ACTION IDENTIFICATION IN CHRONIC PAIN: HOW DO PEOPLE CONSTRUCT MEANING IN ACTION?

Helen Louise Robinson

Submitted in accordance with the requirements for the degree of

Doctor of Clinical Psychology (D. Clin. Psychol.)

The University of Leeds

Academic Unit of Psychiatry and Behavioural Sciences

School of Medicine

June 2011

The candidate confirms that the work submitted is her own and that appropriate credit has been given where reference has been made to the work of others.

This copy has been supplied on the understanding that it is copyright material and that no quotation from the thesis may be published without proper acknowledgement.

The right of Helen Louise Robinson to be identified as Author of this work has been asserted by her in accordance with the Copyright, Designs and Patents Act 1988.

© 2011 The University of Leeds and Helen Louise Robinson

ACKNOWLEDGEMENTS

I would like to start by thanking all the people who gave up their time to open-handedly share their experiences of living with chronic pain. I would also like to thank the undergraduate and postgraduate students who participated in the earlier stages of this research. The research would not have been possible without the generous commitment of Kathryn Marczewski to recruiting participants, to whom I am extremely grateful and cannot thank enough. I would also like to thank the other staff working at the pain clinics for their contribution to the recruitment process. Finally, I would like to say a huge thank you to my supervisor, Professor Stephen Morley, for his invaluable knowledge and guidance and his dedication to helping me achieve, throughout.

ABSTRACT

Background

Action Identification Theory holds that every action has different 'levels' of meaning. High levels confer greater meaning and are preferentially sought but when the action is interrupted lower level identities with reduced meaning are elicited. The primary aim of this research was to develop a measure of action identification to investigate the hypothesis that interference to activity caused by chronic pain 'down regulates' levels of action identification thus effectively draining meaning from life. An additional aim was to investigate other factors which influence action identification in chronic pain.

Methods

A measure of action identification for pain (AIP) was developed. The AIP was psychometrically evaluated in samples of students. It was administered to 47 chronic pain patients using a forced choice card-sort method. The chronic pain sample also completed the Meaningful Life Measure and measures of pain intensity, pain interference, depression, withdrawal from activity, acceptance and optimism.

Results

The AIP demonstrated satisfactory internal consistency and test-retest reliability over 2 to 3 weeks.

Data on the inter-correlations between variables are reported. Pain interference negatively correlated with meaning in life and action identification level positively correlated with meaning in life. Multiple regression analyses found that depression and negative mood, acceptance and optimism significantly contributed to variance in meaning in life. Interference and action identification did not. Possible explanations for the results are discussed.

Conclusions

The AIP is a promising measure of action identification. Further work is necessary to overcome methodological limitations of the current research to reliably understand the process of action identification in chronic pain. Interventions aimed at increasing acceptance of pain and training optimism may help increase perceived meaning in life in chronic pain.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS 3
ABSTRACT 4
TABLE OF CONTENTS 5
LIST OF ABBREVIATIONS 12
CHAPTER 1: GENERAL INTRODUCTION 13
1.1 Overview 13
1.2 Review of the Literature 13
1.2.1 Chronic Pain 13
1.2.2 Meaning in Life 15
1.2.3 Cognitive Representation and Organisation of Behaviour 15
1.3 Current Research 28
1.3.1 Action Identification in Chronic Pain 28
CHAPTER 2: DEVELOPING A MEASURE OF ACTION IDENTIFICATION 35
2.1 Overview 35
2.2 Measuring Action Identification in Chronic Pain 35
2.3 Study 1: Establishing the Item Pool 37
2.3.1 Introduction 37
2.3.2 Method 37
2.3.3 Results 39
2.3.4 Discussion 46
2.4 Study 2: Item Analysis 48
2.4.1 Introduction 48
2.4.2 Method 48
2.4.3 Results 50
2.4.4 Discussion 61
2.5 Study 3: Reliability Analysis 62
2.5.1 Introduction 62
2.5.2 Method 62
2.5.3 Results 63

2.5.4 Discussion 64
2.6 General Discussion 65
CHAPTER 3: MAIN STUDY METHOD 66
3.1 Overview 66
3.2 Design 66
3.3 Participants 66
3.3.1 Inclusion and Exclusion Criteria 66
3.3.2 Recruitment 66
3.3.3 Sample 67
3.4 Measures 67
3.4.1 Pain Interference 68
3.4.2 Action Identification 69
3.4.3 Meaning in Life 69
3.4.4 Depression and Negative Mood 70
3.4.5 Acceptance 71
3.4.6 Optimism 72
3.4.7 Psychological Distance 73
3.5 Procedure 73
3.6 Data analyses 75
CHAPTER 4: MAIN STUDY RESULTS 76
4.1 Overview 76
4.2 Data Exploration and Transformation 76
4.2.1 Missing Data Values and Outliers 76
4.2.2 Normality 77
4.3 Summary Statistics 78
4.3.1 Sample 78
4.3.2 Measures 79
4.4 AIP Item Analysis 81
4.5 Correlation Analyses 87

4.5.1 Research Aim 2 89
4.5.2 Research Aim 3 89
4.5.3 Additional Findings 89
4.6 Exploratory Multiple Regression Analyses 90
4.7 Summary 93
4.7.1 Research Aim 1 93
4.7.2 Research Aim 2 93
4.7.3 Research Aim 3 93
CHAPTER 5: GENERAL DISCUSSION 94
5.1 Overview 94
5.2 Summary of Results 94
5.2.1 Research Aim 1 94
5.2.2 Research Aim 2 95
5.2.3 Research Aim 3 97
5.2.4 Additional Findings 99
5.3 Strengths and Limitations 101
5.3.1 Strengths 101
5.3.2 Limitations 102
5.4 Clinical Implications 105
5.5 Further Directions 106
5.6 Conclusions 107
REFERENCES 109
APPENDICES 116
Appendix A: Behaviour Identification Form 116
Appendix B: LIHS/LIGHT ethical approval letter 119
Appendix C: Action Identification for Pain 120
Appendix D: NRES ethical approval letter 125
Appendix E: NRES amendment approval letter 128
Appendix F: Brief Pain Inventory short form 131
Appendix G: Meaningful Life Measure 133

Appendix H: Patient Health Questionnaire.....135

Appendix I: Chronic Pain Acceptance Questionnaire revised version 136

Appendix J: Life Orientation Test revised version 138

Appendix K: AIP-withdrawal 139

LIST OF FIGURES

Figure 1: Control theory and action identification theory 16
Figure 2: Hypothesised relationship between interference caused by pain and meaning in life; and relationships between interference, action identification and meaning 29
Figure 3: Agreement scores for high and low level identities for each item 40
Figure 4: Histogram illustrating normal distribution of total action identification scores 55
Figure 5: Total action identification scores at times 1 and 2 64
Figure 6: Hypothesised relationship between interference caused by pain and meaning in life; and relationships between interference, action identification and meaning 68

LIST OF BOXES

Box 1: Principles of AIT 17
Box 2: Research aims and hypotheses 34
Box 3: Sample questionnaire items 38
Box 4: Research aims and hypotheses 76

LIST OF TABLES

Table 1: Sample items of the BIF 20
Table 2: Factors influencing act identification level 23
Table 3: Implications of task demands and act identification level 24
Table 4: AIP item stems and identities with agreement scores 41
Table 5: Percentage of participants who selected each identity for each item of AIP 51
Table 6: AIP internal consistency analysis item-total statistics 56
Table 7: Final factor loadings on primary factor and minor factors 58
Table 8: Sample items of the MLM 70
Table 9: Sample items of the PHQ-9 71
Table 10: Sample items of the CPAQ-R 72
Table 11: Sample items of the LOT-R 73
Table 12: Descriptive data for pain variables and correlations with age and SQRT years experienced pain 79
Table 13: Descriptive data for psychological variables and correlations with age and SQRT years experienced pain 80
Table 14: Percentage of participants who selected each identity for each item of the AIP 82
Table 15: Mean action identification score and mean psychological distance score for each item of the AIP 86
Table 16: Correlations between all interval level variables 88
Table 17: Multiple regression results when pain interference is entered as a predictor of meaning in life 91
Table 18: Multiple regression results when total action identification is entered as a predictor of meaning in life 91
Table 19: Multiple regression results when pain interference and total action identification are entered as predictors of meaning in life 92

LIST OF ABBREVIATIONS

ACT: Acceptance and Commitment Therapy

AIP: Action Identification in Chronic Pain

AIP-withdrawal: Action Identification in Chronic Pain withdrawal from activity scale

AIT: Action Identification Theory

ANOVA: Analysis of Variance

BDI: Beck Depression Inventory

BIF: Behaviour Identification Form

BOS: Bristol Online Survey

BPI-sf: Brief Pain Inventory short form

CPAQ: Chronic Pain Acceptance Questionnaire

CPAQ-R: Chronic Pain Acceptance Questionnaire revised version

D. Clin. Psychol.: Doctor of Clinical Psychology

LRI: Life Regard Index

LOT-R: Life Orientation Test revised version

MLM: Meaningful Life Measure

NRES: National Research Ethics Service

PASW: Predictive Analytics Software

PHQ-9: Patient Health Questionnaire

PIL: Purpose in Life Test

PWP-B: Purpose in Life Scale

SOC-M: Sense of Coherence meaning Scale

WHYMPI: West Haven-Yale Multidimensional Pain Inventory

CHAPTER 1: GENERAL INTRODUCTION

1.1 Overview

In the pain clinic, patients often say things like, “I don’t think of tomorrow, I just take every day as it comes” or “The pain has really dragged my life down”. Whether they really mean this and their lives impoverished or devoid of longer-term goals and meaning is unknown.

The purpose of this research is to apply action identification theory (AIT, Vallacher & Wegner, 1985) as a possible way of understanding the relationship between chronic pain and how people construct meaning in their lives. AIT holds that all acts can be construed by different ‘levels’ of meaning that range from low level, concerning the details and specifics of the act, to high level, reflecting a more general understanding of the act and its implications. Thus high level identities reflect the implementation of one’s goals, values and interests. Low level identities are devoid of such meaning and self-defining potential.

When something interferes with an act and it cannot be maintained, low level identities become prepotent. One can hypothesise that the ongoing interference to cognitive and behavioural acts caused by chronic pain will down-regulate the level at which a person identifies action. This has negative implications for perceiving meaning and progress in attaining life goals (and thus ability to maintain a continuous and valuable sense of self). The current research is the first study of this type and is particularly concerned with the development of a measure of action identification to test this hypothesis.

1.2 Review of the Literature

1.2.1 Chronic Pain

Chronic pain may be defined as “pain that persists beyond the normal healing time after an injury, or as pain that is the result of an ongoing disease process” (Jensen, 2010, p25). It is “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage” (Merskey & Bogduk, 1994, p211). Chronic pain is an invisible state which is not eradicated with pharmacological treatments or interventions. It has the potential to interfere with capacity to complete everyday tasks and behaviours to a desired standard.

A growing body of evidence supports the involvement of personal beliefs, perceptions and appraisals of chronic pain, in influencing the level of interference experienced. Hyper-vigilance to pain symptoms, beliefs about pain determining one’s future, fears about the uncontrollability of pain, or fears about certain activities aggravating pain can all lead to avoidance of, or withdrawal from, everyday social and occupational activity (see Turk & Okifuji, 2002 for a discussion). As engagement in relationships and activities

diminishes, a person's sense of value, purpose, efficacy, self-philosophy and self-worth can be challenged. Their sense of meaning in life is compromised. Not living in accordance with personal values has implications for emotional wellbeing (Morgan & Farsides, 2009a) and functioning in chronic pain (McCracken & Yang, 2006). It is no surprise then that co-morbid mood disorders are common in people with chronic pain (Gatchel, 1996). A literature review revealed that 52% of patients attending pain clinics or inpatient pain programmes have major depression (Bair, Robinson, Katon, & Kroenke, 2003). Chronic pain and depression are likely to have a complex, mutually reinforcing relationship (Gatchel, Peng, Peters, Fuchs, & Turk, 2007).

Goal-setting, activity scheduling and the technique of challenging unrealistic or unhelpful thoughts, aim to promote engagement in activity to positively influence mood. Randomised controlled trials have found evidence for the efficacy of such cognitive-behavioural approaches (Hoffman, Chatkoff, Papas, & Kerns, 2007; Morley, Eccleston, & Williams, 1999). Specific techniques aimed at increasing peoples' confidence in their ability to manage their pain may improve outcomes (Turner, Holtzman, & Mancl, 2007). Other therapeutic approaches emphasise that suffering is normal and focus on increasing psychological flexibility, rather than explicitly targeting pain or changing the content of thoughts. For example, Acceptance and Commitment Therapy (ACT, Hayes, Strosahl, & Wilson, 1999) assists people to accept the presence of pain without attempts to avoid or control it, whilst simultaneously enhancing engagement in meaningful aspects of their lives (Dahl, Wilson, & Luciano, 2005). ACT has growing evidence in support of its effectiveness as a treatment intervention to reduce emotional suffering and enhance quality of life in people with chronic pain (Dahl, Wilson, & Nilsson, 2004; Johnston, Foster, Shennan, Starkey, & Johnson, 2010; McCracken, Vowles, & Eccleston, 2005; Vowles & McCracken, 2008; Wicksell, Ahlqvist, Bring, Melin, & Olsson, 2008). Recent research has directly investigated the change processes of ACT. McCracken and Gutierrez-Martinez (2011) studied 168 individuals attending an intensive ACT-based group programme (6 and a half hours per day, 5 days per week, over 3-4 weeks) to examine 4 processes of psychological flexibility: acceptance of pain, values-based action, psychological acceptance and mindfulness. Improvements in level of depression, pain-related anxiety, physical and psychosocial disability were noted immediately following treatment and at 3 month follow-up. For all but depression, changes were significantly related to all 4 processes of psychological flexibility. Depression was significantly related to 3 of the 4 processes examined: acceptance of pain, values-based action and psychological acceptance. These findings supported previous research (see McCracken & Zhao-O'Brien, 2010) which suggests that general psychological acceptance (i.e. willingness to experience many varied emotions, memories, thoughts, symptoms, etc) beyond acceptance of pain, contributes to

reduced levels of depression and improved daily functioning in people with chronic pain. No research to date however has investigated exactly how people with chronic pain derive meaning in their day-to-day action.

