Illness appraisals and psychological morbidity in adults with non-specific abdominal pain

Thesis submitted in part fulfilment of the degree of

Doctorate in Clinical Psychology

(DClinPsy)

By

Fiona French

Supervised by: Professor Noelle Robertson

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Declaration

I confirm that the literature review and empirical report in this thesis are an original piece of work. It was submitted in part fulfilment of the Doctorate in Clinical Psychology (DClinPsy) and has not been submitted for any other academic award. This thesis was checked for completion prior to submission and an anonymity checklist is included (Appendix A).

Illness appraisals and psychological morbidity in adults with non-specific abdominal pain

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Thesis Abstract

Enhancing quality of life and managing symptoms in the community has become a central focus in the care of long-term conditions. A large proportion of long-term health conditions are encompassed by unexplained symptoms, such as non-specific abdominal pain (NSAP). Individuals with NSAP are more likely to experience mental health difficulties. Understanding how patients may differ in the way they understand their illness may be the first step to contribute to interventions that focus on improving the individual and societal burden for this patient population.

Literature Review

The association of metacognitions on health outcomes was reviewed within the long-term health care population. Eight quantitative papers were analysed and revealed a strong association between metacognitions and a range of physical health conditions, including chronic fatigue syndrome, chronic pain and Parkinson's disease. Beliefs about the need to control thoughts and beliefs about the uncontrollability of the illness were significantly associated with long-term health conditions.

Empirical Report

This study explored the link between illness appraisals and psychological morbidity between three groups of patients: those with NSAP, those with an organic abdominal diagnosis, and a control group. The overall sample consisted of 64 participants and analysed differences between demographic characteristics, illness appraisals, psychological morbidity, metacognitions and pain using a number of psychometrics.

Results revealed a higher proportion of young females with NSAP, with significantly lower scores on the positive subscale of illness appraisals observed in comparison to those with an organic condition. Correlational analysis also showed significant associations between depression scores and the negative subscale of illness appraisals, as well as anxiety scores and negative metacognitions.

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Contents Page

List of Appendices

List of Tables

Part One: Literature Review

Part Two: Empirical Report

List of Figures

Part One: Literature Review

Part Two: Empirical Report

Part One: Literature Review

Are metacognitions associated with health outcomes in long-term health conditions?

Abstract

Background:

Long-term health conditions account for half of all GP appointments and 70% of hospital bed occupancy (Department of Health, 2011a). Estimated prevalence rates for those living with long-term health conditions, assesses 2.9 million of the UK population are affected, many experiencing co-morbid mental health difficulties and requiring effective psychological interventions to facilitate self and symptom management. Many such interventions seek to target cognitions; however, criticism has arisen for the applicability of the cognitive model for use with long-term health conditions. As such, a growing interest in the role of metacognitions, which can be understood as how we manage our thoughts, has shown positive links with symptom alleviation.

Aims:

To critically evaluate evidence regarding the association between metacognitions and health outcomes in long-term health conditions.

Method:

A systematic search was conducted between July 2017 and January 2019, including the use of grey literature. Using specific inclusion and exclusion criteria, as well as use of the Appraisal tool for Cross-Sectional Studies (AXIS) (Downes *et al.,* 2016), eight articles were elicited.

Results:

All eight studies found metacognitions to be associated with health outcomes in long-term health conditions, and found them to have a stronger association than other variables such as levels of depression. Metacognitions concerning uncontrollability, positive beliefs about worry and cognitive confidence were specifically associated with health outcomes.

Conclusions:

The results highlighted the association between metacognitions and the experience of symptoms. The findings provide counterweight to the dominance of dysfunctional beliefs within cognitive models and offer alternative explanatory constructs at which to direct interventions for those experiencing psychological distress when living with a long-term health condition.

1. Introduction

1.1 Long-term health conditions

A long-term health condition is understood as one for which no cure is available, yet is primarily managed by medication or other therapies (Department of Health, 2011a); notably arthritis, heart and circulatory diseases, diabetes, cancer, COPD, epilepsy and non-specific health conditions. The most recent UK census reported more than 15 million people live with a long-term health condition in England (Department of Health, 2011a) with this predicted to significantly rise in the next decade. Co-morbidity is common with figures predicted to rise to 2.9 million people living with three or more conditions by 2018 (Department of Health, 2011a).

1.2 Healthcare burden

Significant demands on the healthcare system accrue from these conditions. Half of all GP appointments, 64% of outpatients seen and 70% of patient beds in hospitals are attributable to long-term health conditions (Department of Health, 2011a), and the cost of treating these individuals accounts for 70% of all health and social care expenditure. As the incidence of long-term health conditions increases with age, this will inevitably put pressure on healthcare services as the population ages; the UK population comprised of 11.8 million people over the age of 65 in 2016, predicted to rise to 20.4 million by 2041 (Office for National Statistics, 2016).

1.3 Physical and mental health burden of long-term health conditions

In addition to the healthcare burden that accompanies chronic disease, personal and psychological challenges place additional pressure on individuals with long-term health conditions, which can impinge across a range of areas of daily life. Difficulties can include

retaining employment due to long periods off work and impaired career prospects, poorer quality of life due to ongoing symptoms and their management, frequent healthcare consultations, hospital stays and necessity of adhering to treatment regimens, impact on finances and housing, and the impact on the ability to complete regular activities and manage valued relationships. Research has also highlighted the high rate of co-morbid mental health problems within long-term health conditions (Götze *et al.,* 2018), with individuals two to three times more likely to experience mental health difficulties, estimated to raise health care costs by 45% (Naylor *et al.,* 2012). Research evidence has reported the mental health prevalence rates for individuals with long-term health conditions, with depression two to three times more common in cardiovascular disorders (Gunn *et al.,* 2010), two to three times more likely in diabetes patients (Vamos *et al.,* 2009); and results showing 10% of cancer patients experiencing symptoms of depression (Walker *et al.,* 2013).

1.4 Management of long-term health conditions

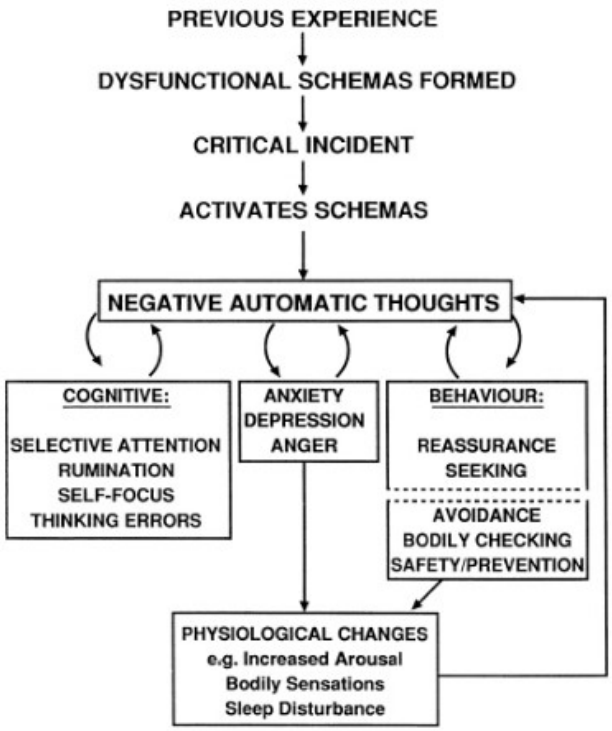
Long-term health conditions are increasingly managed within models of proactive, collaborative processes, emphasising self-management in the community (Grady & Gough, 2014; Lorig, 2007). Much self-management is psychologically-informed, with increasing understanding that health outcomes can be predicted by variables other than physical status and evidenced in the beneficial effects of psychological interventions (Anderson & Ozakinci, 2018). Acknowledgment of the value of such condition management is shown in the expansion of the Improving Access to Psychological Therapies (IAPT) services, as highlighted in the Implementing the Five Year Forward View for Mental Health (Department of Health, 2011). The cornerstone of this expansion is the delivery of psychological therapies rooted in cognitive behavioural principles with targeted focus on addressing behavioural activation, mood, worry, pain and quality of life. It is thought that

aspects of worrying, which are central to long-term health conditions, exacerbate and influence psychological distress (Hanusch *et al.,* 2014) and is related to symptom experience (Lefebvre *et al.,* 2017). Explanations of the link between worry and physical symptom experience have been posited by a number of theories, most notably the cognitive model.

1.5 Cognitive model

Beck's (1993) cognitive model emphasises the importance of the *content* of one's thoughts and it is these thoughts that have an impact on how people feel and behave. In the context of long-term health conditions, this can be understood as an individual attributing meaning to a bodily symptom based on previous or shared cultural experience, with dysfunctional beliefs about illness contributing to symptom severity. This has also been articulated in Salkovskis and Warwick's (1986) cognitive behavioural model of health anxiety (See Figure 1). Dysfunctional beliefs are dormant until they are triggered by health-related information, feeding cyclically into the misrepresentation of bodily symptoms which impacts on levels of anxiety, making the individual over focus on their bodily symptoms and pain by filtering any information through a cognitive bias (Taylor & Asmundson, 2004).

Figure 1 – Salkovskis and Warwick's model of health anxiety (1986)



Such ideas have informed the use of psychological interventions in long-term health conditions to manage thoughts and experiences of symptoms, pain and behavioural engagement. Notably, interventions for long-term health conditions have been led by cognitive behavioural therapy (CBT), its utility demonstrated in research with diabetes whereby providing a psychological framework for interventions improved physical health markers such as diabetes specific quality of life and glycaemic control (Lamers *et al.,* 2011; Snoek *et al.,* 2008). Similarly, the use of CBT for treating depression in patients with coronary heart disease improved heart rate variability and lowered elevated heart rate (Carney *et al.,* 2000). Finally, research reported interventions targeting depression and anxiety in people with long-term health conditions significantly reduced use of physical healthcare services (Layard & Clark, 2014).

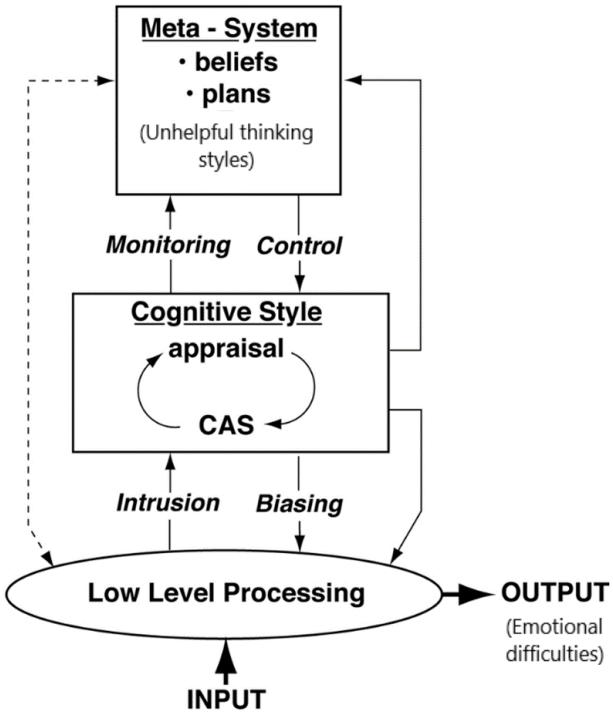
However, the applicability and effectiveness of CBT for mitigating symptoms in long-term health conditions, as well as its cognitive underpinnings, have been challenged. For

example, although there is evidence showing CBT to effectively improve pain in comparison to usual medical care (Eccleston *et al.,* 2014), a Cochrane review reported CBT to show small effect sizes with effects disappearing over time (Williams, Eccleston & Morley, 2012). When considering impacts on long-term health conditions, changes to the cognitive content (i.e. 'if I do this….it will help my pain') appear less applicable in long-term health conditions, where long term management of symptoms and the experience of pain is central to the condition. However, a therapeutic shift has explored the notion of redirecting the focus from the thought content (central to the cognitive model) to the thought processes involved.

1.6 Metacognitions and the Self-Regulatory Executive Function Model

Higher level processes such as metacognitions have been suggested as worthy of better fit to understanding psychological distress and thus exploration. Differentiated from cognitions per se which focus on *what* we think, metacognitions focus on *how* we think, and can be understood as the way in which we manage our thoughts. Their role is primarily explicated by the Self-Regulatory Executive Function (S-REF) Model (Wells & Matthews, 1996). The S-REF model argues that emotional difficulties are initiated, maintained and worsened by unhelpful thinking styles (See Figure 2 for an adapted version from Wells and colleagues model). The manifestation of worry is argued to be determined by positive metacognitions, such as 'worrying about my illness will help me manage it', and also by negative metacognitions, such as 'I can't control my worry'. Thus those individuals whose worry is out of control will present with metacognitions that facilitate worry as a coping strategy and also information processes that focus on threat-related information.

Figure 2 – The S-REF Model (adapted from Wells & Matthews, 1996)



Wells argues that when these strategies are activated they form into a Cognitive-Attentional Syndrome (CAS) (Wells, 2000), which when triggered, perpetuate negative emotions, self-belief is hindered, and availability of negative information increases. The CAS encompasses a number of unhelpful coping strategies such as attentional fixation on threat, rumination, worry, as well as suppression and avoidance. These thought patterns lead to the individual feeling a lack of control over their emotions and cognitions, which in turn can then contribute to psychological difficulties and an increase in symptom severity.

Substantial evidence links metacognitions, the CAS and diverse psychological difficulties. In two distinct studies, significant associations have been shown between metacognitive beliefs and individuals' attentional bias towards information about health (Kaur, Butow & Sharpe, 2013; Kaur, Butow & Thewes, 2011). A more recent meta-analysis examining a quarter of a century's data, encompassing 7,148 individuals, assessed the dysfunctional metacognitions as posited by the S-REF model across different manifestations of

psychological distress (Sun, Zhu & So, 2017). It revealed four of five dysfunctional metacognitions contained within the Metacognitions Questionnaire (MCQ) were more prevalent in those with psychiatric diagnoses in comparison to healthy controls (see Table 1 for an example of the different subscales of the MCQ). Two negative metacognitions in particular (beliefs about uncontrollability and danger of thoughts; and negative beliefs about superstition, punishment and responsibility) were highly predictive of psychiatric conditions.

This supports Wells' (2009) theory in which dysfunctional metacognitions have a central role in the development of psychological distress. Furthermore, Sun, Zhu and So (2017) found psychiatric patients had a higher propensity to excessively monitor their thoughts in comparison to healthy individuals, supporting the notion of the CAS. Research has also shown interventions centred on metacognitive therapy have shown better efficacy than those encompassing CBT. This is particularly the case when treating anxiety and depression (Normann & Morina, 2018; Normann, van Emmerik & Morina, 2014).

Table 1 – Subscales of the MCQ

MCQ Subscale	**Definition**	**Example**
Cognitive confidence	This subscale consists of items concerned with beliefs about the efficacy of one's cognitive skills, in particular memory and attentional functioning.	*"I have a poor memory"*
Positive beliefs	Items relating to the beliefs that worrying helps solve problems, and to avoid unpleasant situations. It also includes items which suggest	*"Worrying helps me avoid problems in the future"*

	that worrying is a necessary feature of a pleasant and normal personality.	
Cognitive self-consciousness	This subscale consists of items relating to the degree to which an individual focuses on their own thinking processes.	*"I am constantly aware of my thinking"*
Uncontrollability and danger	This factor incorporates items tapping the belief that it is necessary to control ones worrying in order to function well as a person, beliefs about the mental and physical dangers or worrying, and the belief that one's worry is uncontrollable.	*"My worrying is dangerous for me"*
Need to control thoughts	This subscale concerns negative beliefs in general, including themes of superstition, punishment and responsibility and includes items relating to negative outcomes that might result from having certain thoughts and to a feeling of responsibility for preventing those outcomes.	*"If a bad thing happens which I have not worried about, I feel responsible".*

1.7 Aims of the review

Previous research reveals the association between cognitive processes and physical symptom experience, with interventions targeting psychological distress shown to improve physical symptoms. Research also supports the link between metacognitions and psychological distress, therefore understanding the relationship between metacognitions and symptom severity could support the identification of support strategies and better

support individuals in the management of their long-term health condition. The main aim of this review was to critically appraise research that investigates the associations between metacognitions and health outcomes in long-term health conditions. However, it is important to note that some of the papers included in the review refer and compare both psychological and distress outcome variables, as well as symptoms of long-term health conditions. Therefore, specific symptoms attributed to the long-term health conditions are not explored in each study.

2. Method

This systematic search was guided and conducted in accordance with the PRISMA guidelines for systematic reviews (Moher *et al.,* 2009). It was undertaken to include all available literature and relevant information concerning metacognitions and health outcomes in long-term health conditions. The focus of this literature review was guided by a positivist epistemological position (See Appendix NN).

2.1 Search strategy

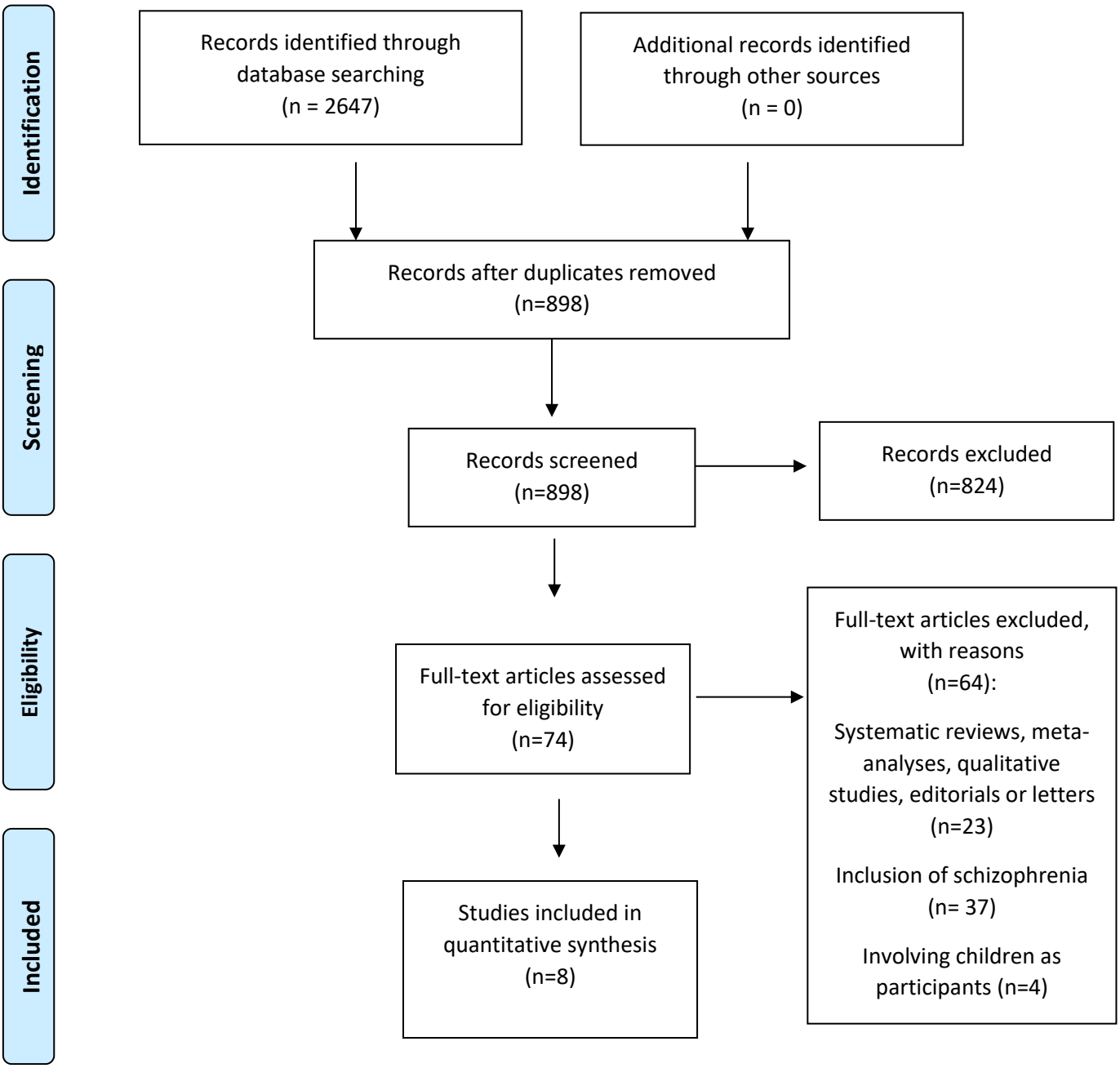
Literature searching was conducted between July and September 2017 and again in January 2019 (to account for any current articles that may have been missed). Searches were completed via Medline, PsychInfo and Scopus to cover a range of psychological and medical journals, alongside a review of the grey literature. An initial scoping exercise was undertaken to identify key words and phrases within the literature. Specific search criteria were then used to ensure all articles pertaining to metacognitions within long-term health conditions were included. Key words that were used within the literature search were metacognitions ("metacog*; "self-regulatory model"; "S-REF" "MCQ") and variations of long term physical health ("pain"; "chronic"; "symptom*"; "symptom severity"; "long-term"; "health"). The search criteria were kept broader to ensure no long-term conditions were missed. To increase the effectiveness of the search criteria Boolean search operators '*AND'* and truncation were used.

