinent to emotional and behavioural functioning. Within the cognitive-behavioural therapy framework, this study area is nearly how mental imagery may impact on emotional and behavioural functioning by exploring how participants respond to images of pain.

Method

Semi-structured interviews have been conducted with individuals who have been seen by the Chronic Pain Management Service, NHS Highland. Twelve interviews have been completed, and interview transcriptions have been initially analyzed according to grounded theory methods.

The core constant comparative method is the primary method of analyzing the data, which may evolve as additional analysis is carried out. The initial stage of data analysis involves the definition of content categories and analysis of data. The initial stage of data analysis involves the definition of content categories and analysis of data. This procedure has allowed the qualitative data, then subsequent data collection, to ensure the validity of the data by fulfilling criteria on a grounded theory analytic level and relevance.

Data will be subject to second-order methods, where there are focused and theorized methods. The final analysis will then be used to explore categories of data to create a substantive theory of the impact of spontaneously-activated images of pain on pain management.

Preliminary Results

Participants readily described the pain as the form of mental images. Akin to the findings in Gosden's (2008) study, participants' descriptions of their pain-related images contain narratives of sensory qualities:

"It's like raw flesh and it's burning inside..." I just know that's as it somebody is burning the joint off..."
"There was a sharp pain in my leg, it was like pulling a red hot nail in the base of my kneecap..."
"It's a network of wires, just an absolute network of pain..."
"If you imagine your arm and you imagine it not hot, if you're going to make me write this, that's what you would write. It's just not hot, it's not the color of real flesh red hot..."

Testimonials from pain management have varied on the perceived impact of these images being a form of an escape route from the heat and pain of the actual experiences. In this study, the images are used to explore sensory and emotional aspects of chronic pain in order to determine between visual descriptions of pain-related mental images.

Pain-related conclusions of the thematic analysis relate to the distinct experiences. For example, we've seen that chronic pain often results in a sense of disconnection.

"Being down a dark hole, it's just a hole for one person but it's a long hole, it just gone down into the ground and it's... you're being left because you can't get going properly..."

"You're trying to keep going but your body doesn't want you to... the fatigue and your body is just slicing you..."

A context, another participant who has been seen for further pain management on individual imagery. In this case, imagery of clouds forming images that might lead to the worst it's that pain. The pain is being imaged in his mind, and he is using a form of imagery, where there is this kind of coherence and there is an adaptive coping strategy.

"When you see things that are non-painful images, and you're imagining it, you're trying to ignore the pain..."

"When you use the branches are the top as you don't go down..."

"You're trying to keep going but you body doesn't want you to..."

"The pain is too bad..."

"I'm not going to talk about the pain..."

"I'm not going to talk about the pain..."

"I'm not going to talk about the pain..."

"I'm not going to talk about the pain..."

Conclusion

Enhancing understanding of pain-related mental imagery and its impact on treatment outcomes is a key design of intervention in clinical practice. Working systematically with patients' unique pain-related images and the thoughts and beliefs that are associated with these images could be a helpful specific target for therapy.