1.2.2 Meaning in Life

Sense of meaning in life is a psychosocial factor thought to be important in health maintenance and wellbeing. In a sample of 99 smoking cessation patients, self-reported propensity to seek meaning in life was associated with better perceived health and more perceived benefits of health care utilisation (Steger, Mann, Michels, & Cooper, 2009). In another questionnaire-based study of 32 healthy male and female adult volunteers, meaning in life negatively correlated with anxiety (Riichiro & Masahiko, 2006). Similarly, meaning in life has been negatively related to depression and post-traumatic stress disorder in a sample of 174 military veterans (Owens, Steger, Whitesell, & Herrera, 2009).

Attempts to define the construct 'meaning in life' have incorporated various theoretical concepts such as sense of coherence in one's life (Antonovsky, 1979; Battista & Almond, 1973), human goal orientation, direction and purpose (Carver & Scheier, 1981; Ryff & Singer, 1998) and personal agency (Bandura, 2001). Accordingly, Reker (2000, p. 41) offers a comprehensive definition of meaning in life as "a multidimensional construct consisting of the cognisance of order, coherence, and purpose in one's existence, the pursuit and attainment of worthwhile goals, and the accompanying sense of fulfilment". This takes into account the cognitive, behavioural and affective components of meaning in life.

Theories of the cognitive representation and organisation of behaviour (e.g. Carver & Scheier, 1990; Vallacher & Wegner, 1985) offer workable models for considering one component of meaning in life: the degree to which mental construal of everyday acts reflects one's broader interests, values, goals and desired self-attributes. Measurement of interference to general activity offers insight into the level of engagement in meaningful aspects of life. The affective components of meaning in life can be investigated via measures of psychological wellbeing. Investigation of the level at which people with chronic pain construe meaning in everyday acts, how this is influenced by the interference to activity caused by chronic pain, and how it relates to wellbeing, should enhance current understanding of the experience of chronic pain. It requires a comprehensive understanding of theories of the cognitive representation and organisation of behaviour.

1.2.3 Cognitive Representation and Organisation of Behaviour

The following discussion provides a comprehensive and hopefully exhaustive account of how the 'thinking' about a behaviour is linked to the 'carrying out' of the behaviour and the factors which influence this process. Much of the research in this area has been completed by Robin Vallacher and Daniel Wegner, or by researchers replicating their

techniques. The lack of critique by others may reflect the empirical basis as well as the intuitive appeal of Vallacher and Wegner's work.

1.2.3.1 Cognitive Hierarchy

Any human act or behaviour can be described in an infinite number of ways. For example, one person might describe an act as "going shopping" while another might describe the same act as "pushing a trolley". Yet another person might describe it as "being responsible". As each description holds a different level of meaning, the descriptions can be arranged hierarchically. This hierarchical arrangement has been formally conceptualised in theories of the organisation of behaviour (e.g. control theory, Carver & Scheier, 1981) and cognitive representation of action (e.g. action identification theory, AIT, Vallacher & Wegner, 1985) as illustrated in Figure 1.

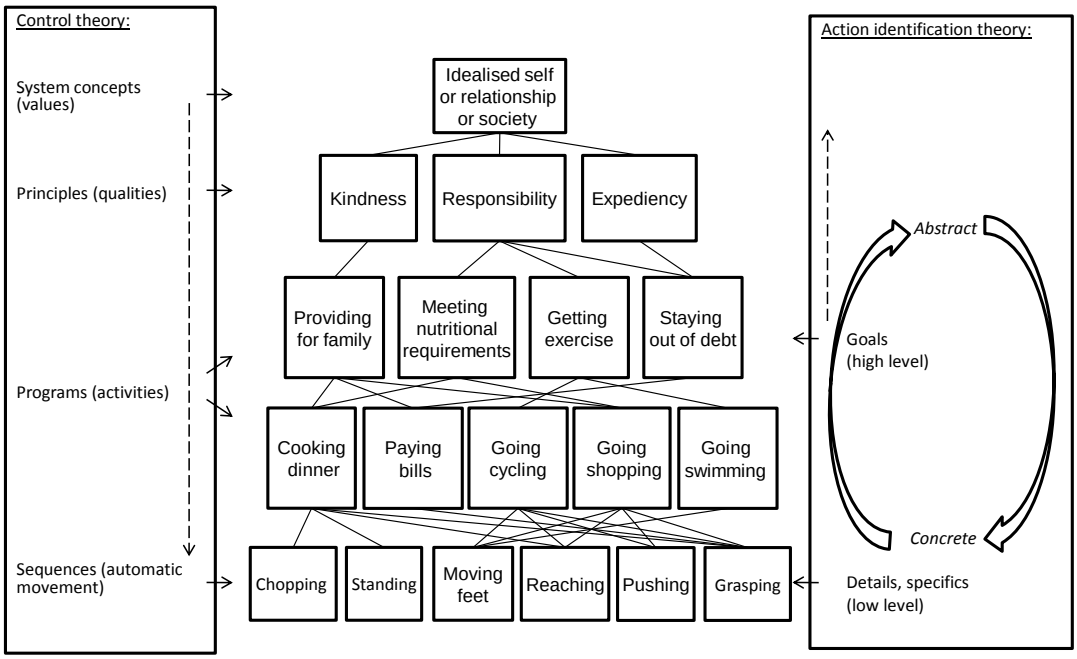


Figure 1: Control theory and action identification theory

The number of levels in the hierarchy is infinite, ranging from descriptions of automatic movement sequences (e.g. "standing") to descriptions of personal qualities and values (e.g. "kindness"). According to Vallacher and Wegner (1985), low level descriptions are those which are more concrete and concern the details and specifics of an act thus indicating how it is done, for example, the cyclist who is "pushing peddles". High level descriptions are those which are more abstract. They reflect general understanding and the

effects and implications of an act thus the act is more likely to reflect the implementation of one's goals (e.g. the cyclist who is "getting exercise") in accordance with personal values (e.g. good health). Torelli and Kaikati (2009) demonstrated this link between high level act description and personal values. They induced subjects to think in high level terms (rather than low level terms) by asking them to think about what goals could be fulfilled by engaging in a hypothetical activity. This lead to a stronger value-behaviour relationship, as evidenced by correlations between endorsements of a list of different values with endorsement of a behaviour which expresses these values. Similarly, Naufel and Beike (2009) primed students to adopt either low level or high level act descriptions (focus on how they would succeed in the Psychology course, or why they would succeed, respectively) and then asked them about their expectations for the course. Students primed to adopt a high level of identification were more concerned with performing well in the course (i.e. doing it for a valued reason such as academic success) than completing the course, whereas students primed to adopt a low level of identification were more concerned with completing the course (i.e. merely doing it) than performing well.

Asking people what they are doing (i.e. asking them to generate an act description) allows insight into the cognitive representation controlling the particular act at that moment in time (Vallacher & Wegner, 1987). Effective execution of moment-by-moment behaviour relies on the dynamic and self-correcting nature of the cognitive processes controlling these representations. In the following discussion of these processes, act descriptions which are more concrete and concerned with the details of the act will be referred to as 'low level act identities'. Descriptions which are more abstract and concerned with the effects and implications of the act (i.e. a greater level of meaning) will be referred to as 'high level act identities'. This is in accordance with the terminology of AIT.

1.2.3.2 Cognitive Processes

According to AIT, 3 fundamental processes guide selection of an act identity. These are summarised in Box 1 and discussed in full below.

Principle 1: "action is maintained with respect to its prepotent identity"
Principle 2: "when both a lower and a higher level act identity are available, there is a tendency for the higher level identity to become prepotent"
Principle 3: "when an action cannot be maintained in terms of its prepotent identity, there is a tendency for a lower level identity to become prepotent"

Box 1: Principles of AIT (taken from Vallacher & Wegner, 1987)

People are motivated to act to reduce discrepancy between their perceived actual state and their desired state. For example, the driver, on perceiving the road to be more on the left side of his car (i.e. discrepant from the desired state of the car being central in the road) will turn the steering wheel slightly left to bring the image of the road back into the appropriate configuration (Carver & Scheier, 1999). The generated act (turning of the steering wheel) impacts on the environment in such a way as the perceptual input now matches the desired state, thereby minimising discrepancy. The act identity controlling action at any moment is the functionally super-ordinate, focally attentive act identity thus is responsible for the maintenance of the action over time. It is referred to as the prepotent act identity (Vallacher & Wegner, 1985). This is principle 1 of AIT. The prepotent act identity is the frame of reference for monitoring occurrence of the act and reflecting on its attainment.

People also search for meaning provided by the context in which they are acting. This concept is reflected in a variety of psychological theories such as learning under reinforcement contingencies whereby an act expands to incorporate the reinforcing effect of that act (e.g. Skinner, 1953), Gestalt principles of perception whereby parts become unified to produce a whole (e.g. Koffka, 1935) and humans as possessing an innate drive to find meaning and significance in their lives (Frankl, 1963). According to principle 2 of AIT, the result of this search for meaning is that when both a lower and a higher act identity are available there is a tendency for the higher level act identity to become prepotent (Vallacher & Wegner, 1985). Wegner and Vallacher (1986) provide the example of how "moving an arm" while holding a cue stick in the presence of a particular configuration of billiard balls, can generate the higher level identity of "putting the 8 ball in the pocket". Similarly, they offer that "winking" in certain circles can generate the higher level identity of "flirting", "talking" at a football match can generate the identity of "talking in a crowd", and "running" a personal best time may generate the identity "running faster than one did earlier". Vallacher and Wegner also demonstrated this search for meaning experimentally: subjects identifying the act of "participating in an experiment" in low level terms were susceptible to the suggested high level act identity that they were "behaving altruistically" by helping the experimenter, or "behaving selfishly" by earning extra credits (Wegner, Vallacher, Kiersted, & Dizadji, 1986, Experiment 1). They also rated themselves consistently with bogus feedback given to them about their personality (Wegner, et al., 1986, Experiment 2).

People remain engaged in efforts to overcome disruptions to goal-directed behaviour as long as they predict eventual success (Scheier, Carver, & Bridges, 1994). This sometimes requires focus on the 'how to' aspects of an act in order to effectively perform the act, for example when contextual factors disrupt the act. Attention must move down the hierarchy

(Carver & Scheier, 1981). Thus where the act cannot be maintained by the prepotent act identity, a lower level identity is elicited (Vallacher & Wegner, 1987). This is principle 3 of AIT. In a demonstration of this process, subjects instructed to "eat Cheetos" with a pair of chopsticks (thus disrupting a simple act) favoured act identities such as "chewing", "swallowing" and "putting food in my mouth" over identities such as "eating", "reducing hunger" and "getting nutrition". Subjects not instructed to use chopsticks preferred the latter, higher level act identities (Wegner, Connally, Shearer, & Vallacher, 1983, see Vallacher & Wegner, 1987). Likewise, regular coffee drinkers who were instructed to drink coffee from an unwieldy cup gave lower level act identities when describing the act than did those instructed to drink from a normal cup (Wegner, Vallacher, Macomber, Wood, & Arps, 1984). Such results illustrate how the cognitive processes involved in act identification are sensitive to the specific demands of the task, as discussed next.

1.2.3.3 Task Demands

A review of the literature reveals that the automaticity and ease of an act (i.e. individual's proficiency) and the individual's familiarity and practise in the act (i.e. level of experience) can affect act identification level. The psychological distance between the individual and the act and the perspective of the individual can also influence act identification level.

Proficiency and experience. In order to investigate which properties of an act influence the prepotent act identity, Vallacher and Wegner developed the Behaviour Identification Form (BIF, see Vallacher & Wegner, 1989). This forced choice questionnaire instructs respondents to re-label 25 varied and goal-oriented mid level acts with either a low level act identity or a high level act identity (the order of the low level and high level alternatives is counterbalanced to eliminate the potential influence of a serial position response set). Respondents are instructed as follows:

> Any behaviour can be identified in many ways. For example, one person might describe a behaviour as "typing a paper", while another might describe the behaviour as "pushing keys". Yet another person might describe the behaviour as "expressing thoughts". We are interested in your personal preferences for how a number of different behaviours should be described. On the following pages you will find several different behaviours listed. After each behaviour will be two choices of different ways in which the behaviour might be identified. Here is an example:
>
> Attending class

_a. sitting in a chair

_b. looking at the blackboard

Your task is to choose the identification, *a* or *b*, that best describes the behaviour for you. *Simply place a check mark in the space beside the identification statement that you pick. Please mark only one alternative for each pair.* Of course, there are no right or wrong answers. People simply differ in their preferences for the different behaviour descriptions, and we are interested in your personal preferences. Be sure to mark your choice for each behaviour. Remember, choose the description that *you personally believe* is more appropriate in each pair (Vallacher & Wegner, 1989, p662).

Table 1 displays some sample items taken from the BIF which is presented in full in Appendix A.

Table 1: Sample items of the BIF (* = higher level alternative)

6. Chopping down a tree
a. Wielding an axe
b. Getting firewood*
10. Paying the rent
a. Maintaining a place to live*
b. Writing a cheque
25. Pushing a doorbell
a. Moving a finger
b. Seeing if someone's home*

According to Vallacher and Wegner, high level act identities likely to be seen as unanticipated or unpleasant consequences of action were avoided, and high level identities included are goal-like and at least fairly positive in nature. This was because concern centred on the characteristic level at which people attempt to maintain acts. Low level act identities are valid descriptions of the act to overcome the problem of respondents feeling obliged to select meaningful (thus high level) identities. A wide variety of acts were sampled. Of the original 60 items, those with an item-total correlation of .27 or above were selected. The BIF

was found to be internally consistent (Cronbach's alpha = .84) indicating that a single construct is being tapped (whether this construct is act identification or not is unknown). It was also found to have high test-re-test reliability over a 2-week period, r = .96 (Wegner, Gould, & Vallacher, 1983, see Vallacher & Wegner, 1989).