2.2 Selection strategy criteria

For the purpose of comparison, the articles were limited to those written in the English language and those conducted on an adult population. Research conducted using children was not included in this review, since not only would their metacognitive development

differ from adults, but also that developing attachment styles can adversely affect the experience and severity of symptoms (Neumann *et al.,* 2015). Period of interrogation of databases started from 1997 (articles were retrieved from 1997-2019) since formal articulation of Wells and Matthew's S-REF model was published in 1996. The available literature was examined using a PRISMA template (Moher *et al.,* 2009) which can be seen in Figure 3. A total of 2647 articles were found using the search criteria. After duplicates were removed the articles were screened to ensure they were appropriate. The inclusion and exclusion criteria can be seen in Appendix B. After the records were screened and identified as meeting the inclusion/exclusion criteria a total of eight papers were deemed relevant for review.

Figure 3 – PRISMA Flowchart



2.3 Data extraction

All articles were collected in reference management software (Refworks). After duplicate articles were removed, 898 articles were screened with a further 824 excluded. A total of 74 full text articles were assessed for eligibility, leaving a final total of eight articles

suitable for review. Each article was independently reviewed by the trainee for its methodology, sample, outcome measures and the reliability of the findings, with a quarter seen and independently rated by another researcher. One minor discrepancy was highlighted, which was resolved by discussion.

2.4 Quality appraisal

From the initial screening, 74 articles were systematically examined using the Appraisal tool for Cross-Sectional Studies (AXIS) (Downes *et al.,* 2016). The AXIS (Appendix C) was developed to assess the quality of cross-sectional studies and highlight any bias that may have occurred. Although other tools, such as the CASP, have been used for cross-sectional studies (Critical Appraisal Skills Programme, 2018) their validity has been criticised (Downes *et al.,* 2016). The AXIS consists of 20 items that assess a study's aims, sample (e.g. size, sample selection, etc), use of measures and data analysis for quality and potential risks of bias.

From this, eight articles were included for this review (Brown & Fernie, 2015; Butow *et al.,* 2015; Donnellan *et al.,* 2016; Fernie *et al.,* 2016; Gill, Mullin & Simpson, 2014; Maher-Edwards *et al.,* 2011; Palagini, Ong & Riemann, 2017; and Yoshida *et al.,* 2012). The articles included in this review are highlighted in the reference list by the use of an asterisk. A detailed table of the appraisal can be seen in Appendix D.

3. Results

All of the eight studies rated eligible for review employed a quantitative methodology. They all examined long-term health conditions and the association of metacognitions with symptom presentation and experience. The health outcomes that were examined included mood symptoms post stroke; levels of fatigue in CFS; levels of chronic pain; pre-sleep arousal in insomnia; fear of cancer recurrence; post-traumatic stress symptoms from acquired brain injury; and motor symptom severity in Parkinson's disease.

3.1 Study characteristics

3.11 Sample

A total of 1,320 participants were included in this review, ranging from 63 (Butow *et al.,* 2015) to 171 (Fernie *et al.,* 2016). Seven of the eight studies reported age ranges varying between 42 years (Brown & Fernie, 2015) and 63 years (Yoshida *et al.,* 2012). Across seven studies that reported gender participation, the average female involvement was 49% with a range from 33% (Donnellan *et al.,* 2016) to 81% (Maher-Edwards *et al.,* 2011). Half of the studies were conducted within the UK, with one studies being undertaken in Italy, one in Bahrain and one in Australia. Yoshida *et al.,* (2012) did not specify the location of the study. A summary of the demographic and study characteristics can be seen in Table 1.

Table 2 – Demographic and study characteristics

First Author	Publication Year	Study Type	Sample size (N)	Country	Age	% Female	Metacognitive Measures Used	Health Condition
Brown	2015	Cross-sectional	106	UK	43-85	45.2%	MCQ-30	Parkinson's disease
Butow	2015	Cross-sectional	63	Australia	*M*: 64.05	47.6%	MCQ-30	Fear of cancer recurrence
Donnellan	2016	Prospective	64	Bahrain	*M*: 61.00	33.0%	MCQ-30	Stroke
Fernie	2016	Prospective	171	UK	18-75	NS	MCQ-30	Chronic fatigue syndrome
Gill	2015	Cross-sectional	140	UK	19-76	67.9%	MCQ-30	Acquired brain injury
Maher-Edwards	2011	Cross-sectional	96	UK	21-70	81.3%	MCQ-30	Chronic fatigue syndrome
Palagini	2017	Cross-sectional	104	Italy	NS	63.2%	MCQ-I	Insomnia
Yoshida	2012	Cross-sectional	129	NS	22-85	56.0%	TCQ	Muscular dystrophy

NS – *Not Specified*

3.12 Study Design

Six of the studies employed a cross-sectional design (Butow *et al.,* 2015; Brown & Fernie, 2015; Gill, Mullin & Simpson, 2015; Maher-Edwards *et al.,* 2011; Palagini, Ong & Riemann, 2017; and Yoshida *et al.,* 2012) with the other two studies using a prospective design (Donnellan *et al.,* 2016; and Fernie *et al.,* 2016) (See Appendix E).

3.13 Study Measures

The focus of this review was to synthesise findings on the association between metacognitions and health outcomes in long-term health conditions. Therefore, only measures analysing metacognitions and outcome measures were considered. Nearly all the studies used the 30-Item Metacognitions Questionnaire (MCQ-30) (Wells & Cartwright-Hatton, 2004) or an adapted version for insomnia. The MCQ-30 is a self-report measure that encompasses five dimensions of metacognitions. These are positive beliefs about worry, negative beliefs about thoughts concerning uncontrollability and danger, cognitive confidence, beliefs about the need to control thoughts, and cognitive self-consciousness. The MCQ-30 has been shown to possess good psychometric properties and has been used across a variety of health conditions (Spada, Mohiyeddini & Wells, 2008).

Yoshida *et al.,* (2012) used a Thought Control Questionnaire (TCQ) (Wells & Davies, 1994), which involves the five subscales of worry, punishment, reappraisal, distraction, and social control to assess for control strategies used when experiencing negative affect. The TCQ scales have shown good internal consistency coefficients (Reynolds & Wells, 1999) as well as positive associations between unwanted thoughts and psychological functioning in clinical populations (Coles & Heimberg, 2005).

The psychometric properties of the measures used across the studies are all well validated and reliable tools however it is important to take into consideration that the validity/reliability of the measures used is going to vary within populations and conditions, such as within the studies included in this review. There is some reference to certain measures, such as the HADs, being well validated with the range of patients included in this review. For example patients with Parkinson's disease (Marinus *et al.,* 2002) and patients with traumatic brain injuries (Draper & Ponsford, 2009). Additionally, there is some reference to the MCQ-30 being validated within the varying populations in this review, such as with Parkinson's Disease (Allott *et al.,* 2005) and with insomnia disorder (Palagini *et al.,* 2014) however there is limited information and reference to these measures being used in all of the populations included in this review. Therefore, this would need to be taken into consideration when interpreting the results.

3.2 Summary of results

Maher-Edwards *et al.,* (2011) examined 96 patients with a diagnosis of chronic fatigue syndrome to examine relationships between metacognitions, negative emotions and symptom severity, and whether metacognitions are associated with long-term health conditions. A series of multiple regressions revealed that certain dimensions of metacognitions (cognitive confidence and beliefs about the need to control thoughts) are associated with long-term health conditions, independent of negative emotions.

Fernie *et al.,* (2016) analysed whether Cognitive Behavioural Therapy and Graded Exercise Therapy are effective treatments for chronic fatigue syndrome. Using a prospective design, they specifically looked at whether the metacognitions subscales could predict severity of fatigue symptoms independent of changes in other variables or across the two treatment pathways. This was achieved by assessing the patients on a number of

psychometrics pre and post treatment. On analysing the metacognitive change seen before and after treatment, they found the subscales of 'negative beliefs about thoughts' and 'cognitive confidence' had significant effects on levels of fatigue at post treatment. Along with depression, these two metacognitive subscales were shown to produce significant effects when entered into the regression models when fatigue severity was the outcome variable. This was evident regardless of what treatment the participants were receiving. However, it is pertinent to note that the study did not have a large enough sample size to power an analysis modelled on all five subscales of the MCQ. Therefore, this limits the interpretation of the change seen.

Butow *et al.* (2015) investigated the relationship between metacognitions and attentional bias and whether these predicted Fear of Cancer Recurrence (FCR). Sixty three participants, previously diagnosed with either breast or prostate cancer who had finished active treatment without recurrence, took part in the study. The results showed that individuals within the clinical level of FCR scored higher on the metacognitions scale in comparison to those at the non-clinical level. They also scored higher for specific subscales of the metacognitions questionnaire, showing higher scores for 'positive beliefs about worry' (10.1 vs 7.4) and 'beliefs about uncontrollability and danger of worry' (12.0 vs 7.7). Positive significant correlations were seen for the FCR score and total metacognitions score ($r = 0.489$, $p < 0.01$). The results support the association between negative metacognitions and FCR with those individuals with clinical level of FCR placing more importance on controlling their worrying in comparison to the non-clinical level group. Criticisms however were highlighted by the use of the AXIS quality appraisal tool. Specifically, it was unclear whether there were any biases from the responders and whether these impacted on the internal consistency of the results.

Donnellan *et al.* (2016) examined the relationship between metacognitions and mood symptoms in the acute phase after suffering a stroke. Sixty four individuals were assessed for mood symptoms and cognitive processes using a range of psychometrics in this prospective stroke study. Results were gathered one to two weeks after an episode of stroke. Correlational analysis was conducted to assess if any variables related to each other and further multiple regression analysis was undertaken to assess the predictive value of metacognitions and their subscales on other variables such as psychological distress. The correlational results showed that both anxiety ($r = .51$, $p < .001$) and depression ($r = .47$, $p < .001$) were significantly associated with total metacognitions scores. Additionally, the results highlighted that the MCQ subscales of cognitive confidence, cognitive self-consciousness, and uncontrollability were all significantly correlated to both anxiety and depression ($p < .001$). The results from the multiple regression showed that after adjusting for the variables education and global cognition, the MCQ subscales of cognitive confidence and uncontrollability explained 34 % of the variance in anxiety. Similarly, cognitive confidence, self-consciousness, and uncontrollability explained 32% of the variance in depression. The overall findings from this study highlight that metacognitions appear to be a better determinant of mood symptoms after stroke than other variables such as global cognition or executive function. These findings replicate those found in the literature with similar patients groups. The quality appraisal summary for this study showed a very good inclusion of all the requirements when undertaking correlational research.

Brown and Fernie (2014) investigated the relationship between symptoms of Parkinson's, anxiety and metacognitions. Results showed that anxiety was not correlated with symptoms of Parkinson's however metacognitions were shown to significantly relate to

distress in patients. In particular, metacognitions regarding uncontrollability and danger were significantly associated with distress symptoms seen in Parkinson's.

Palagini, Ong and Riemann (2017) investigated the relationship between metacognitions, unhelpful sleep related beliefs and pre-sleep arousal in individuals with diagnosed insomnia disorder. A total of 68 participants were recruited to the insomnia group and a further 36 participants were assigned to the 'good sleeper' group, all recruited from a hospital in Italy. Results showed metacognitive beliefs specific to insomnia were significantly associated with pre-sleep arousal (Unstandardized co-efficient = 0.07, Beta = 0.37, $p < 0.001$). The multi regression model was also shown to be significant ($F = 13.3$, $p < 0.0001$) with insomnia specific metacognitions being one of the variables significantly associated with pre-sleep hyper arousal.

Gill, Mullin and Simpson (2015) examined whether metacognitive processes were predictive of long-term health conditions in individuals after an acquired brain injury. A total of 140 participants completed questionnaires on a range of variables. The results showed metacognitive variables were significantly associated with long-term health conditions within these individuals. It found that 'negative beliefs about uncontrollability and danger of worry' was a significant predictor ($\beta = 0.13$, $t = 1.8$ $p < 0.05$), as well as 'beliefs about the need to control thoughts' ($\beta = 0.25$, $t = 3.42$ $p = 0.001$). From a quality appraisal perspective, this paper showed good evidence of accounting for all aspects of data collection and participation requirements.

Yoshida *et al.,* (2012) investigated the association between metacognitions and chronic pain within individuals with muscular dystrophy. In particular they examined the impact of catastrophizing and pain control beliefs. One hundred and twenty nine individuals completed a number of psychometrics. The results of the regression analyses showed that

scales from the Thoughts Control Questionnaire contributed an additional 10% variance to the prediction of catastrophizing, as well as 13% additional variance to the prediction of pain control. There were however aspects of this study that remained unclear after quality appraisal including the approval of consent for participation.

4. Discussion

The current review is the first to systematically appraise the literature examining the relationship between metacognitions and health outcomes in long-term health conditions. Eight quantitative studies were examined and the findings are discussed with reference to Wells and Matthew's (1996) Self-Regulatory Executive Function model of metacognition.

4.1 Summary of findings

Across all studies, significant associations were revealed between metacognitions and health outcomes in long-term health conditions, which in most cases showed stronger associations with health outcomes than other factors such as negative emotion (Butow *et al.,* 2015; Maher-Edwards *et al.,* 2011). Key dimensions of metacognitive beliefs showed strong correlations with symptom severity: Beliefs about the need to control thoughts; thoughts concerning uncontrollability; and cognitive confidence. Maher-Edwards *et al.,* (2011) found these dimensions were specifically linked to symptom severity in chronic fatigue syndrome and Yoshida *et al.,* (2012) found control beliefs to be important in the management of pain symptoms in their study. This was also seen in the research by Butow *et al.,* (2015) where individuals with high levels of FCR tended to perceive worry as being important to control. Finally, Butow *et al.,* (2015) found that individuals with a higher level of FCR were more likely to see worry as being beneficial and imperative to control.

4.2 Theoretical implications

The results presented in this review support aspects of the metacognitive theory (Wells, 2009), in that certain domains of metacognitions are associated with symptom severity. Beliefs about uncontrollability are seen as pivotal predisposing factors for the development of psychological disorders (Spada *et al.,* 2015). The theory postulates that these beliefs are responsible for the activation of the Cognitive Attentional Syndrome (CAS). The CAS is

considered to encompass maladaptive thinking processes such as worrying about illness, illness related threat monitoring, and unhelpful coping strategies (Bailey & Wells, 2015).

Support for this process was seen in the study by Gill, Mullin and Simpson (2015) who suggest that PTSD symptoms after a traumatic event are a normal process of emotional recovery known as the reflexive adaptation process (RAP). PTSD symptoms are thought to lessen over time if the individual is able to proceed through the RAP without interruption. However, some are not able to progress because of metacognitive beliefs they hold. These beliefs are being maintained by the activation of the CAS, which in turn hampers the normal processing through the RAP. Therefore, dysfunctional metacognitions are impacting on symptom severity.

The S-REF model challenges the view of general cognitive models such as Beck's schema theory (1991) in understanding the experience of symptoms in long-term health conditions. How individuals regulate their cognitions are integral to the S-REF model, as opposed to the content of the thoughts highlighted in cognitive models. It suggests that anxiety is not preceded by the content of unhelpful thoughts, but rather the amount of attention we give to them (Fisher & Wells, 2009). This was supported by the findings shown by Palagini, Ong and Riemann (2017) who highlighted that individuals with insomnia may have underlying metacognitive processes associated with hyperarousal and it is this attention on these processes that affects their predisposition to anxiety related sleep issues.

The results reported in this review suggest the value of a cognitive model examining thoughts as process rather than content. Metacognitive processes are an alternative way by which unhelpful symptoms can be understood and perpetuated, which could provide support on shaping interventions in long-term health conditions.

4.3 Clinical implications

The current review found that components of metacognitions, notably, beliefs about uncontrollability are associated with health outcomes in long-term health conditions. Future research could focus on developing interventions aimed at modifying illness beliefs, helping individuals to feel more in control of their symptoms. Furthermore, it is suggested that targeting both cognitive content and metacognitions simultaneously may provide even better outcomes (Yoshida *et al.,* 2012). Research could be developed to assess the long-term impact of interventions focused on both cognitive and metacognitive content to improve symptom experience.

It is suggested that the dysfunctional beliefs of the cognitive model may not play as significant part in symptom experience as once thought. Therefore, interventions that challenge these beliefs may not produce long term effects. Metacognitive therapy on the other hand directly targets the CAS by helping individuals change the way they relate to their thinking. It appears to have a more direct role in the experience of distress and symptoms, therefore targeting metacognitions within treatment may have more beneficial long term effects.

Interventions based on metacognitive therapy involve the modification of attention away from threat. Therefore long-term health conditions whereby individuals predominantly focus on the perceived threat of their illness could benefit from this type of intervention, as opposed to modifying their thought content. Certain techniques may be helpful in doing this which include Detached Mindfulness, Situational Attentional Refocussing and Attention Training Technique (Fergus & Wheless, 2018).

Research has started to show the impact of targeting metacognitions. Normann, Van Emmerik and Morina (2014) showed better outcomes for metacognitive therapy over cognitive therapy when treating depression and anxiety in those with long-term health conditions. Meta-analysis of sixteen trials found large effect sizes post-treatment, which were maintained at follow-up.

4.4 Methodological limitations

The results presented in this review should be interpreted with caution. Firstly, most of the studies employed a cross-sectional design which limited the ability to infer causality. However, two of the studies undertook a prospective approach (Fernie *et al.,* 2015 & Donnellan *et al.,* 2016), which generally provides better quality evidence than cross-sectional studies, as it allows the researcher to see the development of symptoms over a longer time period and allows for identification of risk factors for developing a specific condition. Secondly, many of the studies also failed to use a large enough sample size to adequately power the analysis, which limited the interpretation of certain metacognitions on therapeutic change and symptom reporting. Thirdly, self-report measures were used in all of the studies, meaning errors may have been attributed to self-report biases, social desirability and poor recall. Added to this, some of the measures asked about symptom severity over the previous month as a comparison to previous symptom experience however many individuals may have been ill for long periods of time and would therefore select the 'no worse than usual' response, impacting on the validity of the results. Fourth, there appeared to be a lack of diversity within the samples with some using only white males and some using only young females, impacting on the generalisability of the findings. Lastly, nearly all studies used the MCQ-30 to examine metacognitive beliefs. Although this was designed to evaluate metacognitions involved in worry, it may be more

pertinent to adopt a more appropriate measure for physical health conditions, such as the Metacognitions about Symptom Control Scale (MaSCS) (Fernie *et al.,* 2015).

In terms of the approach adopted for this review, the use of the AXIS for data quality appraisal also has frailties. As it does not use a scoring system to appraise quality, the results are open to bias interpretation of the findings from the researcher, with the potential to exclude information and give a bias overview of the research conducted. However appraisal tools employing numerical scales are also intrinsically vulnerable as there is no necessary equivalence in the weightings offered to constituent elements, and indeed they have been challenged because of their frequent bias of reporting (Higgens *et al.,* 2011).

Finally, it is important to comment on the variation of outcome measures that were compared within this review. Firstly, there were a wide range of physical health conditions that were included in the analysis, which may impede comparisons of physical distress experience in patients. As a result of the heterogeneous nature of the health problems and outcome measures, it would be difficult for these results to have any impact on the development of future interventions as the studies are looking at different health conditions and dependent variables. Further, the results from this review would not be able to be included in a larger meta-analysis as a result of the heterogeneity of the studies. Although it is difficult to completely avoid heterogeneity, in the case of future reviews for this population a stricter criterion for study selection could be employed based on design, population and outcome.

4.5 Conclusion

In conclusion, this review of eight studies deploying measurement from a robust model, and using a largely robust appraisal tool suggests significant relationships between metacognitions and health outcomes for long-term conditions. This appears to be important given that worry and rumination about symptoms and their management are so central to the experience of physical ill health, and give possibilities for intervening to mitigate such distress.

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Part Two: Empirical Report

Illness appraisals and psychological morbidity in adults with non-specific abdominal pain

Target Journal: Journal of Psychosomatic Research

Please see Appendix F for author guidelines.

Abstract

Objective:

The prevalence of non-specific abdominal pain (NSAP) is increasing in the UK, with 90,000 surgical admission a year being seen (Royal College of Surgeons, 2014). Due to the complex nature of symptoms experienced without an underlying organic diagnosis, NSAP adversely affects patient's quality of life, with high rates of psychological morbidity. How individuals make sense of their illness (encompassed by illness appraisals and metacognitions) has been shown to affect symptom experience in other medically unexplained diagnoses. Therefore this study aimed to compare illness appraisals and psychological morbidity in the NSAP population in comparison to patients with a diagnosed condition.