Wegner and Vallacher asked 274 undergraduates to complete the BIF, then by tracking the proportion of high level act identities chosen for each item (i.e. each act), they calculated an average act identity level for each act (Wegner & Vallacher, 1983, see Vallacher & Wegner, 1987). They then asked an unrelated sample of 55 people to rate the 25 acts on 5-point scales for difficulty, familiarity, complexity (i.e. degree to which it consists a variety of means or sub-acts), enactment time and learning time. Low level act identities tended to be selected to the extent that the act was difficult, unfamiliar, complex, required a long time to enact and a long time to learn to do well. These variables were also found to be strongly inter-correlated. Similarly, self-reported experience and proficiency (i.e. increased familiarity, automaticity and ease) with an act (tennis, karate, piano playing, writing, or video gaming) was found to negatively correlate with the likelihood of selecting a low level act identity to describe the act (Vallacher, Wegner, & Frederick, 1981, see Vallacher & Wegner, 1987). This pattern in results has also been observed in a study which did not use the BIF. Highly practised individuals who were asked to perform a coding task gave less detailed accounts of their performance (thus more abstract, higher level meaning) than did those with little practise (Siedel, Stasser, & Collier, 1998).

The finding that more difficult, complex and unfamiliar tasks require lower level identification (than do easier, less complex and more familiar tasks) is intuitive. When faced with an overwhelming problem in life we attempt to break it down into smaller, more manageable constituent tasks. For example, if asked to "submit a thesis" this may be approached by "reviewing the literature", "establishing research questions", "planning the methodology", "collecting the data", "analysing the data", "interpreting the data", "writing the report" and "submitting the report". Similarly, children who are learning to read may be instructed to "break each word down" and focus on the phonetic constituents of the words, rather than the overall story.

Psychological distance and observer perspective. Some of the items of the BIF relate to common acts (e.g. "Locking a door", "Eating"), whereas some may never have been experienced by a lot of people (e.g. "Joining the Army", "Chopping down a tree") or are only likely to be experienced infrequently (e.g. "Taking a test", "Having a cavity filled"). Thus there is variation between items in terms of the psychological distance between the respondent and the item. Psychological distance refers to the likelihood from the directly experienced self in the here and now and can be thought of in terms of time, space, certainty

(e.g. hypothetical versus certain) or social distance (e.g. self versus other, in-group versus out-group, etc). According to construal level theory (see Liberman & Trope, 1998), more psychologically distant acts tend to be identified in a more abstract way as distance reduces the availability of information regarding the sensory and contextual detail (i.e. the 'how to' of the act). Vallacher and Wegner demonstrated the effect of temporal distance by asking subjects to identify what they were doing by "getting married". Those asked over a month before their wedding agreed with higher level act identities of the nature "expressing my love" whereas those asked a day or two before their wedding selected lower level act identities such as "getting a special outfit" (Wegner, Vallacher, & Kelly, 1983, see Wegner & Vallacher, 1986). Caution should be advised in interpreting this result however, as different subjects were used in the different conditions so variables other than psychological distance may have been operating.

It is unclear at present if psychological distance affects whether acts are perceived in the first-person or the third-person. However, perspective has also been found to influence act identification. Libby, Shaeffer and Eibach (2009) demonstrated how subjects who pictured themselves performing the acts of the BIF from a third-person visual perspective (as an observer of oneself) interpreted the acts in a more abstract way (tending to select the high level identity) than those who pictured themselves performing the acts from a first-person visual perspective (who tended to select more low level identities). This relation existed when controlling for act experience.

Implications. In any given situation, various factors (i.e. demands of the task) are influencing act identification. The particular combination of factors, each of which will be differentially increasing or decreasing act identification level, determines the resultant level of meaning with which the act is identified. This complexity is illustrated in Table 2. Crucially, the identity level arrived at is that which is conducive to maximum success in performing the act. For example, an easy act affords high level identification, yet if the act is very unfamiliar to the individual, this will lower the level of identification. Psychological distance and individual perspective also contribute.

Table 2: Factors influencing act identification level (and direction of influence: ↑ = move to higher level; ↓ = move to lower level)

Act automaticity and ease (i.e. individual proficiency)	Individual's familiarity and practise (i.e. experience with the act)	Psychological distance	Perspective
Proficient (↑)	Experienced (↑)	Long (↑)	Third-person (↑)
			First-person (↓)
		Short (↓)	Third-person
			First-person
	Inexperienced (↓)	Long	Third-person
			First-person
		Short	Third-person
			First-person
Unskilled (↓)	Experienced	Long	Third-person
			First-person
		Short	Third-person
			First-person
	Inexperienced	Long	Third-person
			First-person
		Short	Third-person
			First-person

Furthermore, acts do not occur in a social vacuum. In an investigation of social interactions, shared knowledge between communicators was found to override the effect of temporal distance in determining act identity level. Identification was more low level as communicators chose to build on the shared knowledge (Clark & Semin, 2008). When there

was no shared knowledge, identification, as predicted by temporal distance, was more high level as communicators tried to present the gist of the act. Thus the context in which one is acting can influence act identification level.

Optimality. Studies which artificially primed action identification level have found that matching the task demands with the act identification level (i.e. act identification level commensurate with the individual's unique stage of endeavour) improves performance and has psychological implications, as summarised in Table 3.

Table 3: Implications of task demands and act identification level

Act	Individual	Level of act identification	Implications	Rate of discrepancy reduction	Affect
Easy, familiar	Proficient	High i.e. abstract (adaptive)	Maintenance of action over time, increased motivation	Adequate/ high	Normal/ positive
		Low i.e. concrete (maladaptive)	Sensitivity to context interrupts action	Low	Negative
Difficult, unfamiliar	In-experienced	High i.e. abstract (maladaptive)	Action cannot be maintained	Low	Negative
		Low i.e. concrete (adaptive)	Successful task completion due to adequate attention to detail	Adequate/ high	Normal/ positive

For example, subjects instructed to deliver a speech to an easy-to-persuade audience and induced to think about this act in high level terms (rather than low level terms), and those instructed to deliver the speech to a difficult-to-persuade audience and induced to think about this act in low level terms (rather than high level terms), made fewer speech errors and felt more satisfied with their performance (Vallacher, Wegner, & Somoza, 1989). Priming optimal action identification level has also been found to increase motivation for a task. Ferguson and Sheldon (2010) primed lower academic achievers (lower scores on a standardised college entrance examination) to focus on plans for the following day (i.e. low level identification). They found that this was positively associated with an increase in autonomous motivation as indexed by subjective ratings. When they primed lower academic achievers in high level identification (focus on the goal of keeping up with class work), this was negatively associated with an increase in motivation. Priming high academic achievers in high level identification however was positively associated with an increase in motivation. Thus matching action identification level with skill level resulted in improved autonomous motivation.

Maximum success in executing an act, that is, optimum rate of reduction in discrepancy between perceived actual state and desired state, reduces negative affect (Carver & Scheier, 1999). A slow rate of discrepancy reduction increases negative affect as the rate of progress towards goals is sensed as being inadequate. This signals a problematic situation thus an attentional shift to more concrete, low level act identification. People however differ in their ability to automatically shift between different act identities, as well as their habitual level of identification.

1.2.3.4 Individual Differences

Some people exhibit a general tendency towards a higher level of act identification (Vallacher & Wegner, 1989). They resist temptation to search for meaning in the immediate sensory experience, instead persevering with their high level act identifications. Their behaviour is more stable over time and less impulsive. High level identification facilitates goal progress and provides greater available means to attain goals. For example, the "cyclist" may alternatively "jog", "swim" or "work out" in pursuit of the goal "getting exercise". People who favour high level identities are said to have a high level of personal agency. Personal agency resembles the concept of psychological flexibility insofar as it involves persisting or changing behaviour according to what the situation affords and one's personal goals and values (Bond, Flaxman, & Bunce, 2008; Hayes, et al., 1999). Personal agency therefore is likely to be a fundamental quality of psychological flexibility.

High level agents also experience greater across-goal concordance as act identities relate to broader, coherent self-regulatory efforts. For example, the distinct acts "excelling at work" and "avoiding unhealthy foods", when identified in high level terms may both be related to the broader act "exercising self discipline" (Freitas, Clark, Kim, & Levy, 2009). Freitas and colleagues used the BIF and a measure of affect and found that in a sample of undergraduate students, higher overall score on the BIF (i.e. higher level of personal agency as indexed by the number of high level identities selected) correlated significantly with positive affect. This relationship remained when controlling for self-esteem. Crucially however, it was mediated by perceived concordance across ongoing goals. Thus across-goal concordance may facilitate positive affect.

Self-conception. High level agents construe more implications concerning the self in acts. To quote Vallacher and Wegner (1987), "to an appreciable extent, knowledge of what one is like is gleaned from knowledge of what one is doing, has done, or is inclined to do". Thus high level agents are more likely to maintain a continuous and valuable sense of self inferred in acts due to the self-defining potential of high level identification. For example, "creating a piece of art" conveys information about the person behind the act, whereas the low level identity "moving a paintbrush" does not (Vallacher & Wegner, 1987). Indeed, low level agents (as assessed by the BIF) have been found to express less overall certainty when asked to describe themselves, to attach less overall importance to personality traits for self-understanding, and to spontaneously generate self-descriptors that are less trait-like, than their higher level counterparts, when controlling for self-evaluation (Vallacher & Wegner, 1989). Further evidence for a relation between personal agency and self-evaluation style was provided by Freitas, Salovey and Liberman (2001). 112 psychology students completed the BIF to ascertain their level of personal agency. When instructed to imagine an opportunity for a free night of bowling, higher level agents were less interested in bowling with less-skilled mates (as opposed to more-skilled mates), than were low level agents. The authors concluded that high level agents were focussing on the abstract utility of the social interaction (rather than the process of the interaction). While comparing oneself with others of inferior ability can boost self-esteem, it is not particularly informative. However, comparing oneself with others of superior ability, despite having the potential to damage self-esteem, helps one get a better sense of one's skills and how to improve them. This result was replicated with an independent sample of 100 psychology students, when action identification was artificially manipulated by increasing or decreasing psychological distance (by imaging that the bowling was 'tonight' or 'next semester'). Bowling with less-skilled mates was preferred by more proximal participants (i.e. lower level agents). In a third sample of 182 psychology students, higher level agents were more interested in acquiring

feedback regarding their social intelligence which helped them to pinpoint their weaknesses (rather than focusing on their strengths), than were lower level agents. These studies support the notion that high level agents construe implications concerning the self in acts.

Goal failure. A high level of personal agency may not always be beneficial. Watkins (2011) discussed how tendency to adopt high level act identities in the presence of negative affect and limited goal progress, has been associated with depression. When participants were trained to think about positive or negative scenarios in low level terms, they showed reduced emotional reactivity in response to failure on a subsequent anagram task, than when they had been trained to think in high level abstract terms (Watkins, Moberly, & Moulds, 2008). The training condition did not have a direct influence on level of self-focus or mood, rather it modified emotional reactivity. Watkins (2011) also discussed how generalised anxiety (worry as an abstract verbal process), post-traumatic stress disorder (experiential avoidance increasing psychological distance) and social anxiety (adoption of an 'observer perspective') have been associated with a tendency to adopt high level act identities. However, as Watkins noted, much of this evidence was derived from studies with other intentions (e.g. investigation of problem solving, emotional processing, cognitive biases, etc) and sometimes using experimental manipulation of mood in non-clinical samples (rather than observing act identification level in clinical samples). This limits the validity of the results. While clear biases in act identification in various psychological disorders, and directions of causality, cannot be concluded, it is reasonable to consider that personal agency may be a key dimension in psychological health.

Genesis of level of personal agency. The factors underlying the genesis of a high versus low level of personal agency remain largely unknown. Vallacher and Wegner (1989) have noted that among a sample of juvenile detainees, higher level agents (as indexed by the BIF) were more likely to have come from an intact family than were lower level agents. They speculated that a stable family environment may provide a context in which children have the opportunity to develop skills, pursue hobbies and otherwise achieve act competence. In such an environment acts can become more automatic and thus can be construed using more abstract meaning. More recently, Watkins (2011) suggested that individuals can learn over time a relationship between context and act identification if it helps to adaptively respond to circumstances. For example, in the face of task failure, a low level act identity may be negatively reinforced by the removal of distress inherent in more abstract internal attributions and negative self-evaluations. Persistent task failure, such as continual failure to elicit care from a parent, repeated criticism at school, or perceived under-

achievement in supposed life trajectory, may be generalised and lead to the habitual adoption of low level act identities i.e. a lower level of personal agency. The presence of chronic pain may be viewed as a mechanism of persistent task failure insofar as it interferes with everyday activity.

1.3 Current Research

The above literature review has summarised chronic pain as a lived, intensely personal experience encompassing physical, cognitive, socio-political, emotional and existential suffering. Meaning in life has been described as a psychosocial factor important for health maintenance and wellbeing. AIT has been critiqued as a plausible model of the cognitive representation of moment-to-moment action, with state-like and trait-like implications for the level of meaning construed in action.

Despite meaning in life being a vaguely defined construct and AIT an under-researched area, the current research draws together existing knowledge of chronic pain, meaning in life and action identification in a completely novel way in an attempt to better understand the experience of chronic pain. No research to date has considered how people with chronic pain construct meaning in their day-to-day acts.

1.3.1 Action Identification in Chronic Pain

The hypothesised model of how interference to life caused by chronic pain relates to meaning in life and in particular how it can affect the level of meaning construed in action is illustrated in Figure 2. Psychological factors thought to influence the perception and experience of pain are also considered. As this is such a complex model (even when simplified in diagrammatic form) it will be discussed in detail in the following sections.

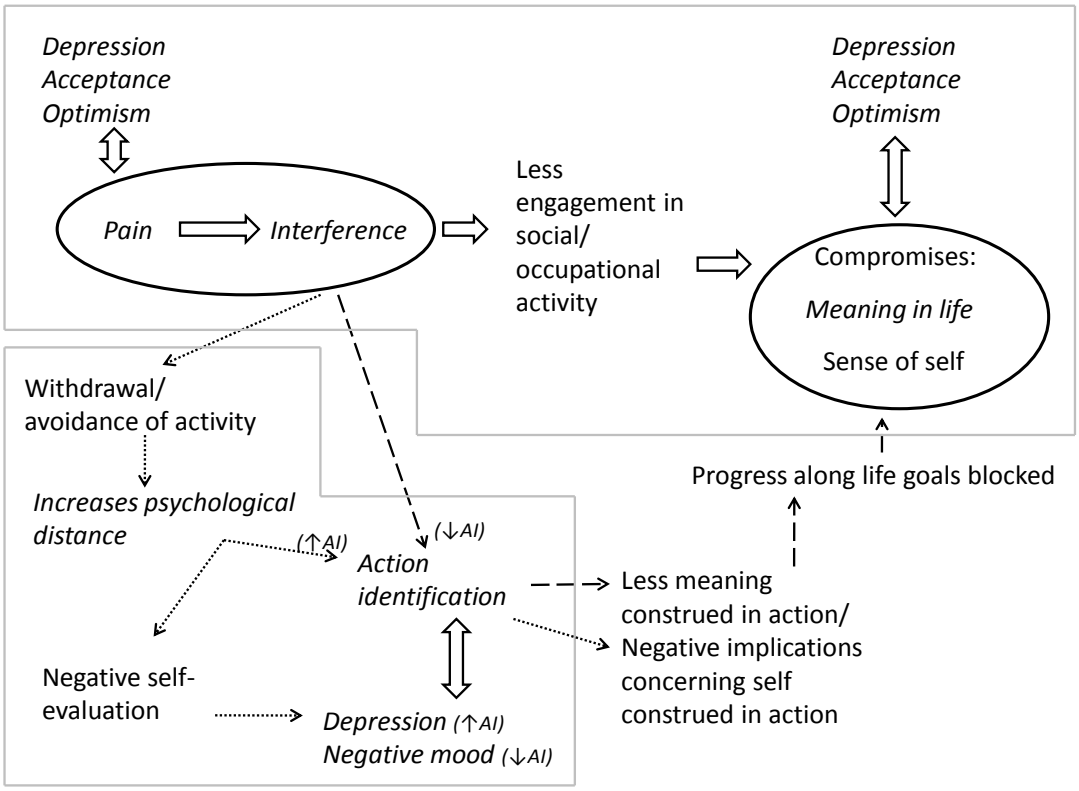


Figure 2: Hypothesised relationship between interference caused by pain and meaning in life; and relationships between interference, action identification and meaning
(Italicised text = variables measured in the current research; ↑*AI* = increase in action identification level; ↓*AI* = decrease in action identification level)

1.3.1.1 Pain and Meaning

The top large box of Figure 2 illustrates how the interference to life caused by pain is linked to diminished engagement in social and occupational activity, which can compromise a person's sense of meaning in life and sense of self. This can have psychological consequences (Morgan & Farsides, 2009a).

Chronic pain is known to interfere with various life activities and subsequent quality of life. In a telephone survey investigating the impact of chronic pain in 15 European countries (including United Kingdom) and Israel, it was found that chronic pain of moderate to severe intensity seriously affects perceived ability to fulfil social and occupational activities (Breivik, Collett, Ventafridda, Cohen, & Gallacher, 2006). A variety of activity domains were investigated including household chores, driving, employment, family relationships, social activities and intimate relationships. Clinical intuition suggests that the personal meaning this holds for a person can influence their sense of self and sense of a changed life. Furthermore, the ability to pursue and attain worthwhile goals is a pre-requisite

of a valued, meaningful life (Morgan & Farsides, 2009a). Chronic pain patients often say things like "I have to keep going otherwise what would be the point in living?" and "If I let the pain stop me I would have no life whatsoever". Those with lowered activity levels (greater perceived interference) thus less contingent rewards in their life (reduced meaning) have also been found to be more likely to develop depressive symptomatology (Rudy, Kerns, & Turk, 1988).

1.3.1.2 Action Identification and Meaning

If people with chronic pain represent a 'psychologically healthy' sample, it can be assumed that their self-regulation is a dynamic, self-correcting and effective process. Based on the principles of AIT, one could hypothesise that the interference to everyday acts caused by chronic pain will result in a tendency to favour low level act identities as awareness of the difficulty with action is apparent. This may initially be adaptive in allowing execution of acts. However, continued low level identification will result in progress along goal-oriented behaviour being blocked and so ability to derive meaning and a continuous and valuable sense of self from activity will be compromised. This relationship is represented by the dashed arrows in Figure 2.

Indeed, common responses to chronic pain (e.g. "the pain is taking over", "the pain belittles you as a person", etc) have been characterised as 'mental defeat' whereby the experience of pain is viewed as an 'enemy' encroaching on identity and self-will (Tang, Salkovskis, & Hanna, 2007). It characterises treatment seeking individuals from non-treatment-seeking individuals with chronic pain. Tang, Goodchild, Hester and Salkovskis (2010) asked 133 working-age adults attending a pain clinic to complete the Pain Self Perception Scale (PSPS, Tang, et al., 2007) to assess mental defeat. Participants also completed measures of pain interference, distress, disability, pain intensity and psychological factors of disability (e.g. catastrophising, worry). As would be predicted based on the current hypothesis, mental defeat was found to correlate strongly with level of interference (when controlling for pain intensity and demographic differences). The authors related mental defeat to the concept of 'self-pain enmeshment' (Pincus & Morley, 2001) in which a person's sense of who they are and what they hope to become can become conditional on the presence or absence of pain. Accordingly, self-pain enmeshment relates to emotional adjustment in chronic pain (Morley, Davies, & Barton, 2005; Sutherland & Morley, 2008). For the purpose of the current research, action identification offers insight into the level of meaning (and thus self-conception) derived in action.

1.3.1.3 Depression and Negative Mood

Co-morbid depressive and anxious disorders are common in chronic pain and can reinforce pain behaviours (i.e. things people do when in pain) and disability (Gatchel, et al., 2007). More intense pain has been associated with greater negative mood (Vendrig & Lousberg, 1997). Negative affect may also result from conflict among goals (Freitas, et al., 2009). For example, the goal of "managing my pain" by avoiding physical exertion (for fear that physical exertion will increase pain), is likely to be at odds with the goal "keeping fit". Depression has also been linked to sense of meaning in life, with positive meaning suggested to negatively correlate with depression in a complex, bi-directional way (Olesovsky, 2003; Owens, et al., 2009; Riichiro & Masahiko, 2006). Furthermore, depression has been associated with an increase in action identification level (Watkins, 2011). Non-clinical negative affect however is thought to signal a problem in act attainment and so lead to a lower level of action identification. The multiple influences of depression and negative mood (on the pain experienced, on sense of meaning in life and on action identification) are represented by the double-headed block arrows in Figure 2.

1.3.1.4 Acceptance

Acceptance of pain constitutes 'pain willingness' i.e. a recognition that strategies aimed at avoiding pain are ineffective; and 'activity engagement' i.e. pursuit of activities in spite of pain (McCracken, Vowles, & Eccleston, 2004). Degree of pain willingness has been found to predict the level of pain interference experienced (Richardson, et al., 2010). Research suggests that overall acceptance is important for emotional adjustment and optimal daily functioning. McCracken (1998) administered the Chronic Pain Acceptance Questionnaire (CPAQ, Geiser, 1992) and other self-report measures of depression, pain-related anxiety and problems in functioning to 160 patients attending a university pain management centre. Greater acceptance of pain was associated with reports of less pain-related anxiety and avoidance, less depression, less physical and psychosocial disability, more daily uptime and better work status. This was independent of level of pain. Similarly, Viane, Crombez, Eccleston, Poppe, Devulder, van Houdenhove and colleagues (2003) found that acceptance predicted mental wellbeing beyond pain severity and catastrophising. In contrast to McCracken's study however, acceptance was not found to predict physical disability. The authors suggested that this may have been due to the generic (rather than pain-specific) physical health scale used being unreliable in the chronic pain population.

As would be expected, treatments promoting flexible and effective daily functioning (i.e. activity engagement) without trying to reduce or change pain (i.e. pain willingness) have been found to be effective in reducing depression, pain-related anxiety, disability and healthcare use, and in improving physical performance (Dahl, et al., 2004; Johnston, et al.,

2010; McCracken, et al., 2005; Vowles & McCracken, 2008; Wicksell, et al., 2008). Improvements have been noted immediately post-treatment and at 3-month follow-up. There is also evidence to suggest that self-help workbooks of this nature improve quality of life in people with chronic pain (Johnston, et al., 2010).

In sum, acceptance is likely to be associated with the pain experienced, as well as sense of meaning in life (double-headed block arrows in top grey box of Figure 2). It is likely to also correlate with depression.

1.3.1.5 Optimism

Optimism can influence pain experienced. A wealth of research already evidences the benefit of dispositional optimism in other areas of health, such as coronary heart disease (Shepperd, Maroto, & Pbert, 1996), head and neck cancer (Allison, Guichard, & Gilain, 2000) and alcoholism (Strack, Carver, & Blaney, 1987). In chronic pain, it may be that 'optimists' cope by mentally disengaging from the pain (Geers, Wellman, Heifer, Fowler, & France, 2008). In support of this, Benyamini (2004) found that 120 elderly arthritis patients who rated themselves high on dispositional optimism reported significantly lower levels of pain and greater use of the pain-coping strategies of diverting attention, reinterpreting pain sensations and ignoring pain sensations. Measures used included the Life Orientation Test (LOT, Scheier & Carver, 1985), the Arthritis Impact Measurement Scale (AIMS2, Meenan, Mason, Anderson, Guccione, & Kazis, 1992) and the Coping with Arthritis Questionnaire (CAQ, Watkins, Shifren, Park, & Morrell, 1999). Optimism is also an important predictor of positive mental health (Halama & Dedova, 2007; Wrosch & Scheier, 2003) and has been found to mediate the relationship between meaning in life and positive mental health (Ho, Cheung, & Cheung, 2010; Krause, 2003). Like acceptance, optimism is likely to be correlated with the pain experienced, sense of meaning in life (double-headed block arrows in top grey box of Figure 2) and depression.

It is worth noting that different research has found the correlation between optimism and pessimism to be positive, negative, or insignificant thus optimism and pessimism are likely to be two distinct constructs rather than bipolar opposites (Benyamini, 2004; Kubzansky, Kubzansky, & Maselko, 2004). They may mediate an illness or state at different phases (Mahler & Kulik, 2000). Only optimism will be considered in the current research.

1.3.1.6 Psychological Distance

Based on the AIT literature it can be assumed that psychological distance affects the relationship between chronic pain interference and action identification level. Withdrawal and avoidance of activity, which increases psychological distance, is often observed in treatment-seeking individuals with chronic pain. Thus it is likely that where there is withdrawal from an activity, this will increase action identification level for that particular

activity. Generalised avoidance of activity may lead to a tendency to favour higher level act identities. However, an associated increased sense of living life in accordance with one's values is not observed. The opposite is true with people reporting a lack of value and meaning in life. Perhaps the tendency for a high level of act identification in the face of persistent avoidance (i.e. task failure) results in an increase in negative meaning, negative self-evaluation and psychological distress (Watkins, 2011). This sequence is captured by the dotted arrows in the bottom left box of Figure 2.

In their review of the current literature, Naufel and Beike (2009) concluded that low level action identification may be necessary for goal initiation by focusing on aspects of feasibility and thereby making ultimate goal attainment more likely. Thus while high level identification is necessary for progress along existing goals, without the necessary focus on feasibility, particularly as pain makes action more difficult, withdrawal from activity and goal failure may be maintained. Exactly how psychological distance may mediate the relationship between pain interference, action identification and meaning and sense of self construed in action, is likely to be a complex process.

1.3.1.7 Summary

The literature suggests that the interference to social and occupational activity caused by chronic pain can affect meaning in life (thus impacts on a person's sense of self). Interference may also be related to meaning in life (more indirectly) via its effects on action identification. The inter-correlated variables depression and negative mood, acceptance of pain, optimism and psychological distance are likely to moderate the relationship between pain interference and meaning in life in various phases. The current research is particularly concerned with the development of a measure of action identification for pain to enable hypotheses regarding action identification and meaning in life in chronic pain to be tested, as summarised in Box 2.

Aim 1. To develop a psychometrically sound measure of action identification in chronic pain.

Aim 2. To use the measure to investigate hypotheses regarding action identification in chronic pain:

- People who are more depressed will favour higher level act identification.
- People who have higher levels of non-clinical negative mood will favour lower level act identification.
- People who withdraw from or avoid activity (i.e. increasing psychological distance) will favour higher level act identification.
- People who experience greater pain interference will favour lower level act identification.

Aim 3. To investigate hypotheses regarding meaning in life in chronic pain:

- People who experience greater pain interference will perceive less meaning in life.
- People who favour higher level act identification will perceive more meaning in life.

Box 2: Research aims and hypotheses

The research provides a cross-sectional insight (each participant's data being collected at one point in time) into the multiple variables which operate. This has the potential to enhance current treatment strategies by providing a better understanding of the link between chronic pain and the way in which people derive a sense of meaning in life (and thus a stable sense of self) via their day-to-day action.

Chapter 2 provides a thorough account of the rationale for and development of a psychometrically sound measure of action identification in chronic pain.

CHAPTER 2: DEVELOPING A MEASURE OF ACTION IDENTIFICATION

2.1 Overview

As discussed in Chapter 1, AIT offers a possible insight into understanding the relationship between chronic pain interference and how people construct meaning in their day-to-day acts. By asking people what they are doing, meaning conferred in everyday action can be revealed. Quantifying a person's responses as high level or low level allows measurement of their tendency level of action identification.