Methods:

Adults (n =64) were seen in a surgical assessment unit and categorised into one of three groups, depending on their diagnosis. They all completed the Hospital Anxiety and Depression Scale (HADS), the Illness Perception Questionnaire-Revised (IPQ-R), the Metacognitions about Symptom Control Scale (MaSCS), and the Numerical Rating Scale for Pain (NRS). Demographic data were also collected.

Results:

There was a difference in scores on the positive subscale of the IPQ-R, with NSAP patients displaying significantly lower scores than the other groups ($p < .001$). NSAP patients also scored significantly lower on two subscales of the IPQ-R; treatment control ($p < .05$) and illness coherence ($p < .01$). Results also showed a significant difference in age ($p < .001$) and gender ($p < .05$) with younger females being seen in the NSAP group.

Conclusion:

Patients with NSAP have been shown to be predominantly young females with high levels of anxiety and dysfunctional illness appraisals. Assessing and promoting positive illness appraisals may contribute to improving physical health symptoms in this population and in turn improve psychological distress. Future research should focus on exploring the impact of interventions focused on modifying illness appraisals for patients with NSAP.

1. Introduction

1.1 Non-specific abdominal pain

Non-specific abdominal pain (NSAP) can be defined as 'acute abdominal pain of less than seven days' duration, where no diagnosis is reached after examination and baseline investigations', (Royal College of Surgeons, 2014, p.11). It is best understood as a functional gastrointestinal condition, assessed using the Rome III Diagnostic Criteria for Functional Gastrointestinal Disorders (Rome III, 2006). Although the Rome guidelines utilise the term 'functional abdominal pain syndrome', this has been superseded by NSAP. NSAP is distinguishable from other functional abdominal conditions by the presence of abdominal pain in the absence of reportable changes in either eating patterns or bowel movements, themselves more commonly seen in irritable bowel syndrome (IBS) and functional dyspepsia (characterised by pain in the upper abdomen).

1.2 Prevalence and burden of NSAP

In England, acute presentation of NSAP accounts for over 300,000 emergency admissions per annum and 90,000 of surgical admissions (Royal College of Surgeons, 2014). Patients admitted with NSAP can undergo a large number of potentially unnecessary investigations, with rates of negative findings at exploratory laparotomy in the order of 25% (Collett, 2013). In the United Kingdom, it has been estimated that NSAP costs the economy in excess of £100 million per annum (Collett, 2013).

NSAP is the sixth most common cause of hospital admissions in women and the tenth most common cause in men (Collett, 2013) with 67% of consecutive admissions to a surgical ward being recorded as NSAP (Halder & Locke, 2009). NSAP patients may attend emergency departments on a frequent basis with a small number of repeat attendees using substantial time and resources; three percent of attenders with chronic pain were found to account for 12% emergency room expenditure (Jorgenson *et al.,* 2007). Given emergency departments are not equipped to manage patients with persistent chronic pain, staff in these units report significant frustration and describe these patients as challenging (Gauntlett-Gilbert *et al.,* 2015).

NSAP prevalence appears to be higher in women than men (Unruh, 1996), with women reporting higher pain severity for abdominal pain of an unknown aetiology (Catala *et al.,* 2002; Gerdle *et al.,* 2008; Picavet & Hazes, 2003,). A large Japanese population assessed

12,209 patients discharged following acute abdominal pain, revealing 70% of the sample as female with highest prevalence of pain between 20 and 39 years (Murata *et al.,* 2014)

1.3 Explanations for NSAP

NSAP experience has been explained through heightened sensitivity of the afferent nerve impulses travelling between the stomach via the spinal cord to the pain centres in the brain (Whitehead, Palsson & Jones, 2002). Sperber and Drossman (2010) proposed that gastrointestinal function disturbance is not necessarily disordered in NSAP, but that the perception of pain is exaggerated by the central nervous system. Given pain experiences involve emotional, cognitive and sensory input, it is plausible that such anomalies affect pain perception. Recent models of aetiology suggest traumatic experiences in childhood and attendant heightened arousal may over sensitise pain perception pathways, provoking functional abdominal problems (Srinath, Turner & Szigethy, 2014). Data from several primary care practices, reporting on women who were sexually abused and/or physically abused in childhood, revealed 46% reported abdominal pain in the preceding six months compared to 28% of a cohort of participants with no such abuse history (McCauley *et al.,* 1997). A history of psychological, physical, or sexual abuse in childhood also appears a strong predictor of gastrointestinal symptoms developing later in life (van Tilburg *et al.,* 2010), and child-experienced psychological stressors, as well as maternal psychological distress during the child's early years, appear predictive of recurrent abdominal pain during adolescence (Helgeland *et al.,* 2010).

1.4 NSAP and psychological morbidity

Whilst there is substantial evidence of distal psychological difficulties correlated with NSAP, far fewer studies have attempted to understand how proximal factors associated with the pain itself affect NSAP. There is limited literature on the experience of NSAP, however one prism by which NSAP may be conceived is through a parallel exploration of medically unexplained symptoms (MUS). Seventy percent of individuals with MUS also experience symptoms of depression and anxiety (NHS England, 2016) with research showing higher rates of depression and anxiety in those with MUS, in comparison to those observed in healthy controls with similar diseases with a known organic pathway (Henningsen, Zimmermann & Sattel, 2003; Duddu, Husain & Dickens, 2008). Kroenke *et al.,* (1994) found a higher proportion of physical symptoms directly correlated to a higher prevalence of depression and anxiety. This was supported in research by Katon and Walker

(1998) who highlighted a significant comorbidity for individuals with MUS and diagnoses of psychiatric disorders.

Although there appears to be a link between MUS and psychological morbidity, the direction of the causality is less clear. It is plausible that experiencing symptoms with no known cause could impact detrimentally on a person's psychological wellbeing, and it could be expected that treating MUS would ameliorate psychological distress. Research has in fact shown the opposite; targeting the psychological distress had a positive impact on symptom severity in those with MUS. Kroenke and Swindle (2000) found the physical attributes of MUS severity decreased when a CBT focused intervention was used for depression and anxiety. Similarly, evidence has shown targeting depression alleviated pain severity in those with arthritis (Lin *et al.,* 2003), as well as CBT positively impacting levels of fatigue in CFS (Price & Couper, 2001).

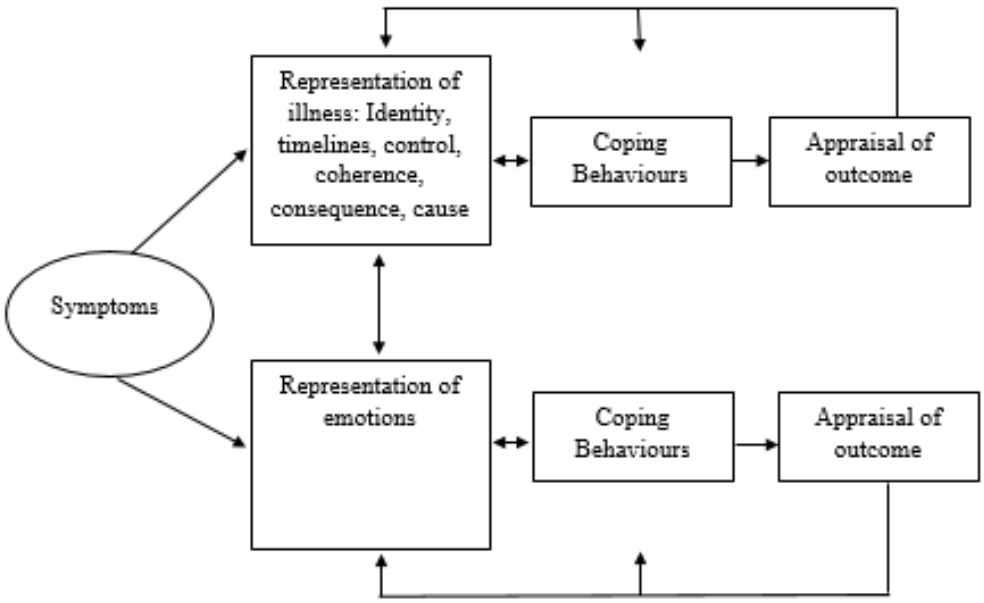
Currently, active focused management of NSAP is lacking, with physical interventions often comprising of discharge into the community and referral to a pain management group, with psychological interventions infrequently adopted for this patient population. Follow-up suggests that the same patients are presenting to acute care with the same symptoms unresolved (Dent, Hunter & Webster, 2010), with evidence to show 45% of repeat attenders also report MUS (Jacob, Hayhurst & Morrison, 2016). This may be attributed to a lack of understanding from the medical profession about the experience of the patient, adding to frustrations seen towards this population (Gauntlett-Gilbert *et al.,* 2015). Gaining greater understanding of whether and how those with functional vs non-functional pain differ may be valuable for both the patient and the doctor relationship. In particular how those with NSAP appraise their experience, may be a first step to tailor interventions that address repeated unsatisfactory consultations, burden and cost.

1.5 Illness appraisals and metacognitions

Substantial research over the last quarter of a century has shown that health behaviours and psychological morbidity can be understood by how we perceive and appraise health challenges such as NSAP. Leventhal's self-regulatory model of health and illness (Leventhal, Nerenz and Steele, 1984) explains how individuals manage and understand their illness and is based around a number of themes that include: *identity*, comprising the labels given to the illness and the symptoms understood as being part of the disease; *cause*, encompassing personal ideas about aetiology which may be simple, single causes or more

complex multiple causal models; *timeline*, how long the patient believes the illness will last; *consequences*, the expected effects and outcome of the illness; and *cure-control*, how one recovers from or controls the illness (See Figure 1). Moss-Morris *et al.,* (2002) later added dimensions of *illness coherence*, understood as the belief about the illness making sense to the individual; and *emotional representations*, which are the individual's emotional responses to the illness. Systematic assessment of these appraisals has been afforded via three questionnaires, derived from Leventhal's self-regulatory model, well-validated and translated into numerous languages: the Illness Perception Questionnaire (IPQ; Weinman *et al.,* 1996), the Illness Perception Questionnaire-Revised (IPQ-R; Moss-Morris *et al.,* 2002), and the Brief Illness Perception Questionnaire (Brief IPQ; Broadbent *et al.,* 2006).

Figure 1 – Leventhal's Self-Regulation Model (1984)



In the iterative model, an individual's illness appraisals can shape adaptation to a health condition and subsequently affect the experience of psychological distress. Significant relationships between such appraisals and psychological distress have been noted in numerous conditions in which pain or unexplained symptoms are central, e.g. arthritis (Zyrianova *et al.,* 2011), cancer (Gallagher, Parle and Cairns, 2002) and IBS (Ben-Ezra *et al.,* 2015). Further, Cordingley *et al.,* (2014) showed how illness appraisals can impact on the severity of anxiety and depression. Indeed, a number of studies have shown that illness appraisals have a greater effect on levels of depression and anxiety than positive health

status (Groarke *et al.,* 2004; Maas *et al.,* 2009), with illness appraisals accounting for 25-30% of the variance in psychological morbidity across a range of illnesses in a meta-analytic review of 31studies (Dempster, Howell and McCorry, 2015).

Illness appraisals can be further dichotomised into negative and positive appraisals. When using the IPQ, high scores on the subscales of identity, timeline, consequences and cyclical dimensions reflect a propensity for negative illness appraisals. Whereas high scores on the subscales of personal control, treatment control and coherence dimensions encompass positive illness appraisals. Research within the MUS literature highlights the impact of negative illness appraisals on physical health decline (Sharpe *et al.,* 2010) and psychological morbidity (Frostholm *et al.,* 2007), with negative illness appraisals being linked with poor health outcomes in chronic conditions (Hagger *et al.,* 2017) and chronic fatigue syndrome (Moss-Morris, 2005). There is mixed empirical evidence on the impact of positive illness appraisals on health outcomes (Hou *et al.,* 2012; Moss-Morris, Spence and Hou, 2011 and van Wilgen *et al.,* 2008) however this has been mainly due to small sample sizes being unable to detect the small to moderate effects being shown. A recent meta-analysis reviewed 23 studies examining the relationship between negative and positive illness appraisals on health outcomes in MUS (McAndrew *et al.,* 2018). It was found that negative illness appraisals (specifically consequence, identity and timeline) were associated with poorer health outcomes (accounting for 77% of the variance) and positive illness appraisals were associated with better health outcomes.

Research has also highlighted that illness appraisals can be key to patient behaviour and self-care; with interventions targeting illness appraisals showing enhanced quality of life in diabetes and HIV (Petrie, Broadbent & Meechan, 2003), as well as myocardial infarction (MI). Patients post-MI in the intervention group (modifying illness appraisals) reported significantly lower rates of angina symptoms in comparison to a control group at the three month follow up (Petrie *et al.,* 2002). Furthermore, therapeutic interventions designed to modify illness appraisals have shown lower levels of reported pain in conditions such as chronic back pain (Glattacker, Heyduck & Meffert, 2012). The subscale of personal control was of particular interest as this was seen to significantly increase in the treatment group in comparison to the control group (F= 4.70, p = .032).

Broader metacognitive constructs have also been adopted to understand symptom experience and pain in conditions such as NSAP. Metacognitions encompass attentional

focus, emotions, behaviour and physical expressions of distress, and are also considered key to the activation of behavioural and psychological responses to health challenges (Wells, 2000). Metacognitions themselves can be divided into positive and negative subscales, and act to assess internal and external events. Positive metacognitions can be understood as beliefs about the benefits of using certain strategies such as rumination or symptom focus, whereas negative metacognitions incorporate negative associations of ruminating or excessive worrying (Wells, 2009). Negative metacognitions may magnify patients' repetitive thinking, worry and attentional bias, potentially inferring negative corollaries from health messages, and magnifying distress (Kollman *et al.,* 2016). Growing research suggests the role of metacognitions in the experience of long-term physical health conditions such as chronic lower back pain (Schütze *et al.,* 2017). It was found that key dimensions of metacognitions, specifically the need to control thoughts and thoughts concerning uncontrollability of thoughts were pertinent in the impact on symptom severity. The association between metacognitions and pain control beliefs was also seen in patients with general chronic pain (Yoshida *et al.,* 2012), metacognitions accounting for 13% additional variance to the prediction of pain control. Given their associations and predictive roles in symptom experience and health-related behaviour, both illness appraisals and metacognitions could provide an insight into the underlying mechanisms of how those with NSAP experience and understand, present and manage their symptoms.

1.6 Study aims

The experience of NSAP adversely affects patient quality of life, as well as contributing to a significant burden at an individual and societal level. Whilst there is evidence to suggest a relationship between illness appraisals and other medically unexplained symptoms, to our knowledge this has yet to be investigated within those presenting with NSAP.

Therefore, the purpose of the present study is to examine associations between illness appraisals, metacognitions, psychological morbidity and pain, along with demographic variables, and explore differences between those with NSAP compared to patients with a diagnosed organic abdominal condition. A second control group (comprised of patients with other physical conditions) was utilised to reflect any potential differences that may be seen between pain residing in the stomach to that in other areas of the body. This was highlighted as a point of clinical interest by medical staff involved in the research.

1.7 Hypotheses

A number of key primary hypotheses were derived from the research highlighted (See Appendix G for justification of the use of one-tailed hypotheses).

1. Given research indicating elevated psychological morbidity for those with MUS, it was predicted that psychological morbidity would be higher in the NSAP group in comparison to the organic abdominal condition group and the control group.

2. Given research highlighting the presence of negative illness appraisals in the MUS population, it was predicted that in comparison to the organic abdominal condition group and the control group, the NSAP group would show:

a) higher scores for negative illness appraisals

b) lower scores for positive illness appraisals

Secondary hypotheses

3. As seen within the metacognitive literature for MUS, it was predicted that higher scores for negative metacognitions and lower scores for positive metacognitions would be seen in the NSAP group.

4. Given research highlighting the presence of over sensitised pain pathways in those with historical psychological difficulties, it was predicted that patients with NSAP would report higher pain severity than those with an organic abdominal condition or other physical condition.

5. It was predicted that a significant relationship would be seen between illness appraisals and psychological morbidity in the NSAP group, as reflected in the current MUS literature.

2. Methods

2.1 Design

A quantitative between groups cross-sectional design was utilised, with three arms. Thus patients were assigned to either a 'NSAP' group, a 'Specific' group (for patients holding a specific organic abdominal diagnosis) or a 'Control' group (patients with any other formal diagnosis). The main independent variable was the group (NSAP vs Specific vs Control) with the main dependent variable of illness appraisal scores. A further five dependent variables were analysed: pain levels, metacognition scores, age, gender, and psychological morbidity. Quantitative data was obtained by the use of paper questionnaires. During the data collection and analysis the researcher was guided by a positivist epistemological position (see appendix NN).

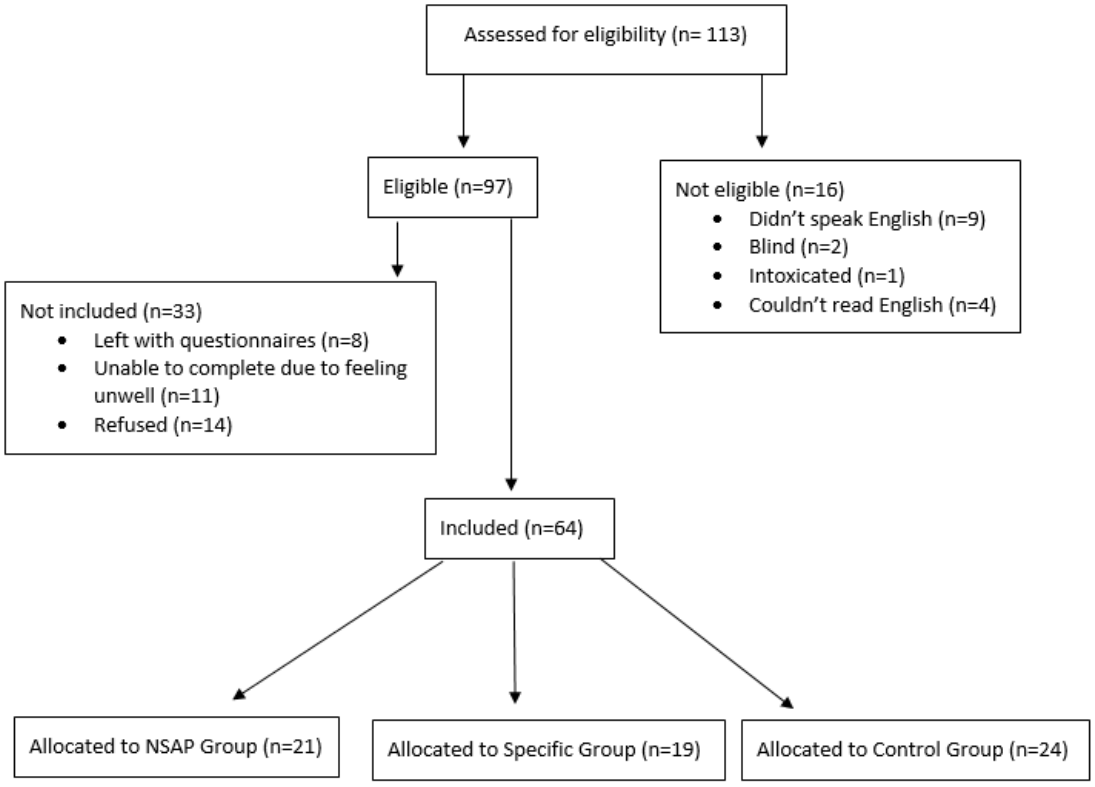
2.2 Ethical approval

After internal University of Leicester peer review, and service user feedback (Appendix H), formal ethical approval was then sought from the NHS Local Research Ethics Committee and Health Research Authority (Appendix I), before sponsorship confirmation was obtained from the university (Appendix J). A breakdown of the research process can be seen in Appendix K.

2.3 Participants

One hundred and thirteen participants were approached during the data collection period of July to December 2017, with 97 participants meeting inclusion criteria. A final total of 64 participants responded with full data (response rate: 66.0%). Figure 2 shows study enrolment figures.

Figure 2 – Study enrolment figures



Of the 64 participants recruited for this study, 21 met criteria for the NSAP group; 19 met criteria for the Specific group and 24 were allocated to the Control group. See Appendix L for a breakdown of diagnoses for the Specific and Control groups. The mean age was: 28.29 years (*SD* 8.22) for the NSAP group, 44.47 years (*SD* 21.23) for the Specific Group, and 45.67 years (*SD* 16.67) for the Control Group. There were 17 females and 4 males in the NSAP group, 10 females and 9 males in the specific group and 11 females and 13 males in the control group (See Table 1).

Table 1 – Demographic information

	NSAP	**Specific**	**Control**
Female (% of total)	17 (80.95)	10 (50.63)	11 (45.83)
Male	4	9	13
Mean Age (*SD*)	28.29 (8.22)	44.47 (21.23)	45.67 (16.67)
Range	16-53	16-89	20-84

2.4 Psychometric instruments

2.41 Hospital Anxiety Depression Scale (HADS)

The Hospital Anxiety and Depression Scale (Appendix M) is a 14-item self-report measure to assess extent of anxiety and depression (Zigmond & Snaith, 1983), and was developed in medical settings with questions designed to minimise impact of physical conditions. Questions (seven each) are responded to from 0-3 on a Likert scale, with potential scores of 21. Cut offs of 11 are usually taken to indicate clinical caseness. The measure has been shown to have high internal consistency for both the anxiety and depression subscales (Cronbach's alpha = 0.93 for the anxiety subscale; 0.90 for the depression subscale) and is well validated (Moorey *et al.,* 1991). It has also been shown to exhibit good psychometric properties (Mykletun, 2001).

2.42 The Revised Illness Perception Questionnaire (IPQ-R)

The IPQ-R (Appendix N) is an 84-item self-completion instrument, divided into three sections (Moss-Morris *et al.,* 2002). The identity subscale presents 14 symptoms and asks patients whether they have experienced any of these symptoms since this illness (with a yes/no format) and then asks whether they believe this symptom relates specifically to their illness (with a yes/no format). The sum of the latter yes-rated items forms the identity subscale score. The second section comprises of 38 statements rated on a five-point Likert scale (strongly disagree to strongly agree). Total scores for each subscale; timeline (acute/chronic), consequences, personal control, treatment control, illness coherence, timeline (cyclical) and emotional representations are obtained by summing item scores (after reverse scoring is accounted for). The final section of causal beliefs presents 18 factors that may be accountable for the current illness. Patients are asked to rate each factor on a five-point Likert scale (strongly disagree to strongly agree). With reference to the scoring manual of the IPQ-R, the recommended statistical method for the causal subscale is factor analysis, due to its lack of scale data. As this is not within the remit of the current research, the causal subscale was not analysed.

High scores on the positive subscale encompassed by the themes of personal control, treatment control and illness coherence represent positive ideas on how much the individual understands their illness and how in control they feel of it. The negative subscale encompassed by the themes of identity, timeline (acute/chronic), consequences and timeline (cyclical) represent ideas on how the individual perceives the number of

symptoms associated with their illness, how long they will experience the symptoms and any negative consequences they feel are attributed to the illness. Internal consistency for each of the subscales in the second section is good (Cronbach's alpha ranging from 0.79 for timeline cyclical to 0.89 for timeline acute/chronic) and the IPQ-R has been shown to highlight discriminant validity between acute and chronic patients and positive predictive validity (Moss-Morris *et al.,* 2002).

2.43 Metacognitions about Symptom Control Scale (MaSCS)

The MaSCS (Fernie *et al.,* 2014) is a 17-item measure of metacognitive beliefs (nine positive and eight negative items, rated on a four-point Likert scale). It is a self-reporting instrument designed to measure metacognitions pertaining to symptom control in the form of symptom focusing and symptom conceptual thinking. Total scores for each subscale (positive and negative) are obtained by summing item scores (See Table 2 for an example of each subscale). Higher scores on the MaSCS reflect stronger beliefs for both positive and negative metacognitions. Analysis revealed both positive and negative factors have good internal consistency (Fernie *et al.,* 2014).

Table 2 – Subscales of the MCQ

MCQ Subscale	**Definition**	**Example**
Cognitive confidence	This subscale consists of items concerned with beliefs about the efficacy of one's cognitive skills, in particular memory and attentional functioning.	*"I have a poor memory"*
Positive beliefs	Items relating to the beliefs that worrying helps solve problems, and to avoid unpleasant situations. It also includes items which suggest	*"Worrying helps me avoid problems in the future"*

	that worrying is a necessary feature of a pleasant and normal personality.	
Cognitive self-consciousness	This subscale consists of items relating to the degree to which an individual focuses on their own thinking processes.	*"I am constantly aware of my thinking"*
Uncontrollability and danger	This factor incorporates items tapping the belief that it is necessary to control ones worrying in order to function well as a person, beliefs about the mental and physical dangers or worrying, and the belief that ones worry is uncontrollable.	*"My worrying is dangerous for me"*
Need to control thoughts	This subscale concerns negative beliefs in general, including themes of superstition, punishment and responsibility and includes items relating to negative outcomes that might result from having certain thoughts and to a feeling of responsibility for preventing those outcomes.	*"If a bad thing happens which I have not worried about, I feel responsible".*

2.44 Numerical Rating Scale for Pain (NRS)

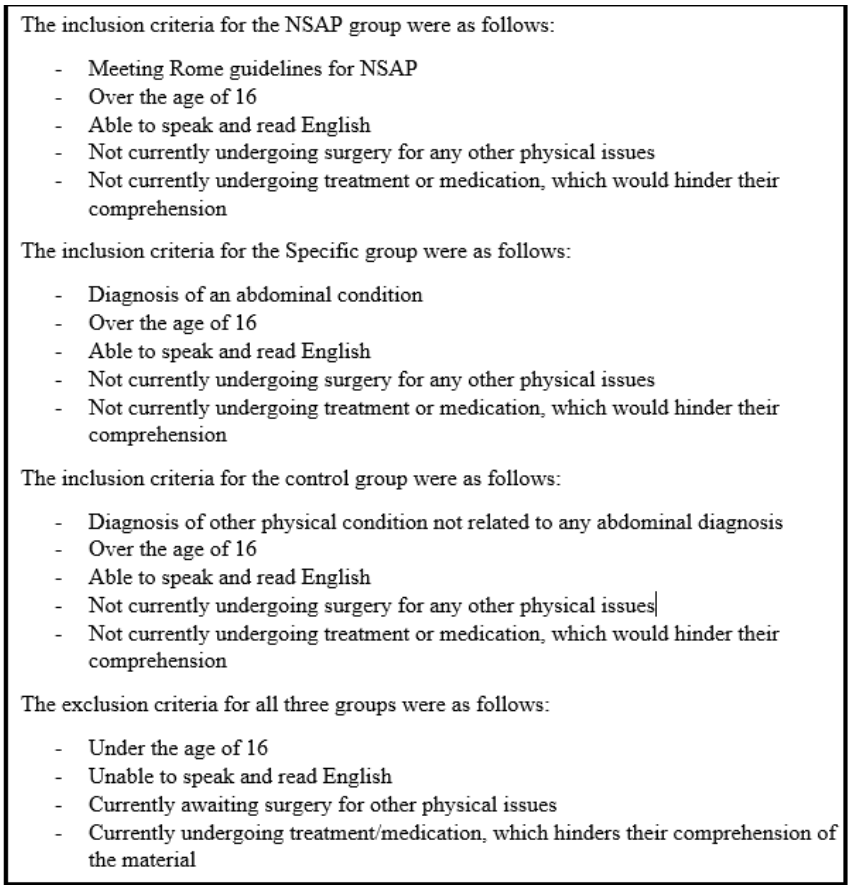
The NRS (Appendix O) is an 11-point numerical scale that measures pain intensity in adults with 0 representing 'no pain' and 10 representing 'worst pain imaginable' (McCaffery & Pasero, 1999). There is some discrepancy in the pain literature for cut off points representing mild, moderate and severe pain depending on the patient population. However, for pain that interferes with functioning, the cut-off between mild and moderate is mostly seen between 3 and 4, and between 6 and 8 for moderate to severe pain (Hirschfeld & Zernikow, 2013; Oldenmenger *et al.,* 2013). High test-retest reliability has been observed (Ferraz *et al.,* 1990) with both literate and illiterate patients (r = 0.96 and 0.95 respectively).

2.5 Procedure

Following ethical approval, a pilot study was conducted to assess methodological and practical issues that might arise from collecting data within a hospital environment. Two participants completed questionnaires in April and June 2017, with no significant issues being highlighted from the process. Data for the study was then collected over six months (between July and December 2017) on a Surgical Assessment Unit (SAU).

Participants were referred to the SAU from within the hospital (predominantly the emergency department) or from their local GP. Once admitted to the unit, nursing and medical staff would establish if they met inclusion or exclusion criteria (See Figure 3). If regarded as appropriate, patients were approached in the waiting room by the researcher and were invited to speak with them in a side room. The researcher explained the purpose of the study, with details provided in an information sheet (Appendix P) and if patients agreed to participate, consent forms were completed (Appendix Q). Participants were then given a questionnaire pack in an envelope to complete back in the waiting room. Once completed, participants were given a debrief form (Appendix R) and allowed an opportunity to ask any questions.

Figure 3 – Inclusion and Exclusion Criteria for Empirical Project



The inclusion criteria for the NSAP group were as follows:

- Meeting Rome guidelines for NSAP
- Over the age of 16
- Able to speak and read English
- Not currently undergoing surgery for any other physical issues
- Not currently undergoing treatment or medication, which would hinder their comprehension

The inclusion criteria for the Specific group were as follows:

- Diagnosis of an abdominal condition
- Over the age of 16
- Able to speak and read English
- Not currently undergoing surgery for any other physical issues
- Not currently undergoing treatment or medication, which would hinder their comprehension

The inclusion criteria for the control group were as follows:

- Diagnosis of other physical condition not related to any abdominal diagnosis
- Over the age of 16
- Able to speak and read English
- Not currently undergoing surgery for any other physical issues
- Not currently undergoing treatment or medication, which would hinder their comprehension

The exclusion criteria for all three groups were as follows:

- Under the age of 16
- Unable to speak and read English
- Currently awaiting surgery for other physical issues
- Currently undergoing treatment/medication, which hinders their comprehension of the material

Patients were triaged by clinical staff according to their presenting symptoms. Once medical testing had been undertaken and results were received, the clinical diagnosis was made by the managing clinical team. Diagnoses were taken by the researcher from the medical case records or discharge summaries after participant recruitment. Thus, the participants were blinded to the group allocation effectively. Once the diagnosis had been confirmed for the patient, the researcher would allocate them to either one of three groups: NSAP, specific abdominal diagnosis group, or control group.

2.6 Statistical methods

The necessary sample size was considered using an *a priori* power calculation in G*Power 3.1 analysis software program. A total of 53 participants per group would be required to detect a medium effect size using Cohen's (1992) recommendation when conducting ANOVAs. Data were analysed using the Statistics for the Social Sciences (SPSS) software package (version 24.0) and tested to see if they met assumptions for the use of parametric testing. The main analysis was conducted in two sections with the first section involving demographic and group differences and the second section utilising correlational analyses

to investigate relationships between the variables within the NSAP group as highlighted in the hypotheses. In cases where missing data exceeded 50%, questionnaires were excluded from analyses and kept in a separate data file. A total of two questionnaires were excluded for this reason.

For group comparisons where assumptions of parametric tests were met (e.g. on the individual subscales of the IPQ-R), ANOVAs were used on a number of variables. Planned contrasts were also undertaken to explain any differences observed. The first planned contrast compared scores from the NSAP group against combined scores from the Specific and Control Groups (NSAP vs Specific and Control). The second planned contrast compared scores from the NSAP group against scores from only the Specific group (NSAP vs Specific). Where assumptions of parametric tests were not met, group comparisons were undertaken using Kruskal-Wallis tests. Post hoc comparisons were conducted using Mann-Whitney tests. Finally a Chi-Square test was used to compare gender differences across the groups. Correlational analysis was conducted using Kendal's Tau due to some of the variables not meeting assumptions for parametric tests, and also due to the small sample size.

The large number of variables, and thus the large number of group comparisons, increases the risk of Type I errors occurring (incorrectly rejecting the null hypothesis). However, the relatively small sample size increases the risk of Type II errors (incorrectly accepting the null hypothesis). This is a common problem in research into relatively rare groups. In relation to the main hypothesis, ANOVAs were conducted with planned comparisons, unless the data was shown to be non-parametric in which case Kruskal-Wallis and post hoc Mann Whitney tests were undertaken. With regards to the secondary hypotheses the testing was the same apart from the use of Chi-Square for gender comparisons and correlational analysis.

The most conservative method of controlling family-wise error to account for multiple tests would be application of Bonferroni corrections to adjust alpha. For the first primary hypothesis (psychological morbidity would be higher in the NSAP group), corrections to alpha were not made, due to a number of factors as outlined by Armstrong (2014). These factors included the use of a small number of planned comparisons, the study is exploratory involving post-hoc testing of planned comparisons, the focus of individual tests being regarded as more important than the number of comparisons and it is vital to

avoid a Type II error. With regards to the second primary hypothesis (differences between subscales of the IPQ-R) and one part of the secondary hypotheses (correlational analysis), a more stringent alpha was utilised based on Bonferroni correction. A Bonferroni correction was utilised due to the high number of tests within those variables; eight tests in both variables making the alpha correction .006. The other variables of the secondary hypotheses (metacognitions and pain) did not need corrections due to similar factors outlined for the primary hypotheses. See Appendix OO for a breakdown of the tests used.

ANOVA effect sizes were calculated using omega squared as opposed to eta squared, given it is seen as a less biased alternative when using small sample sizes and is a more accurate measure of effect (Field, 2009). Kirk (1996) suggested values of .01, .06 and .14 to represent small, medium and large effect sizes. Effect sizes were also calculated for the planned contrasts and post-hoc Mann Whitney tests with .1, .3 and .5 representing small, medium and large effects.

3. Results

3.1 Assumption testing

Normality of distributions was assessed by box plots and the Kolmogorov-Smirnov test. The Shapiro-Wilk test was considered due to the smaller sample size however as advised by Clark-Carter (2010), the Shapiro-Wilk test is only advised when the sample size is less than 50. Normality of distribution was found for all variables apart from Depression and Identity (Appendix S). Log transformations were therefore conducted and the log-transformed variables were found to be normally distributed (Appendix T).

Homogeneity of variance was assessed using Levene's test. For three variables (Age; IPQ-R Negative and Illness Coherence), variances were significantly different between groups (Appendix U). Log transformations did not rectify this. Therefore, non-parametric tests were used for the analysis of these variables.

3.2 Demographic characteristics

There was a notable difference between the demographic features of the three groups therefore statistical analysis was undertaken to compare age and gender across the groups. Results showed a significant difference in age across the three groups, H (2) = 13.84, p = .001 (See Table 3). Mann-Whitney tests were used to follow up this finding (See Table 4). Age in the NSAP group (*Mdn* = 29.00) differed significantly from the Specific Group (*Mdn* = 38.00), U = 115.50, z = -2.28, p = 0.01 (1-tailed), r = .36 and differed significantly from the Control Group (*Mdn* = 42.00), U = 82.00, z = -3.87, p < 0.0001 (1-tailed), r = .58 (Appendix V).

There was also a significant association between gender and group χ^2 (2) = 6.32, p = 0.045 (Fisher's Exact Test), φ_c = .31 (See Table 5 and Appendix W).

Table 3 – Kruskal-Wallis results for age

Variable	*H* value	*p value*
Age	13.84	.001**

Table 4 – Post Hoc tests for age

Variable	Mann Whitney Tests	*U* value	*z* score	*p* value (1-tailed)	*r*
Age	NSAP vs Specific	115.50	-2.28	.01*	-.36
	NSAP vs Control	82.00	-3.87	.001**	-.58

Table 5 – Chi-Square Summary of gender comparisons

Variable	χ^2 value	*p value*	φ_c
Gender	6.32	.05*	.31

3.3 Group comparisons

Results are presented with reference to the hypotheses with means and standard deviations for all variables presented in Table 6. A summary of ANOVA testing can be seen in Table 7 and summary of significant planned contrasts can be seen in Table 8. Further, summary of Kruskal Wallis tests can be seen in Table 9 with summary of post hoc comparisons in Table 10.

Table 6 – Means and standard deviations for all variables

Measures	NSAP Mean *(SD)*	Specific Mean *(SD)*	Control Mean *(SD)*
Age at testing	28.29 (8.22)	44.47 (21.23)	45.67 (16.67
HADS depression	6.24 (4.65)	6.37 (4.84)	5.79 (5.15)
HADS anxiety	10.14 (4.85)	8.89 (4.80)	7.00 (3.86)
IPQ Positive	44.24 (7.27)	52.21 (6.85)	51.96 (8.39)
IPQ Negative	50.10 (6.40)	48.53 (8.68)	46.33 (12.93)
MaSCS Positive	19.05 (7.37)	18.63 (7.72)	18.58 (7.86)
MaSCS Negative	18.57 (5.85)	17.63 (6.12)	17.96 (6.81)
Timeline	15.14 (3.88)	16.16 (4.67)	15.50 (5.30)
Consequences	17.00 (4.17)	16.32 (4.51)	16.67 (5.01)

Personal Control	16.19 (3.23)	18.74 (2.73)	17.46 (4.74)
Treatment Control	16.38 (3.53)	18.58 (2.48)	18.71 (2.71)
Illness Coherence	11.67 (3.95)	15.16 (5.09)	15.63 (5.80)
Timeline Cyclical	13.86 (3.38)	12.05 (3.21)	11.42 (4.17)
Emotional Representation	19.14 (4.18)	18.16 (4.79)	16.83 (5.04)
Pain	5.67 (1.37)	5.32 (1.76)	5.93 (2.07)

3.3.1 Hypothesis 1 – Psychological morbidity would be higher in the NSAP group

There was no significant overall effect of group on Anxiety, F (2, 61) = 2.81, p = .07, ω^2 = 0.06. (Appendix X). There was no significant effect of group on depression scores, F (2, 61) = .152, p = .86, ω^2 = .03. (Appendix Y).

3.3.2 Hypothesis 2 - higher scores for negative illness appraisals and lower scores for positive illness appraisals would be seen in the NSAP in comparison to the organic abdominal condition and the control group

There was no significant effect of group on IPQ-R Negative scores, H (2) = 3.87, p = .15. Mann-Whitney tests were used to follow up this finding. IPQ-R Negative scores in the NSAP Group (Mdn = 49.00) did not differ from the abdominal Group (Mdn = 49.00), U = 191.50, z = -.22, p = .42 (1-tailed), r = .03 however did differ from the Control Group (Mdn = 43.00), U = 165.00, z = -1.98, p = .024 (1-tailed), r = .30 (Appendix Z).

There was a significant effect of group on IPQ-R positive scores, F (2, 61) = 7.50, p < .001, ω^2 = .17. Planned contrasts revealed having any diagnosis (abdominal or otherwise) was associated with significantly higher IPQ-R positive scores than the NSAP group (t (61) = 3.87, p < .001, r = .44), and that the NSAP group differed significantly from the organic abdominal group on IPQ-R positive scores, t (61) = -3.32, p <.01, r = .39 (Appendix AA).

Subscale Analysis

Analysis was also conducted on the individual subscales of the IPQ-R. As the individual subscales of the IPQ-R meant multiple tests were conducted a Bonferroni-corrected alpha has been calculated at .006 and any significant results are highlighted in the tables.

There was no significant effect of group on Identity, F (2, 61) = 0.59, p = 0.56, ω^2 = 0.01. (Appendix BB).

There was no significant effect of group on Timeline, F (2, 61) = .24, p = .79, ω^2 = .02. (Appendix CC).

There was no significant effect of group on Treatment Control scores, F (2, 61) = 4.21, p = .019, ω^2 = 0.09 (Appendix DD).

There was no significant effect of group on Consequences, F (2, 61) = .11, p = .90, ω^2 = .03. (Appendix EE).

There was no significant effect of group on Personal Control, F (2, 61) = 1.69, p = .19, ω^2 = .49. (Appendix FF).

There was no significant effect of group on Timeline Cyclical, F (2, 61) = 2.81, p = .07, ω^2 = .05. (Appendix GG).

There was no significant effect of group on Emotional Representations, F (2, 61) = 1.37, p = .26, ω^2 = .01. (Appendix HH).

There was no significant difference in Illness Coherence scores across the groups, H = 7.63, p = .02. (Appendix II).

3.33 Hypothesis 3 - High scores for negative metacognitions and low scores for positive metacognitions were predicted for the NSAP group

There was no significant effect of group on scores on the MaSCS Negative subscale, F (2, 61) = .12, p = .89, ω^2 = .03 (Appendix JJ).

There was no significant effect of group on the MaSCS Positive subscale, F (2, 61) = .024, p = .977, ω^2 = .03. (Appendix KK).

3.34 Hypothesis 4 - patients with NSAP would report higher pain severity than those with an organic abdominal condition or other physical condition

There was no significant effect of group on pain scores, F (2, 61) = .636, p = .533, ω^2 = 0.10. (Appendix LL).

3.35 Hypothesis 5 - A significant relationship would be seen between illness appraisals and psychological morbidity in the NSAP group.

Correlations analysis showed none met critical alpha. See appendix MM for correlation matrix for NSAP group.