The current chapter describes the development and psychometric evaluation of a measure of action identification suitable for use in a population of people with chronic pain (Research Aim 1).

2.2 Measuring Action Identification in Chronic Pain

Action identification relates to personal meaning, values and qualities, with higher level act identities having greater abstract meaning, being more goal-oriented and holding greater self-defining significance (Vallacher & Wegner, 1987). Acting in accordance with personal attributes and values, and to pursue and attain worthwhile goals, are preconditions for having meaning in life (Reker, 2000). The BIF is an efficient way of measuring action identification level to offer insight into the level of meaning a person construes in action. It reflects a performance setting insofar as non-naturalistic methods can, accepting that only in-vivo methods could accurately represent psychological distance. It has been shown to be an internally consistent scale which measures action identification level consistently over time (Vallacher & Wegner, 1989). As such, use of the BIF seems to be the preferred method for measuring action identification level. Little attention has been given to the potential drawbacks of this however, or to investigation of the extent to which scores on the BIF relate to the broader construct, meaning in life.

Although the BIF was validated in a sample of undergraduate students in the 1980s, some of the items and identities probably lack relevance to this population and other populations nowadays (e.g. "Joining the army", "Chopping down a tree", "Using a yardstick", etc). According to construal level theory, items which lack relevance are perceived as more psychologically distant thus identified in a more abstract way (Liberman & Trope, 1998). There is no reason why abstract identification (i.e. higher level of meaning) in this instance should correlate with sense of living in accordance with personal values to attain worthwhile goals (i.e. meaning in life). In fact, Freitas et al. (2009) in their experiments using the BIF and Steger et al.'s (2006) meaning in life questionnaire (MLQ), found that scores on the BIF were not related to meaning in life, in a sample of undergraduate students. Several items of the BIF may be particularly lacking in relevance for people with chronic pain (e.g. "Painting a room", "Climbing a tree", etc) as the

disablement caused by pain makes many activities very difficult or even thought of as impossible.

One alternative way of measuring the level of meaning construed in action would be to investigate how people talk, for example language used in an extract of conversation about a particular topic. The language would need to be coded as high level meaning, mid level meaning, or low level meaning, perhaps with reference to Vallacher and Wegner's hierarchy of perceived functional asymmetry, whereby a high level act identity is performed *by* performing a mid level identity, which is performed *by* performing a low level identity. For example, "one sees if someone is home *by* pushing a doorbell, and one pushes a doorbell *by* moving a finger" (Vallacher & Wegner, 1987). This would require a lengthy qualitative method of analysis however and it would be difficult to make comparisons between subjects. Results may also be contaminated by regional dialect, evaluation apprehension or the language used by the interviewer.

Another option for measuring the level of meaning construed in action would be to use a sentence completion task in which sentences prime familiar action domains. However, to enable comparison between subjects very specific sentence completion items would be necessary, in which the level of meaning is likely to already have been specified (e.g. "I go to the supermarket to…" would probably generate a response such as "get food" or "buy food"). This would make it impossible to detect variations in action identification level between subjects. If more general sentences were used (e.g. "When I am eating…"), then the generation of unique responses by subjects (e.g. "I use a knife and fork", "I'm enjoying my food", "I'm hungry", etc) would make comparisons between subjects very difficult. Sentences might also prime a single word which would not alter the level of meaning (e.g. "When I am eating…bananas").

Meaning construed in action could be investigated using the Value Implications of Activities technique (VIA, Horley, 2000) whereby participants consider a number of statements concerning personally elicited activities (e.g. "If I were involved in activity *x*, but not activity *y* or activity *z*") and state how each would implicate a pre-determined list of values. Values frequency scores are then calculated. However, this would be a rather abstract, difficult task for participants and would rely on their ability to express the relationship between their goals or values and their actions. Furthermore, it would generate a list of personal values (each endorsed to a greater or lesser degree) rather than an overall level of 'value' or 'meaning', which would make comparison between participants difficult.

The difficulties inherent in these alternative methods of measuring level of meaning construed in action are overcome if a forced choice format is used to allow quantification of responses (like the BIF). However, careful consideration needs to be given to the process of selecting items to ensure they are relevant to most people. Necessity or mundane tasks of

living (e.g. “doing the ironing”) may not necessarily be enjoyable to perform. However, they are relevant to most people. People engage in them as they are necessary for longer-term interests (e.g. “looking presentable”), or for avoiding negative consequences (e.g. “looking scruffy”). They are positive insofar as they relate closely to personal values. These activities also have potential to be disrupted by pain, allowing investigation into the way in which people with chronic pain derive meaning in their day-to-day activities.

2.3 Study 1: Establishing the Item Pool

2.3.1 Introduction

Questionnaires which measure disability and functioning in chronic pain include many items about common tasks of living (Millard, 1991). This makes the content of these questionnaires suitable for use in a questionnaire measure of level of action identification in chronic pain (AIP). The aim of this study was to agree an item pool based on the consensus opinion of a sample of people educated in AIT.

2.3.2 Method

2.3.2.1 Design

This was a questionnaire-based in-house study yielding quantitative and qualitative data. Formal ethical approval was not necessary.

2.3.2.2 Participants

Participants were recruited from the Programme in Clinical Psychology (D. Clin. Psychol.), University of Leeds. All 51 trainees (12 males, 39 females) enrolled on the programme during the data collection period (February to March, 2010) were invited to participate. 25 trainees (49.1%) returned useable data (6 males, 19 females).

2.3.2.3 Data Sources

An extensive literature review of existing measures of disability and functioning in chronic pain was conducted. Relevant measures and appropriate search terms were first identified in the ‘Handbook of Pain Assessment’ (Bradley & McKendree-Smith, 2001). Independent searches using the title terms “pain disability”, “pain functioning”, “measuring pain”, “pain inventory”, “pain index”, “problem inventory”, “sickness impact”, “pain measures”, “limitations profile” and “measuring disability” were then run using two electronic databases in OVID: PsycINFO (1806 to January Week 1 2010) and MEDLINE (1950 to December Week 5 2009). To ensure generalisability of the items, measures which are typically only used in a population with a specific type of pain, or in a population of a specific age, gender or culture, were excluded. Those published in non-English language journals were also excluded. Measures retained therefore were Chronic Illness Problem

Inventory (Kames, Naliboff, Heinrich, & Schag, 1984), Groningen Activity Restriction Scale (Kempen & Suurmeijer, 1990), Pain Disability Index (Pollard, 1984), Sickness Impact Profile (Bergner, Bobbit, Carter, & Gibson, 1981) and West Haven-Yale Multidimensional Pain Inventory (Kerns, Turk, & Rudy, 1985).

As many different mid level item stems as could be derived from items of each questionnaire were generated to resemble the BIF. High level act identities and low level act identities were generated for each mid level stem in accordance with AIT (i.e. hierarchy of perceived functional asymmetry) and again resembling the BIF. The stems and identities were reviewed by the research supervisor who was familiar with AIT. Amendments were made collaboratively. (For a list of the 55 stems and 110 identities generated, see Table 4, page 41).

2.3.2.4 Procedure

All trainees were sent an email inviting them to take part. The email instructed those wishing to participate to read the attached information sheet and then complete the attached questionnaire (and return via email or paper copy). The brief information sheet described the essence of AIT and the 'definitions' of high level identification and low level identification. The questionnaire contained 110 items consisting of each stem followed by either the high level act identity or the low level act identity and then each stem occurring a second time with the remaining identity. Sample items are displayed in Box 3. For each item, participants had to read the stem and identity and then indicate whether they thought the identity was high level or low level. There was also a space beside each item to note any free text comments regarding the appropriateness of, or ease to complete the item. The order in which the high level act identity and low level act identity occurred for each stem was counterbalanced in a second version of the questionnaire.

	High level	Low level	comments
6. Planning social activities _maintaining a social life*	☐	☐	
10. Laughing _expressing myself*	☐	☐	
18. Feeding myself _using a knife and fork	☐	☐	

Box 3: Sample questionnaire items (* = higher level alternative)

2.3.2.5 Data Analyses

Quantitative. The percentage of participants answering an item who rated the identity as the same level as intended by the researcher was calculated for each identity. This was termed the 'agreement score' (i.e. a value between 0.00 and 1.00). Items where both the high level identity and the low level identity had an agreement score of 0.65 or greater were retained for inclusion in the measure (it was thought that 0.65 was a large enough minimum agreement score which also allowed enough items to be retained for future analyses concerning the internal validity and measurement consistency of the measure).

Qualitative. Comments regarding the appropriateness of or ease to complete an item were considered individually.

2.3.3 Results

2.3.3.1 Quantitative

As illustrated in Figure 3, agreement scores were clustered with at least one identity of each item meeting the 0.65 cut-off criterion. Some data points represent more than one item. There appeared to be one outlier which was the high level identity ("removing food waste from crockery") of item number 2 ("Washing dishes"). Table 4 lists the agreement score for each identity of each item. 40 items met the cut-off criterion with both identities. These 40 items were retained for inclusion in the measure.

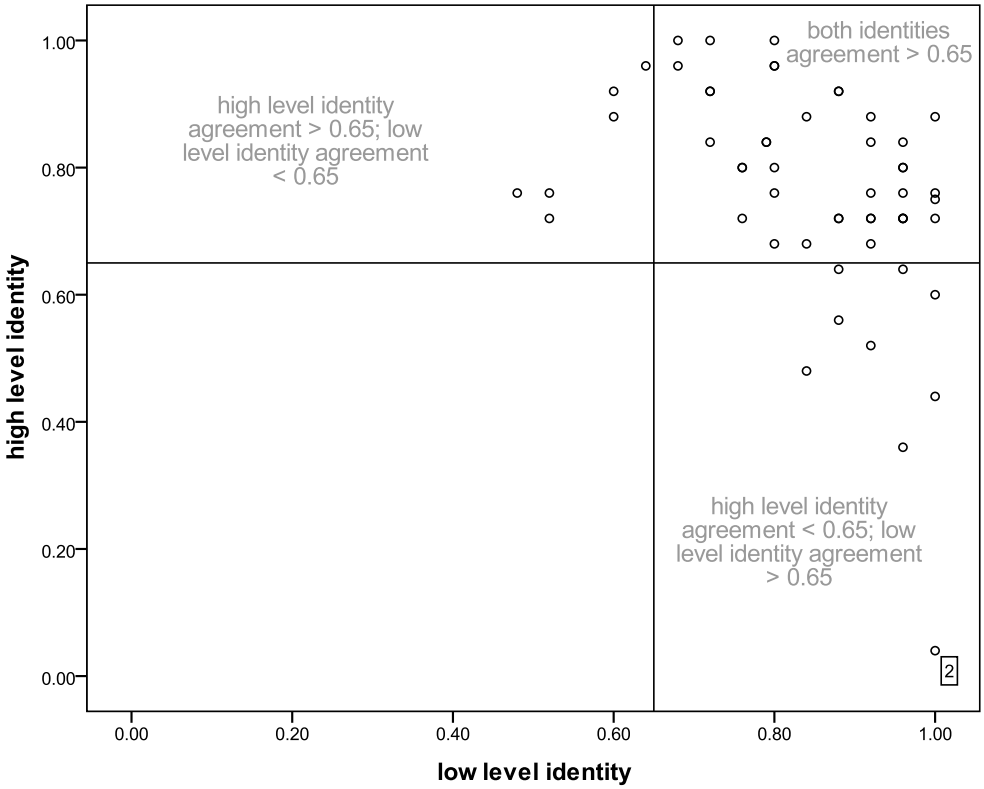


Figure 3: Agreement scores for high and low level identities for each item

Table 4: AIP item stems and identities with agreement scores (shaded items = items removed following analysis)

Item	Stem	High level identity	Agreement score	Low level identity	Agreement score
1	Cleaning the house	showing one's concern for cleanliness	0.88	vacuuming the floor	1.00
2	Washing dishes	removing food waste from crockery	0.04	putting crockery into the sink/dishwasher	1.00
3	Doing chores around the house	maintaining the household	0.84	tidying things away	0.79
4	Joking with family members	maintaining family relationships	0.80	listening and laughing	0.76
5	Taking care of my children or family	ensuring people's happiness	0.96	cooking dinner	0.64
6	Spending time with relatives	providing enjoyment	0.88	sitting with family	0.92
7	Visiting friends	maintaining friendships	0.92	talking to others	0.72
8	Doing favours for other	keeping the family together	0.88	doing a task for someone	0.60

Item	Stem	High level identity	Agreement score	Low level identity	Agreement score
	family members				
9	Going out for entertainment	having fun	0.80	going to the pub	0.80
10	Planning social activities	maintaining a social life	0.92	seeing when everybody is available	0.60
11	Eating out	treating myself	0.88	paying for food	0.84
12	At the cinema	enjoying being entertained	0.80	watching a film	0.76
13	Going to a party or social function	maintaining social networks	0.92	talking to others	0.72
14	Lying down	looking after myself	0.72	being horizontal	0.96
15	Sleeping	restoring my body and mind	0.76	closing my eyes	1.00
16	Maintaining the garden	making the garden look tidy	0.68	pulling up weeds	0.80
17	Mowing the lawn	maintaining the garden	0.84	pushing a mower	0.96
18	Watching TV	being entertained	0.72	watching a screen	1.00
19	Playing cards or other games	spending leisure time	0.76	following rules	0.52
20	Doing leisure time activities	relaxing	0.72	watching TV	0.88