Table 7 – Summary of ANOVA results

Variable	***F* value**	***p* value**	**Effect size (ω^2)**
HADs Anxiety	2.81	0.07	0.06
HADs Depression	0.15	0.86	0.03
IPQ-R Positive Subscale	7.50	0.001**	0.17
Pain	0.64	0.53	0.01
MaSCS Negative Subscale	0.12	0.89	0.03
MaSCS Positive Subscale	0.02	0.98	0.03
Illness Appraisal Subscales			
Identity	0.59	0.56	0.01
Timeline	0.24	0.79	0.02
Consequences	0.11	0.90	0.03
Timeline – Cyclical	2.81	0.07	0.05
Treatment Control	4.21	0.02	0.09
Personal Control	1.69	0.19	0.49
Emotional Representations	1.37	0.26	0.01

Table 8 – Summary of planned comparisons

Variable	Planned Comparisons	*t* value	*p* value (1-tailed)	*r*
HADs Anxiety	NSAP vs Specific and Control	-1.84	0.04*	0.23
	NSAP vs Specific	0.88	0.19	0.11
HADs Depression	NSAP vs Specific and Control	-0.05	0.48	0.01
	NSAP vs Specific	-0.22	0.41	0.03
IPQ-R Positive	NSAP vs Specific and Control	3.87	< 0.001**	0.44
	NSAP vs Specific	-3.32	0.002**	0.39
Pain	NSAP vs Specific and Control	-0.09	0.46	0.004
	NSAP vs Specific	0.62	0.27	0.08
MaSCS Negative	NSAP vs Specific and Control	-0.46	0.32	0.06
	NSAP vs Specific	0.47	0.32	0.06
MaSCS Positive	NSAP vs Specific and Control	-0.22	0.42	0.03
	NSAP vs Specific	0.17	0.43	0.02
Identity	NSAP vs Specific and Control	-0.61	0.27	0.08
	NSAP vs Specific	0.10	0.46	0.01
Timeline	NSAP vs Specific and Control	-0.55	0.29	0.07
	NSAP vs Specific	-0.68	0.25	0.09
Consequences	NSAP vs Specific and Control	-0.41	0.34	0.05
	NSAP vs Specific	0.47	0.32	0.06
Timeline - Cyclical	NSAP vs Specific and Control	-2.17	0.02	0.27

	NSAP vs Specific	1.44	0.08	0.18
Treatment Control	NSAP vs Specific and Control	2.88	0.003	0.35
	NSAP vs Specific	-2.36	0.01	0.30
Personal Control	NSAP vs Specific and Control	1.56	0.06	0.20
	NSAP vs Specific	-1.84	0.04	0.23
Emotional Rep	NSAP vs Specific and Control	-1.32	0.10	0.17
	NSAP vs Specific	0.66	0.26	0.08

Table 9 – Illness appraisals results

Variable	***H* value**	***p value***
IPQ-R Negative	3.87	.15
Illness Coherence	7.63	.02

Table 10 – Post Hoc tests for illness appraisals

Variable	**Mann Whitney Tests**	***U* value**	***z* score**	***p* value (1-tailed)**	***r***
IPQ-R Negative	NSAP vs Specific	191.50	-.22	.42	.03
	NSAP vs Control	165.00	-1.98	.024*	.30
Illness Coherence	NSAP vs Specific	110.00	-2.43	.007	-.38
	NSAP vs Control	149.00	-2.36	.009	-.35

* Significant result at 0.05

** Significant result at 0.01

*** Significant result at adjusted alpha of .006

4. Discussion

4.1 Summary of results

The present study examined illness appraisals, metacognitions, psychological morbidity and pain across three groups in a surgical assessment unit, exploring relationships between variables and comparing these between patients with NSAP to groups holding specific diagnoses. A total of 64 participants completed questionnaires assessing their beliefs around their illness (encompassed by illness appraisals) and beliefs about their thinking styles (captured by scores on the metacognitions scale), experience of pain, and reported pain, anxiety and depression.

The current study found a difference was observed for positive illness appraisals with NSAP patients displaying significantly lower scores (F (2, 61) = 7.50, $p < .001$, $\omega^2 = .17$) than patients from the abdominal diagnosis or control group. Taking into consideration the adjusted alpha, none of the subscales of the IPQ-R were significant however interesting effect sizes were observed throughout.

The findings did not show any significant difference in negative illness appraisals between the groups (H (2) = 3.87, $p = .15$) however both the NSAP and the specific group significantly differed from the control group, with higher rates of negative illness appraisals being observed. Results for the metacognitive scales did not produce any significant difference for either the negative or positive subscales. Additionally, no significant difference in pain scores or psychological morbidity were observed between groups. Finally, no significant results were observed for the correlational analysis.

The current study did find a large proportion of young females within the NSAP group. A total of 81% of the NSAP group was comprised of females under the age of 40 in comparison to 26% and 17% in the specific and control groups. Rates of psychological morbidity did not statistically differ between the groups for either depression or anxiety. However, for the latter a medium effect size was observed ($p = .07$, $\omega^2 = 0.06$) with 52% of the NSAP group reporting anxiety levels at clinical caseness, in comparison to 42% and 17% for the specific and control groups respectively. This is in excess of anxiety levels of 12-19% observed in community norms (Breeman *et al.,* 2015).

4.2 Contribution to current literature

Although the sample size was relatively small, there was a notable difference seen in group demographics, supporting the current literature that reports higher prevalence of young females presenting with somatic abdominal pain (Catala *et al.,* 2002; Gerdle *et al.,* 2008; Picavet and Hazes, 2003). This supports research conducted in other functional abdominal conditions with a 3:1 female-to-male ratio reported within IBS (Drossman *et al.,* 1993).

Although statistical significance was lacking, interesting effect sizes were observed. For example, a medium effect size was shown for anxiety levels between groups, with NSAP patients reporting higher rates of anxiety in comparison to those with an organic abdominal diagnosis or patients in the control group. This links in with previous research that shows the association between a range of somatic syndromes and anxiety in comparison to controls with a known organic aetiology (Duddu, Husain & Dickens, 2008; Henningsen, Zimmermann & Sattel, 2003). Future studies within the NSAP population using a larger sample size may produce statistically significant results to support this research.

Additionally, although no significant associations were seen between positive illness appraisals and psychological morbidity in the NSAP group, significant differences were observed for scores on the positive illness appraisals scale between the NSAP group and both the specific and control groups. Both the latter groups scored much higher than the NSAP group for positive illness appraisals, representing positive beliefs about the controllability and personal understanding of the condition. This could suggest that managing diagnostic ambiguity has an impact on the ability to draw on positive illness appraisals. Greater perceived control and coherence has been related to better management of symptoms and better health outcomes in a range of MUS (Brandes & Mullan, 2014; Broadbent *et al.,* 2015; Dempster, Howell & McCorry, 2015). This supports the research in that interventions focused on improving illness appraisals could benefit the symptom experience and psychological morbidity of patients with unexplained symptoms (Petrie *et al.,* 2002).

4.3 Clinical implications

The findings presented here highlight the importance of further investigating the salience of illness appraisals and psychological morbidity for those presenting with NSAP. Currently these patients appear distressed, yet in receiving no formal diagnosis they remain unclear about their symptoms and management, and utilise significant healthcare resource

and expenditure. Further, medical professionals can often find presentation of unexplained symptoms as frustrating (Gauntlett-Gilbert *et al.,* 2015), with doctors often attributing negative emotions towards this patient group. Added to this, patients who have not been given a formal diagnosis can often feel dismissed and punished (Sowińska & Czachowski, 2018).

Research has reported difficulties between doctors and patients during medical consultations for MUS (Sowińska & Czachowski, 2018), which have included the presence of a dominant medical model driving the assessment, doctors' attitudes towards patients and breakdown in communication style, with little space to talk about psychosocial factors (Ring *et al.,* 2005). Assessment processes for NSAP may benefit from taking into account current psychological difficulties and seeking to understand the meaning individuals place on their illness. Often patients who feel dissatisfied with their care will continue to seek care until their needs have been met (Rief & Broadbent, 2007). Therefore, a thorough assessment could inform interventions to modify illness appraisals and contribute to less repeat attendance to healthcare providers if the patient feels they have received adequate care.

4.4 Study limitations

These results should be interpreted with caution. Although statistical analysis accommodated the use of a small sample size, this may have affected generalisability of the findings. A number of reasons, including high numbers of refusal and issues with erratic departmental opening, meant the original intended sample was not reached. Recruitment may have been maximised if alternative strategies were adopted. For example, data could have been collected across several hospital sites or over a longer period of time. However the physical and time constraints of the study meant that extending recruitment was not feasible.

During data collection, it became apparent that questionnaire completion seemed compromised by symptom experience and waiting times. The researcher debated whether sustained discomfort in an acute setting and a lengthy wait for diagnosis, undermined focus on the questionnaire and comprehensive responses. Furthermore, participants in this study were seen by a range of clinicians, all of whom have their own biases and methods of elimination when assessing patients. It is plausible to think that some of the diagnoses given, particularly in the NSAP group may have been incorrect and only when future

admissions occurred would this have been highlighted. However, as this study only captured a one off assessment, this may have negatively affected the results, as individuals within the NSAP group (who may have been wrongly categorised) would potentially score well for illness appraisals, skewing the results for this group. Attempts could have been made to go through the clinical histories of the patients to minimise the chances of a miscoding error, however this was restricted due to time constraint and access to computerised files. The researcher did ensure that patients were discussed with medical staff to confirm the diagnosis and gain a further understanding of the symptoms.

4.5 Future directions

Further research could improve the current study to ensure it is more methodologically robust by taking into consideration the limitations described above. Specifically, recruitment of a larger sample size may increase validity, while data collection methods could be adapted to ensure maximum completion rates were achieved.

It is interesting to also think about the impact of staff attitudes and perceptions of this group of patients. It was observed by the researcher throughout the process that if a young female was admitted with acute abdominal pain, the staff were more inclined to think it was a NSAP presentation and subsequently more inclined to discharge the patient into the community. Although the evidence suggests there is a higher proportion of young females seen within the NSAP population, this assumption by the medical team could mean another diagnosis may be missed. A research area of interest would be to investigate staff attitudes towards this patient group and whether this affects the outcome of diagnosis and treatment given.

4.6 Conclusion

This research found patients with NSAP were predominantly young women, reporting high levels of anxiety and exhibiting low levels of positive illness appraisals. However, a small sample accessed via a surgical admissions unit precludes definitive comment, yet findings suggest interesting successor research. Investigating the impact of modifying illness appraisals in the NSAP population provides interesting clinical information, which in turn could contribute to the development of interventions aimed at improving symptom experience and quality of life for patients with NSAP.

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Appendices

**Appendix A – University checklist assuring confidentiality/anonymity of participants*

	Checked in Executive Summary/Abstract/ Overview (if included in assignment)	**Checked in main text**	**Checked in appendices**
Pseudonym or false initials used	✔	✔	✔
Reference to pseudonym/false initials as a footnote	✔	✔	✔
Removed any reference to names of Trusts/hospitals/clinics/services (including letterhead if including letters in appendices)	✔	✔	✔
Removed any reference to names/specific dates of birth/specific date of clinical appointments/addresses/ location of client(s), participant(s), relatives, caregivers, and supervisor(s). [For research thesis – supervisors can be named in the research thesis "acknowledgements" section]	✔	✔	✔
Removed/altered references to client(s) jobs/professions/nationality where this may potentially identify them. [For research thesis – removed potential for an individual research participant to be identifiable (e.g., by a colleague of the participant who might read the thesis on the internet and be able to identify a participant using a combination of the participants specific job title, role, age, and gender)]	✔	✔	✔
Removed any information that may identify the trainee (consult with course staff if this will detract from the points the trainee is making)	✔	✔	✔
No Tippex or other method has been used to obliterate the original text – unless the paper is subsequently photocopied and the trainee has ensured that the obliterated text cannot be read	✔	✔	✔
The "find and replace" function in word processing has been used to check the assignment for use of client(s) names/other confidential information	✔	✔	✔

Appendix B – Inclusion and exclusion criteria for literature review

Inclusion Criteria:

- In the English language
- Published between 1997-2017 (2019 on additional search)
- Have metacognitions as a main variable
- A quantitative piece of research
- Specifically looking at whether metacognitions impact on symptoms
- Include participants with long-term health conditions
- Adult population only

Exclusion Criteria:

- Abstracts, editorials, reviews, reports and meta-analyses
- Research on metacognitions within mental health conditions such as schizophrenia
- Qualitative research on symptom experience

Appendix C – Appraisal tool for Cross-Sectional Studies (AXIS)

Appraisal of Cross-sectional Studies

	Question	Yes	No	Don't know/ Comment
Introduction				
1	Were the aims/objectives of the study clear?			
Methods				
2	Was the study design appropriate for the stated aim(s)?			
3	Was the sample size justified?			
4	Was the target/reference population clearly defined? (Is it clear who the research was about?)			
5	Was the sample frame taken from an appropriate population base so that it closely represented the target/reference population under investigation?			
6	Was the selection process likely to select subjects/participants that were representative of the target/reference population under investigation?			
7	Were measures undertaken to address and categorise non-responders?			
8	Were the risk factor and outcome variables measured appropriate to the aims of the study?			
9	Were the risk factor and outcome variables measured correctly using instruments/measurements that had been trialled, piloted or published previously?			
10	Is it clear what was used to determined statistical significance and/or precision estimates? (e.g. p-values, confidence intervals)			
11	Were the methods (including statistical methods) sufficiently described to enable them to be repeated?			
Results				
12	Were the basic data adequately described?			
13	Does the response rate raise concerns about non-response bias?			
14	If appropriate, was information about non-responders described?			
15	Were the results internally consistent?			
16	Were the results presented for all the analyses described in the methods?			
Discussion				
17	Were the authors' discussions and conclusions justified by the results?			
18	Were the limitations of the study discussed?			
Other				
19	Were there any funding sources or conflicts of interest that may affect the authors' interpretation of the results?			
20	Was ethical approval or consent of participants attained?			

Appendix D – AXIS quality appraisal summary

	Donnellan *et al.* (2012)	Butow (2015)	Fernie *et al.* (2015)	Brown and Fernie (2015)	Yoshida *et al.* (2012)	Gill *et al.* (2015)	Palagini *et al.* (2017)	Maher-Edwards *et al.* (2011)
Were the aims/objectives of the study clear?	Y	Y	Y	Y	Y	Y	Y	Y
Was the study design appropriate for the study aim(s)?	Y	Y	Y	Y	Y	Y	Y	Y
Was the sample size justified?	N	N	N	N	N	N	N	N
Was the target/reference population clearly defined? (Is it clear who the research was about?)	Y	Y	Y	Y	Y	Y	Y	Y
Was the sample frame taken from an appropriate population base so that it closely represented the target/reference population under investigation?	Y	Y	Y	Y	Y	Y	Y	Y
Was the selection process likely to select subjects/participants that were representative of the target/reference population under investigation?	Y	Y	Y	Y	Y	Y	Y	Y
Were measures undertaken to address and categorise non-responders?	Y	N	Y	Y	Y	Y	N	N
Were the risk factor and outcome variables measured appropriate to the aims of the study?	Y	Y	Y	Y	Y	Y	Y	Y
Were the risk factor and outcome variables measured correctly using instruments/measurements that had been trialled, piloted or published previously?	Y	Y	Y	Y	Y	Y	Y	Y
Is it clear what was used to determine statistical significance and/or precision estimates? (e.g. p-values, confidence intervals)	Y	Y	Y	Y	Y	Y	Y	Y

Were the methods (including statistical methods) sufficiently described to enable them to be repeated?	Y	Y	Y	Y	Y	Y	Y	Y
Were the basic data adequately described?	Y	Y	Y	Y	Y	Y	Y	Y
Does the response rate raise concerns about non-response bias?	N	DK	N	N	N	N	DK	DK
If appropriate, was information about non-responders described?	Y	N	Y	N	Y	Y	N	N
Were the results internally consistent?	DK	DK	DK	DK	Y	Y	DK	Y
Were the results presented for all the analyses described in the methods?	Y	Y	Y	Y	Y	Y	Y	Y
Were the authors' discussions and conclusions justified by the results?	Y	Y	Y	Y	Y	Y	Y	Y
Were the limitations of the study discussed?	Y	Y	Y	Y	Y	Y	Y	Y
Were there any funding sources or conflicts of interest that may affect the authors' interpretation of the results?	N	DK	N	N	DK	N	DK	DK
Was ethical approval or consent of participants gained?	Y	Y	Y	Y	DK	Y	Y	Y

Yes or No answer that reflected positively on paper

No answer that reflected lack of information

Information not available in paper

Appendix E – Study characteristics from literature review

First Author	Sampling	Methodology	Dependent Variables
Brown	106 adults with idiopathic Parkinson's Disease were recruited from a cohort of patients involved in a separate longitudinal study.	Correlational	Self-reported motor fluctuations and 'off periods' as assessed by the MD-UPDRS
Butow	63 early-stage breast or prostate cancer survivors diagnosed within 6 months to 5 years prior to participation recruited through oncology clinics.	Mixed method (within and between subjects comparisons)	Fear of cancer recurrence score
Donnellan	130 patients were recruited from teaching hospital all with confirmed diagnosis of stroke within month prior to assessment.	Correlational	Hospital Anxiety and Depression Scale scores
Fernie	171 patients with chronic fatigue syndrome undertook a course of either CBT or GET.	Correlational	Chalder Fatigue Questionnaire score
Gill	140 participants with a TBI or SAH and had sustained their injury less than one month prior to data collection recruited from neuropsychology services within the NHS.	Correlational	The PTSD Checklist score
Maher-Edwards	96 patients referred to Fatigue Service in London were recruited by mail-out.	Correlational	Chalder Fatigue Questionnaire score
Palagini	68 subjects with insomnia disorder were recruited from a sleep centre and 36 'good sleepers' were recruited from the hospital and university personnel.	Correlational	Insomnia severity index score and arousal predisposition scale
Yoshida	129 patients with muscular dystrophy and chronic pain were recruited from a larger sample pool who had previously participated in research.	Correlational	Numerical rating scale for pain score

**Appendix F – Journal of psychosomatic research author guidelines*

Your Paper Your Way

We now differentiate between the requirements for new and revised submissions. You may choose to submit your manuscript as a single Word or PDF file to be used in the refereeing process. Only when your paper is at the revision stage, will you be requested to put your paper in to a 'correct format' for acceptance and provide the items required for the publication of your article.
To find out more, please visit the Preparation section below.

Introduction

Types of article

Full Length Papers
Full length research papers will not normally be more than 4000 words in length (Introduction through Discussion) and will preferably be shorter. Submission of a paper to the Journal of Psychosomatic Research will be held to imply that it represents original research not previously published (except in the form of an abstract or preliminary report), that it is not being considered for publication elsewhere, and that if accepted by the Journal of Psychosomatic Research it will not be published elsewhere in the same form in any language without the consent of the Publisher. Major papers of topical content will be given priority in publication. **Please note that this journal does not publish animal studies.**

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The journal welcomes short reports, which may be either preliminary communications or brief accounts of original research. Short Reports must not exceed 1500 words and should include no more than 2 tables and 30 references. The journal does not publish case reports.

Editorials
The Editor welcomes suggestions for editorials which give personal and topical views on subjects within the journal's area of interest. They should not normally exceed 1500 words, excluding references and should have no more than 20 references.

Review Articles
Review papers are normally systematic reviews of 4000-5000 words (Introduction through Discussion). Authors are advised to consult the Editor with an outline before submitting a review.

Letters to the Editor
These normally refer to articles previously published in the journal. The Editor is also willing to consider letters on subjects of direct relevance to the journal's interest, including research letters. Letters should not exceed 1000 words, including references. Where appropriate, they should begin with a reference to the published article that is the subject of the letter. Research letters should be submitted as 'Letters to the Editor.'

Special Articles
These may be invited by an editor or submitted after discussion with the editor. Special articles are designed to provide an analysis of a topic of particular interest to readers of the journal and are more extensive in scope than an editorial. They should not primarily be a commentary on an article previously published in the journal, which would be better addressed in a letter or editorial.

Other Papers
The Editor welcomes suggestions for other types of papers, such as conference reports, accounts of major research in progress and interviews with senior research workers. These should not be submitted without prior consultation with the editor.

Contributions for the European Association for Psychosomatic Medicine (EAPM) pages
These should generally not exceed 1000 words, excluding references. Contributions for the EAPM pages must not have an abstract. Topics covered in these pages should be of interest to EAPM members and may be focused on innovations and developments in clinical services in specific European countries, updates on important developments in specific European countries, contributions related to the EAPM, papers focusing on historic topics, etc. Results of scientific research should not be submitted to the EAPM pages, since these require peer-review. Contributions for the EAPM pages are not peer-reviewed but subject to editorial approval. EAPM In case of doubt about the suitability of a subject, please contact the Editor or the EAPM section editor.

Contact details for submission
Journal of Psychosomatic Research
Editorial Office
E-mail:JPsychosomRes@healthcare.uiowa.edu

Submission checklist

You can use this list to carry out a final check of your submission before you send it to the journal for review. Please check the relevant section in this Guide for Authors for more details.

Ensure that the following items are present:

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All necessary files have been uploaded:
Manuscript:
• Include keywords
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• All tables (including titles, description, footnotes)
• Ensure all figure and table citations in the text match the files provided
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• Manuscript has been 'spell checked' and 'grammar checked'
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• A competing interests statement is provided, even if the authors have no competing interests to declare
• Journal policies detailed in this guide have been reviewed
• Referee suggestions and contact details provided, based on journal requirements

For further information, visit our Support Center.

Before You Begin

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Changes to authorship

Authors are expected to consider carefully the list and order of authors **before**submitting their manuscript and provide the definitive list of authors at the time of the original submission. Any addition, deletion or rearrangement of author names in the authorship list should be made only **before** the manuscript has been accepted and only if approved by the journal Editor. To request such a change, the Editor must receive the following from the **corresponding author**: (a) the reason for the change in author list and (b) written confirmation (e-mail, letter) from all authors that they agree with the addition, removal or rearrangement. In the case of addition or removal of authors, this includes confirmation from the author being added or removed.
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Authors whose native language is not English are advised to seek help before submission. Statistical procedures should be clearly explained.

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Number tables consecutively in accordance with their appearance in the text. Place

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If there is more than one appendix, they should be identified as A, B, etc. Formulae and equations in appendices should be given separate numbering: Eq. (A.1), Eq. (A.2), etc.; in a subsequent appendix, Eq. (B.1) and so on. Similarly for tables and figures: Table A.1; Fig. A.1, etc.

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TIFF (or JPG): Bitmapped line drawings: use a minimum of 1000 dpi.
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Please do not:
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• Supply files that are too low in resolution.
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These should be numbered consecutively in the text in the order in which they are first mentioned and be so denoted in the list. Their form should be that adopted by the US National Library of Medicine, as used in the Index Medicus and as recommended in Huth EJ, Medical Style and Format.

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List: Number the references (numbers in square brackets) in the list in the order in which they appear in the text.
Examples:
Reference to a journal publication:
[1] J. van der Geer, J.A.J. Hanraads, R.A. Lupton, The art of writing a scientific article, J. Sci. Commun. 163 (2010) 51–59. https://doi.org/10.1016/j.Sc.2010.00372.
Reference to a journal publication with an article number:
[2] Van der Geer, J., Hanraads, J.A.J., Lupton, R.A., 2018. The art of writing a scientific article. Heliyon. 19, e00205. https://doi.org/10.1016/j.heliyon.2018.e00205.
Reference to a book:
[3] W. Strunk Jr., E.B. White, The Elements of Style, fourth ed., Longman, New York, 2000.
Reference to a chapter in an edited book:
[4] G.R. Mettam, L.B. Adams, How to prepare an electronic version of your article, in: B.S. Jones, R.Z. Smith (Eds.), Introduction to the Electronic Age, E-Publishing Inc., New York, 2009, pp. 281–304.
Reference to a website:
[5] Cancer Research UK, Cancer statistics reports for the UK. http://www.cancerresearchuk.org/aboutcancer/statistics/cancerstatsreport/, 2003 (accessed 13 March 2003).
Reference to a dataset:
[dataset] [6] M. Oguro, S. Imahiro, S. Saito, T. Nakashizuka, Mortality data for Japanese oak wilt disease and surrounding forest compositions, Mendeley Data, v1, 2015. https://doi.org/10.17632/xwj98nb39r.1.

Journal abbreviations source
Journal names should be abbreviated according to the List of Title Word Abbreviations.

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Include interactive data visualizations in your publication and let your readers interact and

engage more closely with your research. Follow the instructions here to find out about available data visualization options and how to include them with your article.

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Data statement
To foster transparency, we encourage you to state the availability of your data in your submission. This may be a requirement of your funding body or institution. If your data is unavailable to access or unsuitable to post, you will have the opportunity to indicate why during the submission process, for example by stating that the research data is confidential. The statement will appear with your published article on ScienceDirect. For more information, visit the Data Statement page.

Appendix G – Justification of the use of one-tailed hypotheses

A number of one-tailed hypotheses were proposed for the current research. Justification for the use of one-tailed tests rather than two-tailed tests were guided by the requirements proposed by Ruxton & Neuhauser (2010). They suggested that the use of one-tailed hypotheses is justified if there is no interest in an effect in the opposite direction. Given the area of interest for this research is the association between elevated levels of psychological morbidity and high scores on illness appraisals, there would no interest if the opposite effect was seen (high levels of psychological morbidity but low scores on illness appraisals). This would not contribute to our understanding of interventions aimed at improving psychological distress through modification of illness appraisals. Secondly, Kimmel (1957) highlights the justification of treating an observed difference in the unexpected direction as the same as an expected difference in the proposed direction, that is not strong enough to reject the null hypothesis. In the current research, if high levels of psychological morbidity were found in the Specific or Control groups as opposed to the NSAP group, this would not contribute to understanding the contribution of illness appraisals on psychological distress.

Appendix H - Service user feedback

SERVICE USER REFERENCE GROUP (SURG)
EVALUATION OF TRAINEE RESEARCH

TRAINEE NAME: Fiona French

TITLE OF STUDY: Are illness appraisals a predictor of psychological morbidity in adults with non-specific abdominal pain?

1. Is this a topic that has relevance to service users?

   YES/NO (YES)

2. Is the research problem stated clearly?

   YES/NO (YES)

   If no, please state what you feel is difficult to understand.

3. Is the background to the research clearly stated?

   YES/NO (YES)

   If no, please state what you feel is missing

4. Is the proposal logically organised and clearly written?

   YES/NO (YES)

If you wish to make any additional comments about the research, please give these below:

This research proposal sounds very interesting, I would imagine this would easily cross over to similar diagnosis situations where the idiopathic, the unknown reasons for medical complaints leave the patients with many uncertainties.

** Appendix I – REC and HRA letters of approval*

NHS
Health Research Authority

North West - Greater Manchester South Research Ethics Committee
3rd Floor, Barlow House
4 Minshull Street
Manchester
M1 3DZ

Telephone: 0207 104 8002

Please note: This is the favourable opinion of the REC only and does not allow you to start your study at NHS sites in England until you receive HRA Approval

27 January 2017

Mrs Fiona French
Trainee Clinical Psychologist

[redacted]

Dear Mrs French

Study title:	**Are illness appraisals a predictor of psychological morbidity in adults with non-specific abdominal pain?**
REC reference:	**17/NW/0064**
Protocol number:	**UoL603**
IRAS project ID:	**212329**

Thank you for your letter of 26 January 2017, responding to the Proportionate Review Sub-Committee's request for changes to the documentation for the above study.

The revised documentation has been reviewed and approved by Mr Richard Hovey.

We plan to publish your research summary wording for the above study on the HRA website, together with your contact details. Publication will be no earlier than three months from the date of this favourable opinion letter. The expectation is that this information will be published for all studies that receive an ethical opinion but should you wish to provide a substitute contact point, wish to make a request to defer, or require further information, please contact please contact hra.studyregistration@nhs.net outlining the reasons for your request.

Under very limited circumstances (e.g. for student research which has received an unfavourable opinion), it may be possible to grant an exemption to the publication of the study.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting

NHS
Health Research Authority

Mrs Fiona French
Trainee Clinical Psychologist
[redacted]
Email: hra.approval@nhs.net

21 February 2017

Dear Mrs French

Letter of HRA Approval

Study title:	**Are illness appraisals a predictor of psychological morbidity in adults with non-specific abdominal pain?**
IRAS project ID:	**212329**
Protocol number:	**UoL603**
REC reference:	**17/NW/0064**
Sponsor	**Research & Enterprise Division**

I am pleased to confirm that **HRA Approval** has been given for the above referenced study, on the basis described in the application form, protocol, supporting documentation and any clarifications noted in this letter.

Participation of NHS Organisations in England

The sponsor should now provide a copy of this letter to all participating NHS organisations in England.

Appendix B provides important information for sponsors and participating NHS organisations in England for arranging and confirming capacity and capability. **Please read *Appendix B* carefully**, in particular the following sections:

- *Participating NHS organisations in England* – this clarifies the types of participating organisations in the study and whether or not all organisations will be undertaking the same activities
- *Confirmation of capacity and capability* - this confirms whether or not each type of participating NHS organisation in England is expected to give formal confirmation of capacity and capability. Where formal confirmation is not expected, the section also provides details on the time limit given to participating organisations to opt out of the study, or request additional time, before their participation is assumed.
- *Allocation of responsibilities and rights are agreed and documented (4.1 of HRA assessment criteria)* - this provides detail on the form of agreement to be used in the study to confirm capacity and capability, where applicable.

Further information on funding, HR processes, and compliance with HRA criteria and standards is also provided.

** Appendix J – Sponsorship approval*

UNIVERSITY OF LEICESTER

Research & Enterprise Division
University of Leicester
Research Governance Office
Fielding Johnson Building
University Road
Leicester
LE1 7RH
Email: uolsponsor@le.ac.uk
Admin Tel 0116 373 6410 / 223 1660

30 March 2017

Mrs Fiona French
Trainee Clinical Psychologist
[redacted]

Dear Mrs French

Ref:	**UOL 0603 / IRAS project ID: 212329**
Study title:	**Are illness appraisals a predictor of psychological morbidity in adults with non-specific abdominal pain?**
Status:	**Approved**
End Date:	**01/02/2018**
Site:	**University Hospitals Leicester NHS Trust**

I am pleased to advise you that following confirmation of a Favourable Opinion from an Ethics Committee, HRA, NHS Trust R&D Approval, and where relevant regulatory authority agreements have been received, the University are able to confirm sponsorship for the above research at the above site.

Please note you are required to notify the Sponsor and provide copies of:

- Changes in personnel to the Study
- Changes to the end date
- All substantial amendments and provisional and favourable opinions
- All minor amendments
- All serious adverse events (SAEs) and SUSARS
- Annual progress reports
- Annual MHRA (DSUR) safety reports (if applicable)
- End of study declaration form
- Notifications of significant breaches of Good Clinical Practices (GCP)or Protocol

Please copy the Sponsor into all correspondence and emails by using uolsponsor@le.ac.uk.

Please note it is essential that you notify us as soon as you have recruited your first patient to the study.

I would like to wish you well with your study and if you require further information or guidance please do not hesitate to contact me.

Yours sincerely

[redacted]

Acting Research Governance Manager

**Appendix K – Chronology of research process*

Activity	Time Period
Exploration of research topic	October 2015
Research proposal development	April – June 2016
Research proposal submitted for peer review	June 2016
Research area agreed and feedback sought from Service User Reference Group	October 2016
Feedback received from peer review	November 2016
Integrated Research Application System (IRAS) submission	January 2017
Favourable opinion from Research Ethics Committee (REC)	January 2017
Approval from Health Research Authority (HRA)	February 2017
Consent Training for data collection	February 2017
University research sponsorship confirmed	March 2017
Letter of access for data collection	March 2017
Pilot Study	April – June 2017
Data collection	July – December 2017
Literature search and write up	December 2017 – February 2018 & January – March 2019
Data analysis for research	January – March 2019
Research report write-up with feedback of drafts	January – April 2019
Thesis submission	April 2019

**Appendix L – Hospital Anxiety and Depression Scale (HADS) (Permission sought for reproduction of all psychometrics presented)*

Hospital Anxiety and Depression Scale (HADS)

Tick the box beside the reply that is closest to how you have been feeling in the past week.
Don't take too long over you replies: your immediate is best.

D	A		D	A	
		I feel tense or 'wound up':			**I feel as if I am slowed down:**
	3	Most of the time	3		Nearly all the time
	2	A lot of the time	2		Very often
	1	From time to time, occasionally	1		Sometimes
	0	Not at all	0		Not at all
		I still enjoy the things I used to enjoy:			**I get a sort of frightened feeling like 'butterflies' in the stomach:**
0		Definitely as much		0	Not at all
1		Not quite so much		1	Occasionally
2		Only a little		2	Quite Often
3		Hardly at all		3	Very Often
		I get a sort of frightened feeling as if something awful is about to happen:			**I have lost interest in my appearance:**
	3	Very definitely and quite badly	3		Definitely
	2	Yes, but not too badly	2		I don't take as much care as I should
	1	A little, but it doesn't worry me	1		I may not take quite as much care
	0	Not at all	0		I take just as much care as ever
		I can laugh and see the funny side of things:			**I feel restless as I have to be on the move:**
0		As much as I always could		3	Very much indeed
1		Not quite so much now		2	Quite a lot
2		Definitely not so much now		1	Not very much
3		Not at all		0	Not at all
		Worrying thoughts go through my mind:			**I look forward with enjoyment to things:**
	3	A great deal of the time	0		As much as I ever did
	2	A lot of the time	1		Rather less than I used to
	1	From time to time, but not too often	2		Definitely less than I used to
	0	Only occasionally	3		Hardly at all
		I feel cheerful:			**I get sudden feelings of panic:**
3		Not at all		3	Very often indeed
2		Not often		2	Quite often
1		Sometimes		1	Not very often
0		Most of the time		0	Not at all
		I can sit at ease and feel relaxed:			**I can enjoy a good book or radio or TV program:**
	0	Definitely	0		Often
	1	Usually	1		Sometimes
	2	Not Often	2		Not often
	3	Not at all	3		Very seldom

Please check you have answered all the questions

Scoring:
Total score: Depression (D) _____ Anxiety (A) _____
0-7 = Normal
8-10 = Borderline abnormal (borderline case)
11-21 = Abnormal (case)

**Appendix M – The Illness Perception Questionnaire – Revised (IPQ-R)*

ILLNESS PERCEPTION QUESTIONNAIRE (IPQ-R)

Name**……** ***Date*****……**

YOUR VIEWS ABOUT YOUR ILLNESS

Listed below are a number of symptoms that you may or may not have experienced since your illness. Please indicate by circling *Yes* or *No*, whether you have experienced any of these symptoms since your illness, and whether you believe that these symptoms are related to your illness.

	I have experienced this symptom *since my illness*			This symptom is *related to my illness*	
Pain	**Yes**	**No**	_____	**Yes**	**No**
Sore Throat	**Yes**	**No**	_____	**Yes**	**No**
Nausea	**Yes**	**No**	_____	**Yes**	**No**
Breathlessness	**Yes**	**No**	_____	**Yes**	**No**
Weight Loss	**Yes**	**No**	_____	**Yes**	**No**
Fatigue	**Yes**	**No**	_____	**Yes**	**No**
Stiff Joints	**Yes**	**No**	_____	**Yes**	**No**
Sore Eyes	**Yes**	**No**	_____	**Yes**	**No**
Wheeziness	**Yes**	**No**	_____	**Yes**	**No**
Headaches	**Yes**	**No**	_____	**Yes**	**No**
Upset Stomach	**Yes**	**No**	_____	**Yes**	**No**
Sleep Difficulties	**Yes**	**No**	_____	**Yes**	**No**
Dizziness	**Yes**	**No**	_____	**Yes**	**No**
Loss of Strength	**Yes**	**No**	_____	**Yes**	**No**

We are interested in your own personal views of how you now see your current illness.

Please indicate how much you agree or disagree with the following statements about your illness by ticking the appropriate box.

	VIEWS ABOUT YOUR ILLNESS	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE
IP1	My illness will last a short time					
IP2	My illness is likely to be permanent rather than temporary					
IP3	My illness will last for a long time					
IP4	This illness will pass quickly					
IP5	I expect to have this illness for the rest of my life					
IP6	My illness is a serious condition					

	VIEWS ABOUT YOUR ILLNESS	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE
IP7	My illness has major consequences on my life					
IP8	My illness does not have much effect on my life					
IP9	My illness strongly affects the way others see me					
IP10	My illness has serious financial consequences					
IP11	My illness causes difficulties for those who are close to me					
IP12	There is a lot which I can do to control my symptoms					
IP13	What I do can determine whether my illness gets better or worse					
IP14	The course of my illness depends on me					
IP15	Nothing I do will affect my illness					
IP16	I have the power to influence my illness					
IP17	My actions will have no affect on the outcome of my illness					
IP18	My illness will improve in time					
IP19	There is very little that can be done to improve my illness					
IP20	My treatment will be effective in curing my illness					
IP21	The negative effects of my illness can be prevented (avoided) by my treatment					
IP22	My treatment can control my illness					
IP23	There is nothing which can help my condition					
IP24	The symptoms of my condition are puzzling to me					
IP25	My illness is a mystery to me					
IP26	I don't understand my illness					
IP27	My illness doesn't make any sense to me					
IP28	I have a clear picture or understanding of my condition					
IP29	The symptoms of my illness change a great deal from day to day					
IP30	My symptoms come and go in cycles					
IP31	My illness is very unpredictable					
IP32	I go through cycles in which my illness gets better and worse.					
IP33	I get depressed when I think about my illness					
IP34	When I think about my illness I get upset					
IP35	My illness makes me feel angry					
IP36	My illness does not worry me					
IP37	Having this illness makes me feel anxious					
IP38	My illness makes me feel afraid					

CAUSES OF MY ILLNESS

We are interested in what <u>you</u> consider may have been the cause of your illness. As people are very different, there is no correct answer for this question. We are most interested in your own views about the factors that caused your illness rather than what others including doctors or family may have suggested to you. Below is a list of possible causes for your illness. Please indicate how much you agree or disagree that they were causes for you by ticking the appropriate box.

	POSSIBLE CAUSES	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE
C1	Stress or worry					
C2	Hereditary - it runs in my family					
C3	A Germ or virus					
C4	Diet or eating habits					
C5	Chance or bad luck					
C6	Poor medical care in my past					
C7	Pollution in the environment					
C8	My own behaviour					
C9	My mental attitude e.g. thinking about life negatively					
C10	Family problems or worries caused my illness					
C11	Overwork					
C12	My emotional state e.g. feeling down, lonely, anxious, empty					
C13	Ageing					
C14	Alcohol					
C15	Smoking					
C16	Accident or injury					
C17	My personality					
C18	Altered immunity					

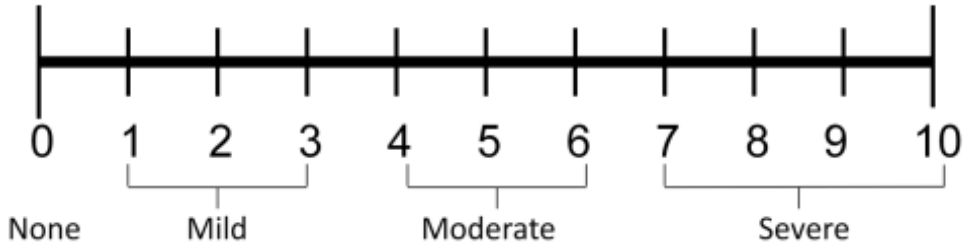
In the table below, please list in rank-order the three most important factors that you now believe caused <u>YOUR illness.</u> You may use any of the items from the box above, or you may have additional ideas of your own.

The most important causes for me:-

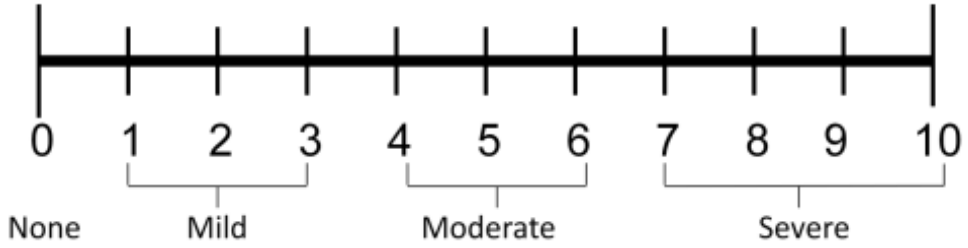
1. _____
2. _____
3. _____

**Appendix N – The numerical rating scale for pain (NRS)*

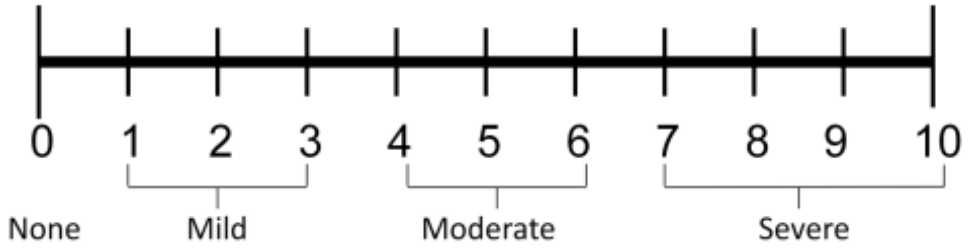
Please indicate your current level of pain on a scale of 0 (no pain) to 10 (worst pain imaginable)



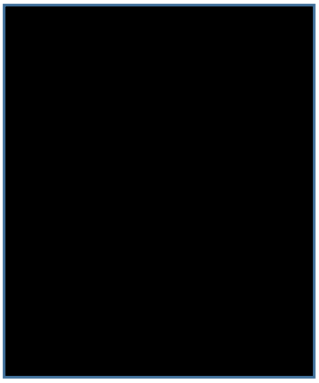
Please indicate your best level of pain on a scale of 0 (no pain) to 10 (worst pain imaginable) in the past 24 hours



Please indicate your worst level of pain on a scale of 0 (no pain) to 10 (worst pain imaginable) in the past 24 hours



Appendix O – Participant information sheet



Participant Information Sheet

Title of Study: Are illness appraisals a predictor of psychological morbidity in adults with non-specific abdominal pain?