Item	Stem	High level identity	Agreement score	Low level identity	Agreement score
21	Doing the shopping	getting essential supplies	0.75	pushing a supermarket trolley	1.00
22	Using public transport	travelling to a place	0.64	paying a fare	0.88
23	Riding in a car	getting to my destination	0.56	following the road	0.88
24	Using kitchen gadgets	cooking a meal	0.72	cutting up food	0.96
25	Preparing a meal	meeting my nutritional requirements	0.72	peeling vegetables	0.96
26	Working on a needed house repair	taking pride in the house	0.92	using a screwdriver	0.88
27	Washing the car	taking pride in the car	0.84	removing dirt	0.79
28	Going in to town	completing an errand	0.48	following a route	0.84
29	Taking a holiday	having a break from routine	0.72	leaving home	0.76
30	Going to a park or beach	getting some fresh air	0.68	being outside	0.84
31	Washing clothes	keeping my clothes clean	0.60	putting clothes into the machine	1.00
32	Laughing	expressing myself	0.76	making a noise	0.96

Item	Stem	High level identity	Agreement score	Low level identity	Agreement score
33	Bathing myself	making myself clean	0.52	using soap and water	0.92
34	Dressing myself	getting ready to go out	0.72	putting on clothes	0.88
35	Caring for myself	maintaining my wellbeing	0.92	cleaning my teeth	0.88
36	Taking care of business affairs	getting organised	0.72	writing a cheque	0.92
37	Working on a budget	maintaining a lifestyle	0.96	adding up bills	0.68
38	Paying bills	staying out of debt	0.96	handing over money	0.80
39	Listening to other people's problems	showing kindness	1.00	not speaking	0.72
40	Solving problems	finding the best course of action	0.76	thinking	0.48
41	Learning new things	becoming wiser	1.00	remembering instructions	0.68
42	Concentrating	working something out	0.76	watching something	0.80
43	Thinking	coming up with a solution	0.72	using my brain	0.52
44	Being affectionate	showing my love	0.76	holding hands	0.92

Item	Stem	High level identity	Agreement score	Low level identity	Agreement score
45	Walking up and down hills	taking exercise	0.68	putting one foot in front of the other	0.92
46	Writing or typing	communicating	0.96	putting words on a page	0.80
47	Communicating by gestures	emphasising a point	0.84	moving my hands	0.92
48	Carrying on a conversation	sharing thoughts with someone	0.84	talking	0.72
49	Feeding myself	gaining energy	0.80	using a knife and fork	0.96
50	Eating	getting nutrition	0.64	chewing and swallowing	0.96
51	Reading	gaining knowledge	1.00	following lines of print	0.80
52	Walking	transporting myself	0.44	moving my legs	1.00
53	Tidying up	making the house look neat	0.72	putting things away	0.92
54	Cleaning the windows	getting a better view	0.80	using a sponge	0.96
55	Making the bed	tidying the bedroom	0.36	folding sheets	0.96

2.3.3.2 Qualitative

Only 6 participants commented on the appropriateness of, or ease to complete items. 1 participant explicitly commented that an item, "Doing the shopping", was too difficult to answer. However, as this item received high agreement scores well above the cut-off criterion for both identities (0.75 for the high level identity and 1.00 for the low level identity), the item was retained. The most frequent comments were "easy", "hard", "not sure", indicating that participants felt that items differed in terms of their ease to complete, as reflected in the varying agreement scores. One participant commented "cognitive ones more difficult". One participant suggested an alternative high level identity for the item, "Riding in a car". However the decision was taken to discard this item based on the high level agreement score (0.56) falling below the cut-off criterion.

2.3.4 Discussion

A pool of 40 items based on the consensus opinion of 25 D. Clin. Psychol. trainees who had been educated in AIT, was achieved. 40 items is sufficiently large to accommodate a reduction in number following more rigorous analyses of validity and reliability. Very few participants explicitly commented on the quality of these items. Taken with the knowledge that there was very little missing data (most participants had answered every item), it can be assumed that participants did not have any strong objections to the items.

All high level identities are goal-like and at least fairly positive in nature. This is necessary in a measure of action identification where concern centres on the characteristic level at which people attempt to maintain action (Vallacher & Wegner, 1989). On closer inspection, the mid level stem "Washing dishes" could be perceived as higher level than the intended high level identity "removing food waste from crockery". This identity was in fact classed as low level by most participants (agreement score 0.04) and so the item removed from the AIP. It could also be argued that the mid level stem "Maintaining the garden" is higher level than, or equal level to, the intended high level identity "making the garden look tidy". However, this identity received an adequate agreement scores (0.68), therefore the item was retained. It was hoped that any anomalies which had been overlooked in this stage of the analysis would be detected during the following validity and reliability analyses.

Low level identities are valid descriptions of the action which is also necessary to overcome the problem of respondents feeling obliged to select meaningful (thus high level) identities (Vallacher & Wegner, 1989). On closer inspection, it could be argued that the low level identities "vacuuming the floor" (stem "Cleaning the house"), "cooking dinner" (stem "Taking care of my children or family"), "going to the pub" (stem "Going out for entertainment"), "watching TV" (stem "Doing leisure time activities") and "cleaning my

teeth" (stem "Caring for myself") are too specific (being discrete activities in their own right) or too deviant from their stem. One of these items ("Taking care of my children or family") was removed following item analysis. However, as the other items all had very high agreement scores for their low level identities (range 1.00 - 0.80) and no participants commented that these identities were not suitable, the decision was taken to retain these items.

The item pool was established based on a readily available sample who had received an information sheet explaining the essence of AIT and the 'definitions' of high level identification and low level identification. As the sample were non-experts in the theory it is possible that they were making inaccurate judgements, which limits the validity of the items. However, the sample were all university graduates, the 'definitions' of high level and low level were based on the simple 'why you are acting' versus 'how you act' distinction (see Vallacher & Wegner, 1985) and it was anticipated that judgements would be made relative to the mid level item stems rather than requiring in depth consideration or detailed knowledge of AIT. Therefore it is unlikely that the sample misinterpreted the essence of AIT and high level and low level identification, or struggled with the task. Furthermore, even if experts in AIT had been recruited, their judgements would be somewhat subjective and relative as Vallacher and Wegner do not provide concrete definitions of high level and low level identification.

The sample consisted of predominantly female trainees enrolled on the D. Clin. Psychol. programme at the University of Leeds. It is unknown whether action identification relates to gender or academic achievement, though in their analysis of the BIF, Vallacher and Wegner (1989) found no differences in action identification between males and females, or between undergraduate students, university employees, gynaecology outpatients and juvenile detainees. A literature search revealed that gender-specific differences in the interaction between social anxiety and negative self-evaluation, when manipulating action identification level, have been observed (Ritts & Patterson, 1996), however no research exists which directly investigates how gender relates to action identification. Differences in level of action identification among college 'seniors' in different academic majors have also been found (Bishop, Thomas, & Peper, 2000), though this study is the only one of its kind.

Importantly, all items were adapted from existing measures of disability and functioning in chronic pain. For this reason it is unlikely that gender and academic biases (if they were to exist) have significantly reduced the suitability of the item pool for use in a population of people with chronic pain. All items concern common activities which are relevant to most people. The item pool was also reviewed by a number of health service users present at a research interest group. They commented that the items were suitable and

easy to complete and encouraged the continued development and validation of the AIP, which was the focus of Study 2.

2.4 Study 2: Item Analysis

2.4.1 Introduction

To be able to deduce that all items of a questionnaire are indicators of the same underlying construct (whether that be level of meaning construed in action or not), the items must display common variance. The underlying construct may or may not be heterogeneous, consisting several components. The aims of this study therefore were to select the set of items of the AIP which reflect a common, underlying construct and to investigate the dimensionality of this construct.

2.4.2 Method

2.4.2.1 Design

This was a questionnaire-based study yielding quantitative data. Ethical approval was provided via the Leeds Institute of Health Sciences and Leeds Institute of Genetics, Health and Therapeutics (LIHS/LIGHT) joint ethics committee on 22nd June 2010 (see Appendix B for approval letter).

2.4.2.2 Participants

Undergraduate students studying at the University of Leeds were recruited from the Faculty of Arts (*n* = 78), Faculty of Biological Sciences (*n* = 9), Faculty of Business (*n* = 3), Faculty of Education, Social Sciences and Law (*n* = 1), Faculty of Engineering (*n* = 1), Faculty of Mathematics and Physical Sciences (*n* = 157), Faculty of Medicine and Health (*n* = 1) and Faculty of Performance, Visual Arts and Communications (*n* = 19). A total of 269 undergraduate students (104 males, 165 females) returned useable data during the period September to October, 2010. Most participants had English as a first language (*n* = 245) and were aged between 18 years and 23 years old (*n* = 260). As an incentive for participation, the first 50 respondents were awarded 100 university printer credits.

2.4.2.3 Procedure

Following liaison with Faculty Deans and Heads of Schools, undergraduate students of participating Schools were sent an email (from their course administrator) inviting them to participate. The email instructed those wishing to participate to follow the online link to the study on Bristol Online Survey (BOS, 2006). Where email was not permitted, posters advertising the study and web address were displayed in participating Schools.

Having entered the website, participants were presented with the ethics-approved information page and a consent page. They were then asked to provide some basic demographic data (age, gender, faculty under which they studied and whether English was their first language). They were then taken to an instructions page which read as follows:

> "Any behaviour can be identified in many ways. For example, one person might describe a behaviour as "pushing a doorbell", while another might describe the behaviour as "moving a finger". Yet another person might describe the behaviour as "seeing if someone's home". We are interested in your personal preferences for how a number of different behaviours should be described. On the following page you will find several different behaviours listed. After each behaviour will be two choices of different ways in which the behaviour might be identified. Here is an example:
>
> 1.Attending class
>
> sitting in a chair
> learning new information
>
> Your task is to choose the identification that best describes the behaviour for you. *Simply check the space beside the identification statement that you pick. Please mark only one alternative for each pair.* Of course, there are no right or wrong answers. People simply differ in their preferences for the different behaviour descriptions, and we are interested in your personal preferences.
> Make sure you mark your choice for each behaviour. Remember, choose the description that *you personally believe* is more appropriate in each pair."

Once participants clicked continue, they were taken to the AIP (see Appendix C). They were given the opportunity to supply their university ISS username for the purpose of awarding printer credits. The final page was a thank you page which indicated that participation was complete.

2.4.2.4 Data Analyses

BOS automatically recorded each participant's responses. There were no missing values. For each item, the high level identity was scored 1 and the low level identity scored 0. A total action identification score for each participant was calculated by summing their response choices. Summary statistics were obtained for the dataset. Responses were then

subjected to an internal consistency analysis using the "Reliability analysis" routine of a statistical software package (PASW statistics 18, IBM, 2009). Internal consistency reflects the extent to which items inter-correlate with one another thus indicating a common underlying construct (Spector, 1992). Item-total coefficients for each item are calculated. The average of the correlations between every possible combination of split halves is also calculated. This is known as coefficient alpha (Cronbach, 1951).

A principal component analysis using the "Factor" routine with an oblique rotation (allowing correlation between factors as many variables influence action identification) was also conducted. Principal component analysis is a psychometrically sound procedure for investigating linear components (i.e. factors) existing in data and how items contribute to these components (Field, 2000). Internal consistency and principal component analyses are commonly used in scale construction (Spector, 1992). They assume normality of the dataset.

2.4.3 Results

Table 5 lists the percentage of participants who selected each identity for each item. For the majority of items, at least 20.0% of participants had selected each identity. Exceptions were "Doing the shopping" (low level = 9.7%), "Taking a holiday" (low level = 14.5%), "Laughing" (low level = 10.4%), "Taking care of business affairs" (low level = 6.3%), "Doing leisure time activities" (low level = 16.0%), "Listening to other people's problems" (low level = 7.4%), "Being affectionate" (low level = 11.9%), "Going out for entertainment" (low level = 12.3%), "Concentrating" (low level = 7.4%) and "Caring for myself" (low level = 12.3%). For these 10 items it was the high level identity which tended to be selected.

Table 5: Percentage of participants who selected each identity for each item of AIP

Stem	High level identity	Percentage	Low level identity	Percentage
Cleaning the house	showing one's concern for cleanliness	27.5	vacuuming the floor	72.5
Writing or typing	communicating	37.5	putting words on a page	62.5
Joking with family members	maintaining family relationships	27.5	listening and laughing	72.5
Visiting friends	maintaining friendships	58.7	talking to others	41.3
At the cinema	enjoying being entertained	22.3	watching a film	77.7
Communicating by gestures	emphasising a point	58.4	moving my hands	41.6
Lying down	looking after myself	39.0	being horizontal	61.0
Maintaining the garden	making the garden look tidy	76.2	pulling up weeds	23.8
Watching TV	being entertained	66.2	watching a screen	33.8
Doing the shopping	getting essential supplies	90.3	pushing a supermarket trolley	9.7
Using kitchen gadgets	cooking a meal	78.1	cutting up food	21.9

Stem	High level identity	Percentage	Low level identity	Percentage
Paying bills	staying out of debt	39.8	handing over money	60.2
Preparing a meal	meeting my nutritional requirements	51.3	peeling vegetables	48.7
Working on a needed house repair	taking pride in the house	55.4	using a screwdriver	44.6
Washing the car	taking pride in the car	38.3	removing dirt	61.7
Taking a holiday	having a break from routine	85.5	leaving home	14.5
Going to a party or social function	maintaining social networks	42.4	talking to others	57.6
Eating out	treating myself	77.0	paying for food	23.0
Doing chores around the house	maintaining the household	39.0	tidying things away	61.0
Laughing	expressing myself	89.6	making a noise	10.4
Dressing myself	getting ready to go out	55.4	putting on clothes	44.6

Stem	High level identity	Percentage	Low level identity	Percentage
Going to a park or beach	getting some fresh air	50.2	being outside	49.8
Taking care of business affairs	getting organised	93.7	writing a cheque	6.3
Spending time with relatives	providing enjoyment	30.9	sitting with family	69.1
Doing leisure time activities	relaxing	84.0	watching TV	16.0
Listening to other people's problems	showing kindness	92.6	not speaking	7.4
Learning new things	becoming wiser	78.1	remembering instructions	21.9
Working on a budget	maintaining a lifestyle	59.9	adding up bills	40.1
Being affectionate	showing my love	88.1	holding hands	11.9
Walking up and down hills	taking exercise	76.2	putting one foot in front of the other	23.8
Sleeping	restoring my body and mind	64.3	closing my eyes	35.7
Carrying on a conversation	sharing thoughts with someone	61.3	talking	38.7

Stem	High level identity	Percentage	Low level identity	Percentage
Feeding myself	gaining energy	77.0	using a knife and fork	23.0
Reading	gaining knowledge	78.4	following lines of print	21.6
Tidying up	making the house look neat	60.6	putting things away	39.4
Going out for entertainment	having fun	87.7	going to the pub	12.3
Mowing the lawn	maintaining the garden	50.9	pushing a mower	49.1
Concentrating	working something out	92.6	watching something	7.4
Caring for myself	maintaining my wellbeing	87.7	cleaning my teeth	12.3
Cleaning the windows	getting a better view	39.4	using a sponge	60.6

As illustrated in Figure 4, total action identification scores were assumed to be normally distributed (Kolmogorov-Smirnov test statistic .051, $p > .05$).