Invitation and Brief Summary

We would like to invite you to take part in our research study. This will involve completing five questionnaires about your current health. If you have any questions whilst reading this information sheet please feel free to ask the researcher who will go through it with you and answer any questions you have. If, after reading the information you wish to participate, you will be asked to sign a consent form.

What's involved?

Little is known about the causes of non-specific abdominal pain (NSAP) in adults yet many individuals are admitted into hospital every day with severe stomach pain with no biological cause found. This study will look to examine whether other factors may influence the development of NSAP and compare this to other conditions. A particular factor we are interested in is illness appraisals, which can be best understood as how we make sense of why we are ill. We will be examining whether different levels of illness appraisals predict psychological morbidity (an individual's psychological well-being) across different patients. We will look to compare this in three different groups (patients with NSAP; patients going for endoscopic assessment; and patients within A&E). A total of 200 patients will be involved in this study.

What would taking part involve?

If you agree to consent, the researcher will ask you to read and sign two consent forms. One will be your copy to take away with you and the other will be a copy for the research file.

The researcher will then ask you to complete a number of questionnaires about yourself, your life and your experiences of your pain. These will be completed whilst you are in hospital and can be completed in your own time. The questionnaires will be collected back before you leave hospital. All information will be kept confidential and all personal information will be securely stored.

What are the possible benefits of taking part?

Your participation in this research will not directly benefit your current treatment. However, in understanding the cause of NSAP, improvements may be seen in the assessment and treatment of this population in the future. Furthermore, by improving how NSAP is managed, individual's quality of life may also improve.

What are the possible disadvantages and risks of taking part?

Some of the questions may be upsetting to answer as you will have to think about your own experiences. However a list of support services will be provided in the debrief information sheet, should you require them.

Further supporting information

It is your decision whether you take part. If you decide to take part you will be given this information sheet to keep and be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time without having to give a reason. This would not affect your legal rights or any treatment you are undertaking or will undertake in the future. If you lose capacity during the study process, your information will be withdrawn from the study.

Your information will be kept confidential from the hospital medical team and will be securely stored at the University of Leicester. All participants will be given a number to identify them in the database. Only the main researcher will have access to patient identifiable information. Authorised representatives from the sponsor or the NHS Trust may look at the data from this study for monitoring and auditing purposes.

Once the information is collected and analysed, it will be presented to the University of Leicester as part of the Doctorate in Clinical Psychology. The research will also be submitted to a peer-reviewed journal. You will not be identified in any presentation of the data. A copy of the study findings can be provided by the researcher upon your request.

[redacted]

The study has been developed with the help from service user feedback, with a review fed back. The study has also been reviewed by the University of Leicester doctorate course, the University of Leicester Research department and the University Hospitals of Leicester research and ethics committee.

Complaints

In the event that you have any complaints to make regarding the research process, please contact the researcher.

Alternatively, if you have a query, concern, need some information or wish to make a formal complaint about any of the services provided by the University Hospitals of Leicester the Patient Information and Liaison Service (PILS) can be accessed. Contact details are as follows:

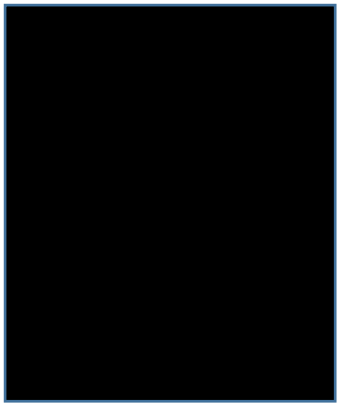
Patient Information and Liaison Service
C/O Glenfield Hospital
Groby Road
Leicester
LE3 9QP Free phone line: 08081 788 337
Email: pils@uhl-tr.nhs.uk

Contact Details:

Researcher: Fiona French, [redacted]

Research Supervisor: [redacted]

**Appendix P – Participant consent form*



CONSENT FORM

Title of Study: Are illness appraisals a predictor of psychological morbidity in adults with non-specific abdominal pain?

Sponsor Reference Number: [redacted]

Name of Researcher: Fiona French

Name of Participant..... *Please initial box*

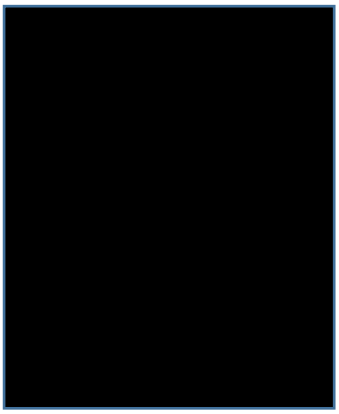
1. I confirm that I have read and understood the participant information sheet (Version 1.1, 26.01.17) for the above study and have had the opportunity to ask questions. ☐
2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason and without my medical care or legal rights being affected. ☐
3. I understand that data collected in this study may be looked at by authorised individuals from the University of Leicester or NHS Trust for monitoring and auditing purposes. ☐
4. I give permission for my answers to be collected, stored securely, analysed and published. I also understand that my personal details will be kept confidential. ☐
5. I agree to take part in the above study. ☐

_____	_____	_____
Name of Participant	Date	Signature
_____	_____	_____
Name of Researcher	Date	Signature

Consent Form: Version 1
22.12.16
IRAS Number: 212329

Page 1 of 1

Appendix Q – Participant debrief form



Debrief Form

Title of Study: Are illness appraisals a predictor of psychological morbidity in adults with non-specific abdominal pain?

Name of Researcher: Fiona French

Purpose

Thank you for taking part in this study. If you found any of the questions upsetting or difficult to answer and would like additional support please see the following services that are available:

Support Services

- Samaritans (24 hour helpline for people in distress): 08457 909090; www.samaritans.org.uk
- Bereavement Support Service based at the Leicester Royal Infirmary: 0116 258 5194
- Rethink – national charity helping people with severe mental health: 0300 5000 927
- Newwork for Change: provide a range of mental health support services across Leicester and Leicestershire
- Adhar Project: provide a mental health support service in Leicester primarily for Black and multi ethnic communities
- The Quetzal Project: offers counselling for women recovering from the trauma of childhood sexual abuse
- The Leicester Counselling Centre: charity providing low cost professional counselling, both short and long term on all issues.
- First Step: organisation run for male survivors of abuse
- The Laura Centre: offers specialist bereavement counselling to parents whose child has died and to children or young people who have been bereaved of a parent or significant person.
- Relate: counselling, sex therapy and education regarding relationship issues.

This study is an investigation of illness appraisals in non-specific abdominal pain (NSAP). Little is known about the causes of NSAP in adults yet many individuals are admitted into hospital every day with severe stomach pain with no biological cause found. This study will look to examine whether other factors may influence the development of NSAP and compare this to other conditions. A particular factor we are interested in is illness appraisals, which can be best understood as how we

make sense of why we are ill. We will be examining whether different levels of illness appraisals predict psychological morbidity (an individual's psychological well-being) across different patients.

Contact after the research

If you have any questions after taking part in the study or would like to be sent a copy of the study results when they become available please email the researcher (Fiona French) using the contact details provided at the end of this sheet. Please be aware that the researcher finishes her doctorate in September 2018, so may no longer be available on the provided contact details after this time. Please contact the academic supervisor if you have any questions or comments to make after this time.

Complaints

In the event that you have any complaints to make regarding the research process, please contact the research supervisor. If you remain unhappy and wish to complain formally, you can do this by contacting the main researcher

Alternatively, if you have a query, concern, need some information or wish to make a formal complaint about any of the services provided by the University Hospitals of Leicester the Patient Information and Liaison Service (PILS) can be accessed. Contact details are as follows:

Patient Information and Liaison Service
The Firs
C/O Glenfield Hospital
Groby Road
Leicester
LE3 9QP

Free phone line: 08081 788 337
Email: pils@uhl-tr.nhs.uk

Further information and contact details

Researcher: Fiona French [redacted]

Research Supervisor: [redacted]
email: [redacted]

Field Supervisor: [redacted]

Appendix R – Tests of normality for all variables

		Kolmogorov-Smirnov[a]		
	Group	Statistic	df	Sig.
Age at Testing	NSAP	.183	21	.065
	Specific	.146	19	.200*
	Control	.147	24	.195
HADS Depression Score	NSAP	.131	21	.200*
	Specific	.215	19	.022
	Control	.178	24	.048
HADS Anxiety Score	NSAP	.147	21	.200*
	Specific	.127	19	.200*
	Control	.144	24	.200*
Pain	NSAP	.101	21	.200*
	Specific	.128	19	.200*
	Control	.091	24	.200*
IPQPos	NSAP	.161	21	.164
	Specific	.118	19	.200*
	Control	.100	24	.200*
IPQNeg	NSAP	.187	21	.053
	Specific	.167	19	.171
	Control	.166	24	.086
MaSCSPos	NSAP	.122	21	.200*
	Specific	.147	19	.200*
	Control	.170	24	.070
MaSCSNeg	NSAP	.158	21	.185
	Specific	.144	19	.200*
	Control	.106	24	.200*
Identity	NSAP	.208	21	.019
	Specific	.162	19	.200*
	Control	.224	24	.003
Timeline	NSAP	.092	21	.200*
	Specific	.171	19	.147
	Control	.153	24	.151
Consequences	NSAP	.166	21	.134
	Specific	.172	19	.142
	Control	.138	24	.200*
PersonalControl	NSAP	.132	21	.200*
	Specific	.183	19	.094
	Control	.102	24	.200*

TreatmentControl	NSAP	.176	21	.088
	Specific	.112	19	.200*
	Control	.141	24	.200*
IllnessCoherence	NSAP	.181	21	.072
	Specific	.145	19	.200*
	Control	.159	24	.120
TimelineCyclical	NSAP	.150	21	.200*
	Specific	.138	19	.200*
	Control	.138	24	.200*
EmotionalRep	NSAP	.104	21	.200*
	Specific	.123	19	.200*
	Control	.171	24	.066

Appendix S – Test of normality for log transformed variables

Tests of Normality

		Kolmogorov-Smirnov[a]		
	Group	Statistic	df	Sig.
LogHadsDep	NSAP	.135	21	.200*
	Specific	.103	19	.200*
	Control	.123	24	.200*
LogIdentity	NSAP	.128	21	.200*
	Specific	.145	19	.200*
	Control	.175	24	.056

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Appendix T – Homogeneity of variance test for all variables

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
Age at Testing	Based on Mean	12.310	2	61	.000
	Based on Median	8.286	2	61	.001
	Based on Median and with adjusted df	8.286	2	49.509	.001
	Based on trimmed mean	11.719	2	61	.000
HADS Depression Score	Based on Mean	.051	2	61	.950
	Based on Median	.039	2	61	.962
	Based on Median and with adjusted df	.039	2	55.756	.962
	Based on trimmed mean	.061	2	61	.941
HADS Anxiety Score	Based on Mean	1.005	2	61	.372
	Based on Median	.974	2	61	.383
	Based on Median and with adjusted df	.974	2	60.522	.383
	Based on trimmed mean	1.008	2	61	.371
Pain	Based on Mean	1.641	2	61	.202
	Based on Median	1.576	2	61	.215
	Based on Median and with adjusted df	1.576	2	53.897	.216
	Based on trimmed mean	1.638	2	61	.203
IPQPos	Based on Mean	1.172	2	61	.317
	Based on Median	1.136	2	61	.328
	Based on Median and with adjusted df	1.136	2	59.795	.328
	Based on trimmed mean	1.164	2	61	.319
IPQNeg	Based on Mean	3.926	2	61	.025
	Based on Median	2.741	2	61	.072
	Based on Median and with adjusted df	2.741	2	44.699	.075
	Based on trimmed mean	3.739	2	61	.029
MaSCSPos	Based on Mean	.096	2	61	.909
	Based on Median	.075	2	61	.928
	Based on Median and with adjusted df	.075	2	57.679	.928
	Based on trimmed mean	.092	2	61	.912
MaSCSNeg	Based on Mean	.517	2	61	.599
	Based on Median	.579	2	61	.563

	Based on Median and with adjusted df	.579	2	59.614	.563
	Based on trimmed mean	.575	2	61	.566
Identity	Based on Mean	.507	2	61	.605
	Based on Median	.448	2	61	.641
	Based on Median and with adjusted df	.448	2	57.274	.641
	Based on trimmed mean	.596	2	61	.554
Timeline	Based on Mean	.699	2	61	.501
	Based on Median	.389	2	61	.679
	Based on Median and with adjusted df	.389	2	52.281	.679
	Based on trimmed mean	.630	2	61	.536
Consequences	Based on Mean	.523	2	61	.595
	Based on Median	.562	2	61	.573
	Based on Median and with adjusted df	.562	2	60.375	.573
	Based on trimmed mean	.548	2	61	.581
PersonalControl	Based on Mean	2.842	2	61	.066
	Based on Median	2.562	2	61	.085
	Based on Median and with adjusted df	2.562	2	48.524	.088
	Based on trimmed mean	2.897	2	61	.063
TreatmentControl	Based on Mean	1.312	2	61	.277
	Based on Median	.782	2	61	.462
	Based on Median and with adjusted df	.782	2	47.886	.463
	Based on trimmed mean	1.242	2	61	.296
IllnessCoherence	Based on Mean	3.274	2	61	.045
	Based on Median	2.610	2	61	.082
	Based on Median and with adjusted df	2.610	2	59.717	.082
	Based on trimmed mean	3.208	2	61	.047
TimelineCyclical	Based on Mean	1.702	2	61	.191
	Based on Median	1.473	2	61	.237
	Based on Median and with adjusted df	1.473	2	60.445	.237
	Based on trimmed mean	1.617	2	61	.207
EmotionalRep	Based on Mean	.572	2	61	.567
	Based on Median	.418	2	61	.661

	Based on Median and with adjusted df	.418	2	59.048	.661
	Based on trimmed mean	.536	2	61	.588

Appendix U – Diagnoses for specific and control groups

Specific Group Diagnoses	Count
Gastroenteritis	4
Hernia	3
Appendicitis	2
Cholecystitis	1
Small bowel obstruction	1
Gastritis	1
Enteritis	1
Suprapubic pain	1
Diverticulitis	1
Epigastric pain	1
Irritable bowel syndrome	1
Oesophagitis	1
Free fluid on pelvis	1

Control Group Diagnoses	Count
Buttock abscess	3
Ovarian cist	3
Muscle strain	3
Cancer	2
Musculoskeletal	2
Post rectal bleed	2
Scrotal swelling	2
Armpit ulcer	2
Anal fissure	1
Haemorrhoids	1
Hip pain	1
Perianal abscess	1
Right groin pain	1

Appendix V – Kruskal-Wallis test for age and Mann Whitney Post Hoc tests

Kruskal-Wallis Test

Ranks

	Group	N	Mean Rank
Age at Testing	NSAP	21	20.40
	Specific	19	35.87
	Control	24	40.42
	Total	64	

Test Statistics[a,b,c]

	Age at Testing
Kruskal-Wallis H	13.837
df	2
Asymp. Sig.	.001

a. Kruskal Wallis Test

b. Grouping Variable: Group

c. Some or all exact significances cannot be computed because there is insufficient memory.

Ranks

	Group	N	Mean Rank	Sum of Ranks
Age at Testing	NSAP	21	16.50	346.5
	Specific	19	24.92	473.5
	Total	40		

Test Statistics[a]

	Age at Testing
Mann-Whitney U	115.500
Wilcoxon W	346.500
Z	-2.277
Asymp. Sig. (2-tailed)	.023
Exact Sig. [2*(1-tailed Sig.)]	.022[b]
Exact Sig. (2-tailed)	.022
Exact Sig. (1-tailed)	.011
Point Probability	.000

a. Grouping Variable: Group

b. Not corrected for ties.

Ranks

	Group	N	Mean Rank	Sum of Ranks
Age at Testing	NSAP	21	14.90	313.00
	Control	24	30.08	722.00
	Total	45		

Test Statistics[a]

	Age at Testing
Mann-Whitney U	82.000
Wilcoxon W	313.000
Z	-3.870
Asymp. Sig. (2-tailed)	.000
Exact Sig. (2-tailed)	.000
Exact Sig. (1-tailed)	.000
Point Probability	.000

a. Grouping Variable: Group

Appendix W – Gender Chi-square output

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	6.236[a]	2	.044	.047		
Likelihood Ratio	6.618	2	.037	.040		
Fisher's Exact Test	6.315			.045		
Linear-by-Linear Association	5.508[b]	1	.019	.023	.013	.008
N of Valid Cases	64					

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 7.72.

b. The standardized statistic is 2.347.

Symmetric Measures

		Value	Approximate Significance	Exact Significance
Nominal by Nominal	Phi	.312	.044	.047
	Cramer's V	.312	.044	.047
	Contingency Coefficient	.298	.044	.047
N of Valid Cases		64		

Appendix X – ANOVA and planned contrasts output for anxiety

Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
HADS Anxiety Score	Based on Mean	1.005	2	61	.372
	Based on Median	.974	2	61	.383
	Based on Median and with adjusted df	.974	2	60.522	.383
	Based on trimmed mean	1.008	2	61	.371

ANOVA

HADS Anxiety Score

			Sum of Squares	df	Mean Square	F	Sig.
Between Groups	(Combined)		113.077	2	56.538	2.812	.068
	Linear Term	Unweighted	110.629	1	110.629	5.503	.022
		Weighted	111.682	1	111.682	5.555	.022
		Deviation	1.395	1	1.395	.069	.793
	Quadratic Term	Unweighted	1.395	1	1.395	.069	.793
		Weighted	1.395	1	1.395	.069	.793
Within Groups			1226.361	61	20.104		
Total			1339.438	63			

Contrast Tests

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
HADS Anxiety Score	Assume equal variances	1	-4.39	2.393	-1.835	61	.071
		2	1.25	1.420	.879	61	.383
	Does not assume equal variances	1	-4.39	2.512	-1.748	36.135	.089
		2	1.25	1.527	.818	37.687	.419

Appendix Y – ANOVA and planned contrasts output for depression

		Levene Statistic	df1	df2	Sig.
LogHadsDep	Based on Mean	.317	2	61	.730
	Based on Median	.238	2	61	.789
	Based on Median and with adjusted df	.238	2	57.411	.789
	Based on trimmed mean	.319	2	61	.728

ANOVA

LogHadsDep

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.037	2	.018	.152	.859
Within Groups	7.340	61	.120		
Total	7.377	63			

Contrast Coefficients

	Group		
Contrast	NSAP	Specific	Control
1	-2	1	1
2	1	-1	0

Contrast Tests

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
LogHadsDep	Assume equal variances	1	-.0092	.18512	-.050	61	.961
		2	-.0245	.10983	-.223	61	.824

Appendix Z – Kruskal-Wallis and post hoc Mann-Whitney output for IPQ-R negative

Kruskal-Wallis Test

Ranks

	Group	N	Mean Rank
IPQNeg	NSAP	21	37.02
	Specific	19	34.82
	Control	24	26.71
	Total	64	

Test Statistics[a,b,c]

	IPQNeg
Kruskal-Wallis H	3.869
df	2
Asymp. Sig.	.145

a. Kruskal Wallis Test

b. Grouping Variable: Group

c. Some or all exact significances cannot be computed because there is insufficient memory.

Mann-Whitney Test

Ranks

	Group	N	Mean Rank	Sum of Ranks
IPQNeg	NSAP	21	20.88	438.50
	Specific	19	20.08	381.50
	Total	40		

Test Statistics[a]

	IPQNeg
Mann-Whitney U	191.500
Wilcoxon W	381.500
Z	-.218
Asymp. Sig. (2-tailed)	.828
Exact Sig. [2*(1-tailed Sig.)]	.830[b]
Exact Sig. (2-tailed)	.835
Exact Sig. (1-tailed)	.417
Point Probability	.005

a. Grouping Variable: Group

b. Not corrected for ties.

Mann-Whitney Test

Ranks

	Group	N	Mean Rank	Sum of Ranks
IPQNeg	NSAP	21	27.14	570.00
	Control	24	19.38	465.00
	Total	45		

Test Statistics[a]

	IPQNeg
Mann-Whitney U	165.000
Wilcoxon W	465.000
Z	-1.983
Asymp. Sig. (2-tailed)	.047
Exact Sig. (2-tailed)	.047
Exact Sig. (1-tailed)	.024
Point Probability	.001

a. Grouping Variable: Group

Appendix AA – ANOVA and planned contrasts output for IPQ-R positive

Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
IPQPos	Based on Mean	1.172	2	61	.317
	Based on Median	1.136	2	61	.328
	Based on Median and with adjusted df	1.136	2	59.795	.328
	Based on trimmed mean	1.164	2	61	.319

ANOVA

IPQPos

			Sum of Squares	df	Mean Square	F	Sig.
Between Groups	(Combined)		866.074	2	433.037	7.504	.001
	Linear Term	Unweighted	667.543	1	667.543	11.568	.001
		Weighted	640.451	1	640.451	11.099	.001
		Deviation	225.623	1	225.623	3.910	.053
	Quadratic Term	Unweighted	225.623	1	225.623	3.910	.053
		Weighted	225.623	1	225.623	3.910	.053
Within Groups			3519.926	61	57.704		
Total			4386.000	63			

Contrast Tests

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
IPQPos	Assume equal variances	1	15.69	4.054	3.871	61	.000
		2	-7.97	2.405	-3.315	61	.002
	Does not assume equal variances	1	15.69	3.932	3.991	41.429	.000
		2	-7.97	2.233	-3.571	37.926	.001

Appendix BB – ANOVA and planned contrasts output for identity

		Statistic	df1	df2	Sig.
LogIdentity	Based on Mean	.300	2	61	.742
	Based on Median	.235	2	61	.791
	Based on Median and with adjusted df	.235	2	59.135	.791
	Based on trimmed mean	.284	2	61	.754

ANOVA

LogIdentity

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.105	2	.052	.591	.557
Within Groups	5.404	61	.089		
Total	5.509	63			

Contrast Coefficients

	Group		
Contrast	NSAP	Specific	Control
1	-2	1	1
2	1	-1	0

Contrast Tests

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
LogIdentity	Assume equal variances	1	-.1138	.15883	-.717	61	.476
		2	.0218	.09424	.232	61	.818

Appendix CC – ANOVA and planned contrasts output for timeline

		Statistic	df1	df2	Sig.
Timeline	Based on Mean	.699	2	61	.501
	Based on Median	.389	2	61	.679
	Based on Median and with adjusted df	.389	2	52.281	.679
	Based on trimmed mean	.630	2	61	.536

ANOVA

Timeline

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	10.512	2	5.256	.239	.788
Within Groups	1339.098	61	21.952		
Total	1349.609	63			

Contrast Coefficients

	Group		
Contrast	NSAP	Specific	Control
1	-2	1	1
2	1	-1	0

Contrast Tests

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Timeline	Assume equal variances	1	1.37	2.500	.549	61	.585
		2	-1.02	1.483	-.684	61	.496

Appendix DD – ANOVA and planned contrasts output for treatment control

TreatmentControl	Between Groups	(Combined)			72.895	2	36.448	4.206	.019
		Linear Term	Unweighted		60.667	1	60.667	7.002	.010
			Weighted		58.622	1	58.622	6.766	.012
			Deviation		14.273	1	14.273	1.647	.204
		Quadratic Term	Unweighted		14.273	1	14.273	1.647	.204
			Weighted		14.273	1	14.273	1.647	.204
	Within Groups				528.542	61	8.665		
	Total				601.438	63			

TreatmentControl	Assume equal variances	1	4.53	1.571	2.881	61	.005
		2	-2.20	.932	-2.358	61	.022
	Does not assume equal variances	1	4.53	1.732	2.612	30.943	.014
		2	-2.20	.957	-2.296	35.905	.028

Appendix EE – ANOVA and planned contrasts output for consequences

Consequences	Between Groups	(Combined)			4.671	2	2.335	.110	.896
		Linear Term	Unweighted		1.244	1	1.244	.059	.809
			Weighted		1.097	1	1.097	.052	.821
			Deviation		3.574	1	3.574	.169	.683
		Quadratic Term	Unweighted		3.574	1	3.574	.169	.683
			Weighted		3.574	1	3.574	.169	.683
	Within Groups				1291.439	61	21.171		
	Total				1296.109	63			

Consequences	Assume equal variances	1	-1.02	2.455	-.414	61	.680
		2	.68	1.457	.470	61	.640
	Does not assume equal variances	1	-1.02	2.330	-.437	44.655	.664
		2	.68	1.378	.497	36.804	.622

Appendix FF – ANOVA and planned contrasts for personal control

		Levene Statistic	df1	df2	Sig.
LogPerCont	Based on Mean	2.129	2	61	.128
	Based on Median	1.608	2	61	.209
	Based on Median and with adjusted df	1.608	2	54.264	.210
	Based on trimmed mean	2.081	2	61	.134

ANOVA

LogPerCont

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.035	2	.017	1.693	.193
Within Groups	.630	61	.010		
Total	.665	63			

Contrast Coefficients

	Group		
Contrast	NSAP	Specific	Control
1	-2	1	1
2	1	-1	0

Contrast Tests

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
LogPerCont	Assume equal variances	1	.0847	.05425	1.562	61	.123
		2	-.0591	.03219	-1.837	61	.071

Appendix GG – ANOVA and planned contrasts for timeline-cyclical

		Levene Statistic	df1	df2	Sig.
LogTimelineCyc	Based on Mean	2.697	2	61	.075
	Based on Median	2.503	2	61	.090
	Based on Median and with adjusted df	2.503	2	54.896	.091
	Based on trimmed mean	2.568	2	61	.085

ANOVA

LogTimelineCyc

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.121	2	.060	2.806	.068
Within Groups	1.314	61	.022		
Total	1.435	63			

Contrast Coefficients

	Group		
Contrast	NSAP	Specific	Control
1	-2	1	1
2	1	-1	0

Contrast Tests

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
LogTimelineCyc	Assume equal variances	1	-.1699	.07834	-2.168	61	.034
		2	.0668	.04648	1.436	61	.156

Appendix HH – ANOVA and planned contrasts for emotional representations

EmotionalRep	Between Groups	(Combined)			60.553	2	30.277	1.374	.261
		Linear Term	Unweighted		59.740	1	59.740	2.711	.105
			Weighted		60.169	1	60.169	2.730	.104
			Deviation		.385	1	.385	.017	.895
		Quadratic Term	Unweighted		.385	1	.385	.017	.895
			Weighted		.385	1	.385	.017	.895
	Within Groups				1344.431	61	22.040		
	Total				1404.984	63			

EmotionalRep	Assume equal variances	1	-3.29	2.505	-1.315	61	.193
		2	.98	1.486	.663	61	.510
	Does not assume equal variances	1	-3.29	2.363	-1.394	45.805	.170
		2	.98	1.427	.690	35.967	.494

Appendix II – Kruskal-Wallis and post hoc Mann-Whitney output for illness coherence

Kruskal-Wallis Test

Ranks

	Group	N	Mean Rank
IllnessCoherence	NSAP	21	23.33
	Specific	19	36.74
	Control	24	37.17
	Total	64	

Test Statistics[a,b,c]

	IllnessCoherence
Kruskal-Wallis H	7.628
df	2
Asymp. Sig.	.022

a. Kruskal Wallis Test

b. Grouping Variable: Group

c. Some or all exact significances cannot be computed because there is insufficient memory.

Mann-Whitney Test

Ranks

	Group	N	Mean Rank	Sum of Ranks
IllnessCoherence	NSAP	21	16.24	341.00
	Specific	19	25.21	479.00
	Total	40		

Test Statistics[a]

	IllnessCoherence
Mann-Whitney U	110.000
Wilcoxon W	341.000
Z	-2.433
Asymp. Sig. (2-tailed)	.015
Exact Sig. [2*(1-tailed Sig.)]	.015[b]
Exact Sig. (2-tailed)	.014
Exact Sig. (1-tailed)	.007
Point Probability	.000

a. Grouping Variable: Group

b. Not corrected for ties.

Mann-Whitney Test

Ranks

	Group	N	Mean Rank	Sum of Ranks
IllnessCoherence	NSAP	21	18.10	380.00
	Control	24	27.29	655.00
	Total	45		

Test Statistics[a]

	IllnessCoherence
Mann-Whitney U	149.000
Wilcoxon W	380.000
Z	-2.355
Asymp. Sig. (2-tailed)	.019
Exact Sig. (2-tailed)	.018
Exact Sig. (1-tailed)	.009
Point Probability	.000

a. Grouping Variable: Group

Appendix JJ – ANOVA and planned contrasts output for MaSCS negative

Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
MaSCSNeg	Based on Mean	.517	2	61	.599
	Based on Median	.579	2	61	.563
	Based on Median and with adjusted df	.579	2	59.614	.563
	Based on trimmed mean	.575	2	61	.566

ANOVA

MaSCSNeg

			Sum of Squares	df	Mean Square	F	Sig.
Between Groups	(Combined)		9.228	2	4.614	.116	.891
	Linear Term	Unweighted	4.210	1	4.210	.106	.746
		Weighted	3.877	1	3.877	.097	.756
		Deviation	5.351	1	5.351	.135	.715
	Quadratic Term	Unweighted	5.351	1	5.351	.135	.715
		Weighted	5.351	1	5.351	.135	.715
Within Groups			2426.522	61	39.779		
Total			2435.750	63			

Contrast Tests

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
MaSCSNeg	Assume equal variances	1	-1.55	3.366	-.461	61	.646
		2	.94	1.997	.471	61	.640
	Does not assume equal variances	1	-1.55	3.230	-.481	43.386	.633
		2	.94	1.898	.495	37.192	.623

Appendix KK – ANOVA and planned contrasts output for MaSCS positive

Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
MaSCSPos	Based on Mean	.096	2	61	.909
	Based on Median	.075	2	61	.928
	Based on Median and with adjusted df	.075	2	57.679	.928
	Based on trimmed mean	.092	2	61	.912

ANOVA

MaSCSPos

			Sum of Squares	df	Mean Square	F	Sig.
Between Groups	(Combined)		2.793	2	1.397	.024	.977
	Linear Term	Unweighted	2.414	1	2.414	.041	.840
		Weighted	2.342	1	2.342	.040	.842
		Deviation	.451	1	.451	.008	.930
	Quadratic Term	Unweighted	.451	1	.451	.008	.930
		Weighted	.451	1	.451	.008	.930
Within Groups			3581.207	61	58.708		
Total			3584.000	63			

Contrast Tests

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
MaSCSPos	Assume equal variances	1	-.88	4.089	-.215	61	.830
		2	.42	2.426	.171	61	.864
	Does not assume equal variances	1	-.88	4.008	-.220	41.666	.827
		2	.42	2.392	.174	37.180	.863

Appendix LL – ANOVA and planned contrasts output for pain

Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Pain	Based on Mean	1.641	2	61	.202
	Based on Median	1.576	2	61	.215
	Based on Median and with adjusted df	1.576	2	53.897	.216
	Based on trimmed mean	1.638	2	61	.203

ANOVA

Pain

			Sum of Squares	df	Mean Square	F	Sig.
Between Groups	(Combined)		4.009	2	2.004	.636	.533
	Linear Term	Unweighted	.780	1	.780	.247	.621
		Weighted	.899	1	.899	.285	.595
		Deviation	3.110	1	3.110	.986	.325
	Quadratic Term	Unweighted	3.110	1	3.110	.986	.325
		Weighted	3.110	1	3.110	.986	.325
Within Groups			192.323	61	3.153		
Total			196.332	63			

Contrast Tests

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Pain	Assume equal variances	1	-.0870	.94755	-.092	61	.927
		2	.3509	.56220	.624	61	.535
	Does not assume equal variances	1	-.0870	.83679	-.104	52.862	.918
		2	.3509	.50281	.698	33.943	.490

Appendix MM – Correlation Matrices for NSAP, specific and control groups

Group = NSAP

Correlations[a]

			Group	Age at Testing	HADS Depression Score	HADS Anxiety Score	Pain	IPQNeg	IPQPos	MaSCSNeg	MaSCSPos
Kendall's tau_b	Group	Correlation Coefficient	.	.	.	.	.	.	.	.	.
		Sig. (1-tailed)	.	.	.	.	.	.	.	.	.
		N	21	21	21	21	21	21	21	21	21
	Age at Testing	Correlation Coefficient	.	1.000	-.263	-.509**	-.422**	.045	.025	-.254	-.300*
		Sig. (1-tailed)	.	.	.053	.001	.005	.392	.440	.060	.032
		N	21	21	21	21	21	21	21	21	21
	HADS Depression Score	Correlation Coefficient	.	-.263	1.000	.370*	.279*	.311*	.069	.130	.015
		Sig. (1-tailed)	.	.053	.	.012	.044	.029	.335	.214	.464
		N	21	21	21	21	21	21	21	21	21
	HADS Anxiety Score	Correlation Coefficient	.	-.509**	.370*	1.000	.330*	.156	-.090	.442**	.084
		Sig. (1-tailed)	.	.001	.012	.	.022	.171	.292	.004	.302
		N	21	21	21	21	21	21	21	21	21
	Pain	Correlation Coefficient	.	-.422**	.279*	.330*	1.000	.000	.114	.285*	.133
		Sig. (1-tailed)	.	.005	.044	.022	.	.500	.242	.041	.206
		N	21	21	21	21	21	21	21	21	21
	IPQNeg	Correlation Coefficient	.	.045	.311*	.156	.000	1.000	-.160	.086	-.289*
		Sig. (1-tailed)	.	.392	.029	.171	.500	.	.164	.301	.038
		N	21	21	21	21	21	21	21	21	21
	IPQPos	Correlation Coefficient	.	.025	.069	-.090	.114	-.160	1.000	-.259	.182
		Sig. (1-tailed)	.	.440	.335	.292	.242	.164	.	.056	.130
		N	21	21	21	21	21	21	21	21	21
	MaSCSNeg	Correlation Coefficient	.	-.254	.130	.442**	.285*	.086	-.259	1.000	.164
		Sig. (1-tailed)	.	.060	.214	.004	.041	.301	.056	.	.157
		N	21	21	21	21	21	21	21	21	21
	MaSCSPos	Correlation Coefficient	.	-.300*	.015	.084	.133	-.289*	.182	.164	1.000
		Sig. (1-tailed)	.	.032	.464	.302	.206	.038	.130	.157	.
		N	21	21	21	21	21	21	21	21	21

**. Correlation is significant at the 0.01 level (1-tailed).

*. Correlation is significant at the 0.05 level (1-tailed).

a. Group = NSAP

Group = Specific

Correlations[a]

			Group	Age at Testing	HADS Depression Score	HADS Anxiety Score	Pain	IPQNeg	IPQPos	MaSCSNeg	MaSCSPos
Kendall's tau_b	Group	Correlation Coefficient	.	.	.	.	.	.	.	.	.
		Sig. (1-tailed)	.	.	.	.	.	.	.	.	.
		N	19	19	19	19	19	19	19	19	19
	Age at Testing	Correlation Coefficient	.	1.000	.314*	.055	.060	.549**	-.030	.222	.281*
		Sig. (1-tailed)	.	.	.033	.375	.362	.001	.430	.097	.049
		N	19	19	19	19	19	19	19	19	19
	HADS Depression Score	Correlation Coefficient	.	.314*	1.000	.130	-.092	.287*	-.229	.251	-.049
		Sig. (1-tailed)	.	.033	.	.228	.298	.048	.095	.074	.389
		N	19	19	19	19	19	19	19	19	19
	HADS Anxiety Score	Correlation Coefficient	.	.055	.130	1.000	-.234	-.135	-.037	.129	.104
		Sig. (1-tailed)	.	.375	.228	.	.089	.218	.416	.229	.274
		N	19	19	19	19	19	19	19	19	19
	Pain	Correlation Coefficient	.	.060	-.092	-.234	1.000	.036	.025	-.055	-.061
		Sig. (1-tailed)	.	.362	.298	.089	.	.416	.444	.375	.362
		N	19	19	19	19	19	19	19	19	19
	IPQNeg	Correlation Coefficient	.	.549**	.287*	-.135	.036	1.000	-.232	.205	.097
		Sig. (1-tailed)	.	.001	.048	.218	.416	.	.090	.115	.286
		N	19	19	19	19	19	19	19	19	19
	IPQPos	Correlation Coefficient	.	-.030	-.229	-.037	.025	-.232	1.000	-.190	.160
		Sig. (1-tailed)	.	.430	.095	.416	.444	.090	.	.136	.179
		N	19	19	19	19	19	19	19	19	19
	MaSCSNeg	Correlation Coefficient	.	.222	.251	.129	-.055	.205	-.190	1.000	.394*
		Sig. (1-tailed)	.	.097	.074	.229	.375	.115	.136	.	.011
		N	19	19	19	19	19	19	19	19	19
	MaSCSPos	Correlation Coefficient	.	.281*	-.049	.104	-.061	.097	.160	.394*	1.000
		Sig. (1-tailed)	.	.049	.389	.274	.362	.286	.179	.011	.
		N	19	19	19	19	19	19	19	19	19

*. Correlation is significant at the 0.05 level (1-tailed).

**. Correlation is significant at the 0.01 level (1-tailed).

a. Group = Specific

Group = Control

Correlations[a]

			Group	Age at Testing	HADS Depression Score	HADS Anxiety Score	Pain	IPQNeg	IPQPos	MaSCSNeg	MaSCSPos
Kendall's tau_b	Group	Correlation Coefficient	.	.	.	.	.	.	.	.	.
		Sig. (1-tailed)	.	.	.	.	.	.	.	.	.
		N	24	24	24	24	24	24	24	24	24
	Age at Testing	Correlation Coefficient	.	1.000	.113	.030	-.030	.196	-.074	-.004	-.037
		Sig. (1-tailed)	.	.	.226	.421	.421	.094	.309	.490	.401
		N	24	24	24	24	24	24	24	24	24
	HADS Depression Score	Correlation Coefficient	.	.113	1.000	.297*	.169	.316*	-.241	.568**	.092
		Sig. (1-tailed)	.	.226	.	.028	.135	.019	.057	.000	.273
		N	24	24	24	24	24	24	24	24	24
	HADS Anxiety Score	Correlation Coefficient	.	.030	.297*	1.000	.289*	.360**	-.245	.459**	.042
		Sig. (1-tailed)	.	.421	.028	.	.030	.009	.054	.001	.391
		N	24	24	24	24	24	24	24	24	24
	Pain	Correlation Coefficient	.	-.030	.169	.289*	1.000	-.199	-.391**	.314*	-.121
		Sig. (1-tailed)	.	.421	.135	.030	.	.093	.005	.019	.212
		N	24	24	24	24	24	24	24	24	24
	IPQNeg	Correlation Coefficient	.	.196	.316*	.360**	-.199	1.000	-.101	.165	.166
		Sig. (1-tailed)	.	.094	.019	.009	.093	.	.250	.136	.136
		N	24	24	24	24	24	24	24	24	24
	IPQPos	Correlation Coefficient	.	-.074	-.241	-.245	-.391**	-.101	1.000	-.384**	.075
		Sig. (1-tailed)	.	.309	.057	.054	.005	.250	.	.005	.308
		N	24	24	24	24	24	24	24	24	24
	MaSCSNeg	Correlation Coefficient	.	-.004	.568**	.459**	.314*	.165	-.384**	1.000	.102
		Sig. (1-tailed)	.	.490	.000	.001	.019	.136	.005	.	.250
		N	24	24	24	24	24	24	24	24	24
	MaSCSPos	Correlation Coefficient	.	-.037	.092	.042	-.121	.166	.075	.102	1.000
		Sig. (1-tailed)	.	.401	.273	.391	.212	.136	.308	.250	.
		N	24	24	24	24	24	24	24	24	24

*. Correlation is significant at the 0.05 level (1-tailed).

**. Correlation is significant at the 0.01 level (1-tailed).

a. Group = Control

**Appendix NN – Epistemological position for literature review and empirical project*

During this project, the researcher took a positivist epistemological position. The researcher had no experience of research in this area prior to carrying out the project, aside from some personal and clinical experience regarding the physical symptomology presented in this work. This allowed the author to take a relatively objective viewpoint of the research findings, with some understanding of their meaning, holding only limited prior conceptions. The researcher perceived themselves as independent of the data collected as the participants completed questionnaires which were anonymised before they were allocated to their group. This produced data which was subsequently statistically analysed to draw conclusions and interpretations. This method is in keeping with a positivist position whereby research is objective and can be carried out using measurable techniques.

Appendix OO – Breakdown of all variables and tests used

Hypothesis	Variable	Test Used	Correction on alpha
Psychological morbidity would be higher in the NSAP group	Psychological morbidity	HADs anxiety – ANOVA	None
		HADs depression – ANOVA	None
Illness appraisal scores would differ in the NSAP group - Higher scores of negative illness appraisals would be seen - Lower scores of positive illness appraisals would be seen - Differences seen on individual subscales	Illness appraisals	IPQ-R Negative – Kruskal Wallis	None
		IPQ-R Positive – ANOVA	None
		Identity – ANOVA	Bonferroni
		Timeline – ANOVA	Bonferroni
		Consequences – ANOVA	Bonferroni
		Timeline Cyclical – ANOVA	Bonferroni
		Treatment Control – ANOVA	Bonferroni
		Personal Control – ANOVA	Bonferroni
		Emotional Rep – ANOVA	Bonferroni
		Illness Coherence – Kruskal Wallis	Bonferroni
Metacognition scores would differ in the NSAP group - Higher scores for negative metacognitions - Lower scores for positive metacognitions	Metacognitions	MaSCS negative – ANOVA	None
		MaSCS positive - ANOVA	None
NSAP group would report higher rates of pain	Pain score	NRS score – ANOVA	None
Relationship between illness appraisals and psychological morbidity would be seen in the NSAP group		Correlational analysis: Age at testing HADs depression HADs anxiety Pain IPQ negative IPQ positive MaSCS negative MaSCS positive	Bonferroni