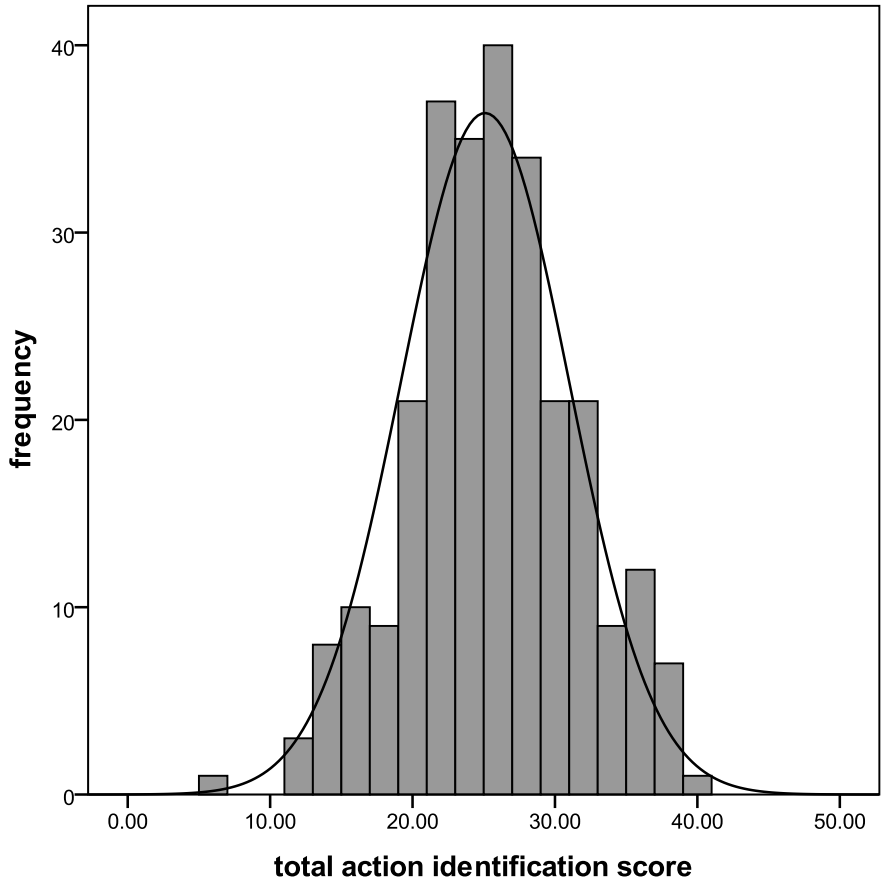


Figure 4: Histogram illustrating normal distribution of total action identification scores

Mean total action identification score (0 – 40) was 25.09 (minimum = 6.00, maximum = 40.00, *SD* = 5.90). The distribution in male scores and the distribution in female scores were assumed to be normal (Kolmogorov-Smirnov test statistics .077, $p > .05$ and .042, $p > .05$ respectively). There was no significant difference ($t_{(267)} = -0.897$, $p = .371$) in mean total action identification score between males ($n = 104$, $M = 24.68$, $SD = 6.26$) and females ($n = 165$, $M = 25.36$, $SD = 25.35$).

Item-total statistics and Cronbach's α are displayed in Table 6. Generally item-total correlations were small (range = .153 - .413) indicating that the scale is not unidimensional. Nunnally (1978) suggests that alpha should be at least .7 for a scale to demonstrate internal consistency, therefore Cronbach's α (.803) indicates that the AIP has satisfactory internal consistency.

Table 6: AIP internal consistency analysis item-total statistics

Cronbach's α .803 (n = 40)		
	Item-total correlations	Cronbach's α if item deleted
Cleaning the house	.310	.797
Writing or typing	.220	.801
Joking with family members	.315	.797
Visiting friends	.228	.800
At the cinema	.332	.797
Communicating by gestures	.333	.796
Lying down	.264	.799
Maintaining the garden	.161	.802
Watching TV	.313	.797
Doing the shopping	.220	.800
Using kitchen gadgets	.153	.802
Paying bills	.247	.880
Preparing a meal	.298	.798
Working on a needed house repair	.371	.795
Washing the car	.312	.797
Taking a holiday	.224	.800
Going to a party or social function	.262	.799
Eating out	.313	.797
Doing chores around the house	.324	.797
Laughing	.299	.798
Dressing myself	.209	.801
Going to a park or beach	.155	.803
Taking care of business affairs	.304	.799
Spending time with relatives	.317	.797
Doing leisure time activities	.222	.800
Listening to other people's problems	.217	.800
Learning new things	.275	.799
Working on a budget	.358	.795
Being affectionate	.221	.800
Walking up and down hills	.201	.801
Sleeping	.404	.794

Carrying on a conversation	.321	.797
Feeding myself	.399	.794
Reading	.256	.799
Tidying up	.203	.801
Going out for entertainment	.193	.801
Mowing the lawn	.413	.793
Concentrating	.212	.801
Caring for myself	.222	.800
Cleaning the windows	.309	.797

As item-total correlations were all small (many less than 0.3 and nearly all less than 0.4), there were no single items immediately obvious to revise or discard. However, different criteria for excluding items were considered to see if remaining item-total correlations were improved. When the 4 items with item-total correlations less than 0.2 were excluded from the analysis, α (.801) and item-total correlations (range = .187 - .409) were relatively unchanged. When all items with item-total correlations less than 0.3 were removed from the analysis, α decreased but remained satisfactory (.737) and item-total correlations did not improve significantly (range = .210 - .401). Therefore, all 40 items were retained.

An overall Kaiser-Meyer-Olkin (KMO) statistic of .712 (and individual item statistics all exceeding .500) indicated that the data was likely to factor well (Kaiser, 1974). Bartlett's Test of Sphericity was highly significant ($p < .001$) thus the correlation matrix was not an identity matrix indicating that there was some relationship between the items and principal component analysis was appropriate. Kaiser's recommended criterion of retaining all factors with eigenvalues greater than 1was used (Kaiser, 1960). The existence of one primary factor with an eigenvalue of 4.83 and 13 minor factors (eigenvalue range = 2.29 - 1.04) were revealed. 23 of the 40 items had their highest loading on the primary factor and all other items also had positive loadings on this factor (0.18 - 0.38). A direct oblimin rotation failed to provide an alternative solution in 25 iterations. Table 7 lists the final factor loadings on the primary factor and minor factors.

Table 7: Final factor loadings on primary factor and minor factors

		Minor factors												
Item	Primary factor	1	2	3	4	5	6	7	8	9	10	11	12	13
Cleaning the house	.374	-.283	-.005	-.044	.198	-.292	.239	-.277	.089	.013	.274	-.015	-.133	.075
Writing or typing	.260	-.279	.346	.079	-.143	-.019	.227	-.093	.067	.297	.191	-.198	-.169	-.232
Joking with family members	.370	-.282	.063	.150	-.030	-.327	.026	.190	.263	-.250	-.084	.035	.050	-.172
Visiting friends	.283	-.222	-.241	-.035	.041	-.098	.020	.413	.516	.063	.188	-.034	-.049	-.070
At the cinema	.401	-.315	.064	-.153	-.128	.025	-.141	-.142	-.097	.176	-.166	-.080	-.313	.088
Communicating by gestures	.397	-.122	.311	.069	-.113	-.070	.388	.021	-.261	.083	-.084	-.142	.003	.179
Lying down	.313	-.223	.236	.245	.091	.017	.186	.131	.119	-.367	-.020	-.084	.226	-.202
Maintaining the garden	.219	.142	.005	-.122	.519	.048	.137	.324	-.368	-.013	.028	.097	-.075	.114
Watching TV	.376	-.001	.455	-.099	.047	.173	.128	.232	-.071	-.162	-.061	-.055	-.214	-.213
Doing the shopping	.287	-.011	-.363	-.011	.312	.002	.183	-.217	-.215	-.238	.090	.082	-.173	-.053
Using kitchen gadgets	.210	.218	.378	-.080	-.114	-.191	.099	-.268	.061	.196	-.225	.159	.165	-.099
Paying bills	.313	-.069	.105	-.331	-.107	.012	-.230	.019	-.044	-.073	.147	-.065	-.200	.009
Preparing a meal	.369	-.316	-.134	-.134	-.211	-.123	.258	-.138	-.039	-.170	-.072	.242	.030	.159
Working on a needed house repair	.461	.083	.120	-.312	.121	-.026	-.150	-.045	-.089	-.051	.258	.229	-.020	-.228
Washing the car	.369	-.136	.116	.086	.019	.075	-.240	-.021	.014	.304	-.166	.311	.206	-.121

Item	Primary factor	Minor factors												
		1	2	3	4	5	6	7	8	9	10	11	12	13
Taking a holiday	.282	.257	.259	-.023	-.272	.348	-.182	-.048	.173	-.110	.113	.337	-.031	.089
Going to a party or social function	.326	-.273	-.337	.042	-.019	.060	.039	.319	.213	.306	.001	.206	.019	.128
Eating out	.380	.282	.221	.246	.091	-.052	-.177	-.158	.054	-.019	.247	-.030	-.197	.242
Doing chores around the house	.391	-.273	-.167	-.330	.192	.115	-.214	.071	-.150	.063	.173	-.243	.247	-.054
Laughing	.366	.118	-.139	.423	.002	-.137	.048	.048	-.232	.290	-.171	.125	-.177	-.119
Dressing myself	.251	.032	.255	.440	.173	.009	-.238	.084	-.093	-.223	-.225	-.254	.103	.023
Going to a park or beach	.180	-.142	.167	.360	-.158	.303	.004	-.019	-.072	-.099	.310	.193	-.050	.179
Taking care of business affairs	.385	.371	-.029	.027	.046	.093	.259	.147	.123	-.061	.087	.269	-.182	.007
Spending time with relatives	.390	-.145	-.199	.090	-.348	.330	-.174	-.174	.138	.033	.033	-.216	-.119	.023
Doing leisure time activities	.306	.442	-.187	-.004	-.096	-.156	-.099	-.127	-.011	-.283	.050	.073	.059	.076
Listening to other people’s problems	.291	.457	-.169	.071	-.056	-.039	-.180	.142	-.062	.162	-.142	-.048	-.079	-.261
Learning new things	.358	.353	-.123	-.014	-.307	-.146	.166	.181	-.356	.158	.256	-.161	.118	-.129
Working on a budget	.430	-.123	-.166	.232	-.111	-.182	-.005	.113	-.156	.054	.126	-.125	.118	.321
Being affectionate	.291	.331	.028	-.318	.140	.329	-.005	.115	.109	.033	-.119	-.266	-.061	.206
Walking up and down hills	.260	.331	-.062	.361	.353	.084	-.012	-.089	.372	.101	.060	-.191	-.100	.018
Sleeping	.493	-.015	-.047	-.157	-.015	.373	.236	-.126	.077	-.003	-.179	-.282	.184	.007
Carrying on a conversation	.408	-.098	-.117	-.028	-.203	-.012	-.080	.273	-.100	-.027	-.424	.090	-.222	.148
Feeding myself	.489	-.123	-.204	-.089	.036	.167	.093	-.180	.033	-.305	-.285	.128	.100	.014

		Minor factors												
Item	Primary factor	1	2	3	4	5	6	7	8	9	10	11	12	13
Reading	.325	.157	-.073	.044	-.415	-.171	-.234	.208	-.114	-.256	.173	-.102	.214	-.048
Tidying up	.243	-.226	.047	.185	.214	.289	-.116	-.110	-.170	.222	.156	.153	.418	.107
Going out for entertainment	.257	.256	.056	-.076	.059	-.402	-.020	-.185	.202	.060	-.132	-.110	.117	.402
Mowing the lawn	.489	-.041	.177	-.106	.370	-.183	-.276	.078	.052	.080	-.081	.100	.083	-.014
Concentrating	.282	.393	.114	-.306	-.115	-.066	.291	.021	.205	.160	.051	.027	.263	-.010
Caring for myself	.301	.199	-.411	.212	.007	.176	.197	-.317	-.002	.030	-.051	-.025	.048	-.316
Cleaning the windows	.384	-.154	-.070	-.101	.047	-.244	-.350	-.339	-.032	-.026	-.008	-.066	-.106	-.198

All loadings on the primary factor were relatively small therefore it was not immediately obvious that specific items should be removed. Some of the items which had their highest loading on a minor factor also had loadings on the primary factor which were comparable to the average loading for the primary factor. Thus there was no rationale for removing the items which did not have their highest loading on the primary factor. As discussed in Chapter 1, variables such as individual proficiency in an act, familiarity with an act and complexity of an act, among many others, influence action identification level (Vallacher & Wegner, 1987). The existence of numerous additional sources of identity level variance offers a plausible explanation for why multiple factors were revealed, why some items did not load most strongly on the primary factor, why cross loadings were evident and why factors did not have many strong loadings. These numerous sources of identity level variance are important components of AIT, which offered a further argument in favour of retaining all items. It was hoped that this would guard against the scale being overly narrow.

2.4.4 Discussion

The internal consistency of the AIP was found to be satisfactory as indexed by Cronbach's α, suggesting that all items reflected a common, underlying construct. Thus all 40 items of the AIP were retained. This does not ensure unidimensionality of the AIP however. The principal component analysis revealed one primary factor and 13 minor factors. Taken together, these results may be interpreted as the AIP being a scale which reliably measures level of meaning construed in action, but that additional sources of identity level variance (e.g. individual proficiency, familiarity with the act, action complexity, etc) influence action identification level for individual items (see Vallacher & Wegner, 1987).

For 10 of the items, the low level identity was selected by less than 20.0% of participants. Whether this is indicative of these identities lacking relevance to undergraduate students, or being too low level, or the high level alternatives being particularly relevant, is unknown. However, as the low level identities of these 10 items were still selected by more than 5.0% of participants, the items were retained in the AIP.

It is acknowledged that the sampling strategy was non-random and the sample was not representative of a population of people with chronic pain for which the AIP is intended. However, recruiting self-selecting undergraduate students from participating Schools to complete the online survey was practical and cost-effective. It would not have been feasible to obtain such a large sample size from a population of people with chronic pain. The sample size of 269 was deemed adequate as it exceeded the 100 - 200 respondents suggested for testing the internal consistency of a scale (Spector, 1992) and was close to the 'rule-of-thumb' that a sample of 300 will provide a stable factor solution (Field, 2000).

There were more female participants (n = 165) than male participants (n = 104). However, no significant difference in mean total action identification score between males and females was detected. This result is consistent with Vallacher and Wegner's (1989) analysis of the BIF and provides preliminary evidence that gender does not directly affect action identification. As most participants were recruited from the Faculty of Mathematics and Physical Sciences, it is not possible to test for any effect of academic preference based on the current sample. Similarly, as most participants were aged between 18 and 23 years old, it is not possible to test for any effect of age on action identification. Importantly however, the primary objective of demonstrating internal consistency was achieved. Study 3 concerns the measurement consistency over time of the AIP.

2.5 Study 3: Reliability Analysis

2.5.1 Introduction

In order for a scale to prove reliable, measurement consistency over time must be demonstrated. The aim of this study therefore was to demonstrate measurement consistency of the AIP empirically.

2.5.2 Method

2.5.2.1 Design

This was a questionnaire-based study yielding quantitative data. Ethical approval was provided via the Leeds Institute of Health Sciences and Leeds Institute of Genetics, Health and Therapeutics (LIHS/LIGHT) joint ethics committee on 22nd June 2010 (see Appendix B for approval letter).

2.5.2.2 Participants

Postgraduate students were recruited from the Leeds Institute of Health Sciences, University of Leeds. As an incentive for participation, they were entered into a prize draw with the chance of winning 1 £10 gift voucher or 1 of 2 £5 gift vouchers. 36 postgraduate students initially participated however 5 dropped out part way through. Data was collected during the period October 2010 to February 2011.

2.5.2.3 Procedure

Following liaison with Course Directors, postgraduate students were approached either via email from their course administrator, or via the researcher canvassing during a scheduled teaching session. Those who wished to participate were given the ethics-approved information sheet and consent form and instructed to complete the AIP (where this was done electronically, submission was via email). Instructions were the same as for Study 2. Participants were also asked to provide their university email address so that they could be

emailed (by the researcher) 2 weeks later and asked to complete the AIP electronically a second time.

2.5.2.4 Data Analyses

For each item, the high level identity was scored 1 and the low level identity scored 0. A total action identification score for each participant at each time was calculated by summing their response choices, with rounded average ratings used where there were missing values (there were only 3 missing values in the dataset). Summary statistics were obtained for the entire dataset. The AIP was then investigated for test-retest reliability using the "Correlate" routine of PASW. Test-retest involves matching scores across 2 administrations to the same respondents and calculating Pearson's correlation coefficient. Pearson's coefficient is a commonly used statistic in scale construction (Spector, 1992). It requires parametric data because it is based on the average deviation from the mean (Field, 2000).

2.5.3 Results

The mean length of time between the two administrations of the AIP was 18.39 days (minimum = 13.00 days, maximum = 67.00 days, *SD* = 12.23), with the majority of participants having completed their participation within 2 to 3 weeks (n = 28). The satisfactory internal consistency of the AIP found in the previous study was replicated in this sample (Cronbach's α at time 1 = .817, Cronbach's α at time 2 = .882).

Normality of data was assumed (Kolmogorov-Smirnov test statistic time 1 = .149, $p > .05$, n = 36; Kolmogorov-Smirnov test statistic time 2 = .128, $p > .05$, n = 31). The scatter plot in Figure 5 shows a positive trend between total action identification score at time 1 and total action identification score at time 2, with one potential outlier (participant number 2). Some data points represent more than one participant.

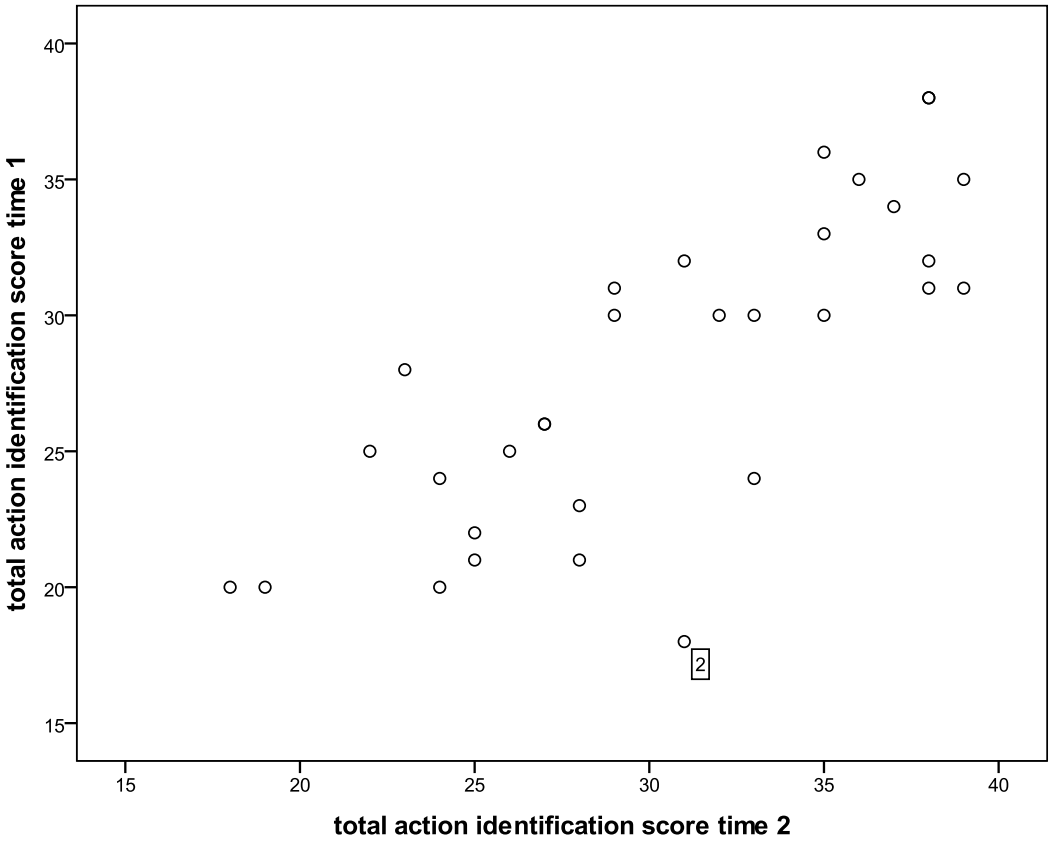


Figure 5: Total action identification scores at times 1 and 2

A test-retest analysis (using listwise deletion i.e. removal of cases where participants had dropped out part way through the study) revealed that the positive correlation between total action identification score at time 1 and total action identification score at time 2 was significant as indicated by Pearson's *r* at .788 ($p < .001$, $n = 31$). Pearson's *r* was not altered significantly when controlling for test-retest time ($r = .787$, $p < .001$) and increased slightly when the potential outlier was removed from the analysis ($r = .838$, $p < .001$, $n = 30$).

2.5.4 Discussion

The AIP displayed satisfactory test-retest reliability over a 2 to 3 week period as indicated by Pearson's *r*. This suggests that the AIP was consistently measuring level of meaning construed in action over time.

There are a number of limitations of the current study. First, the sample size was small which raises the possibility that people with a more stable level of action identification were disproportionately represented. However, there is no known reason why the current self-selecting sample should differ from the wider population. Second, many of the postgraduate courses at the Institute of Health Sciences involve a research component and so many participants were likely to have been familiar with the aims of a test-re-test protocol, even though this was not made explicit to them. It is unknown whether participants were

consciously attempting to replicate their responses from time 1, at time 2. Third, 2 to 3 weeks is a relatively short period of time and reliability may be expected to drop over a longer period, say 3 months. Nevertheless it can be concluded that the aim of the study was achieved insofar as a rough estimate of the test-retest reliability of the AIP was achieved.

2.6 General Discussion

The AIP is a promising measure of level of meaning construed in action. The wide variety of daily tasks included makes it suitable for use in a population of people with chronic pain. Content validity is built into the AIP by virtue of the items being derived following a systematic review of existing measures of disability and functioning in chronic pain, and the design being in accordance with AIT and the BIF. The AIP has satisfactory internal consistency and test-retest reliability. All items are thought to measure the same construct consistently over time.

The fact that the principal component analysis revealed the existence of minor factors is not surprising given that many additional factors (e.g. action familiarity, individual practise, action ease, psychological distance etc) influence action identification (Vallacher & Wegner, 1987). Nor is this problematic when using the AIP alongside other measures intended to assess how people feel and behave at a specific point in time.

Convergent validity means that different measures of the same construct relate strongly (Spector, 1992). The convergent validity of the AIP was not investigated. Future studies could involve comparing scores on the AIP with scores on the BIF to investigate the convergent validity. Caution in interpreting results is advised however as no alternative measures of tendency level of action identification using a different format to the AIP or BIF exist, nor is the BIF particularly well established as a general standard to which comparisons can be made.

The next chapter focuses on the method of application of the AIP in an investigation of how the interference to action caused by chronic pain affects level of meaning construed in action and overall sense of meaning in life (Research Aims 2 and 3).

CHAPTER 3: MAIN STUDY METHOD

3.1 Overview

A psychometrically sound measure of action identification (AIP) has been developed. The current chapter discusses the method used to investigate whether chronic pain interference and action identification level relate to meaning in life in chronic pain. Other variables also thought to associate with pain, action identification level and meaning in life were also measured.

3.2 Design

A cross-sectional design was used. Data were collected via interview-style administration of questionnaires. This method was chosen to limit non-response errors, miss-understanding and reticence, yet still obtain quantitative data to maintain objectivity and facilitate data analysis (Harris & Brown, 2010). Data were statistically analysed using multivariate analyses. Ethical approval following amendment was granted by the National Research Ethics Service (NRES), Leeds (East) Research Ethics Committee on 1st November 2010 (see Appendix D for approval letter and Appendix E for amendment approval letter). Research Management and Governance approval was granted by The Leeds Teaching Hospitals NHS Trust (LTHT) on 3rd November 2010 and NHS Leeds on 10th November 2010.

3.3 Participants

3.3.1 Inclusion and Exclusion Criteria

Inclusion criteria were (1) diagnosis of a chronically painful condition of duration greater than 6 months, (2) age 18 years and over, and (3) fluent in the English language. Exclusion criteria were (1) pain of malignant origin, and (2) a diagnosis of a learning disability. Criteria were chosen based on the target population being adults with non-cancer chronic pain. The AIP relies on people's ability to state how they personally conceptualise acts and other measures used required a degree of abstract thought. Therefore, fluency in English and an adequate language comprehension level were necessary.

3.3.2 Recruitment

Participants were recruited from the Pain Nurse Specialist Clinics at St George's Centre, Middleton, Leeds and Seacroft Hospital, Seacroft, Leeds, and a city-wide Nurse-led support group. Potential participants were identified (inclusion and exclusion criteria determined) by their Pain Nurse. In the first instance, they were approached by their Nurse and given an NRES-approved information sheet. The information sheet instructed those wishing to participate to speak to their Nurse and provide their name and contact details so

that the researcher could contact them. Alternatively, they could contact the researcher directly.

3.3.3 Sample

During the data collection period December 2010 to April 2011, 60 chronic pain patients said they would like to take part however 13 either cancelled prior to interview or did not attend for their interview. Therefore, a total of 47 people with chronic pain took part; 25.53% male (n = 12), 74.47% female (n = 35), age range 33 years to 85 years (M = 60.51, SD = 12.46). Written consent was obtained from each participant and their General Practitioner was informed of their participation in the research (in accordance with NRES). Interviews took place at participants' homes (n = 38) or at St George's Centre (n = 9). They lasted between 30 minutes and 110 minutes (M = 52.34, SD = 17.50). As an incentive for participation, all participants were entered into a prize draw with the chance of winning 1 of 2 £10 gift vouchers or 1 of 4 £5 gift vouchers.

3.4 Measures

As discussed in Chapter 1 and illustrated again below in Figure 6, chronic pain interference is hypothesised to relate directly to sense of meaning in life and also indirectly by its influence on the level of meaning construed in action (i.e. action identification). Depression and negative mood, acceptance, optimism and psychological distance are thought to exert multiple influences in various phases. Each of these 7 variables needed to be measured. A number of questionnaires were considered, particularly those which could be administered with relative ease and speed as subject burden was an obvious concern. Consideration was also given to use of the questionnaires in both clinical and research settings, ability to adapt the questionnaires to interview-style administration and the psychometric properties of the questionnaires. In addition to obtaining basic demographic and clinically relevant descriptive data (age, gender, duration of pain, clinical diagnosis or cause of pain), the measures discussed below were used.

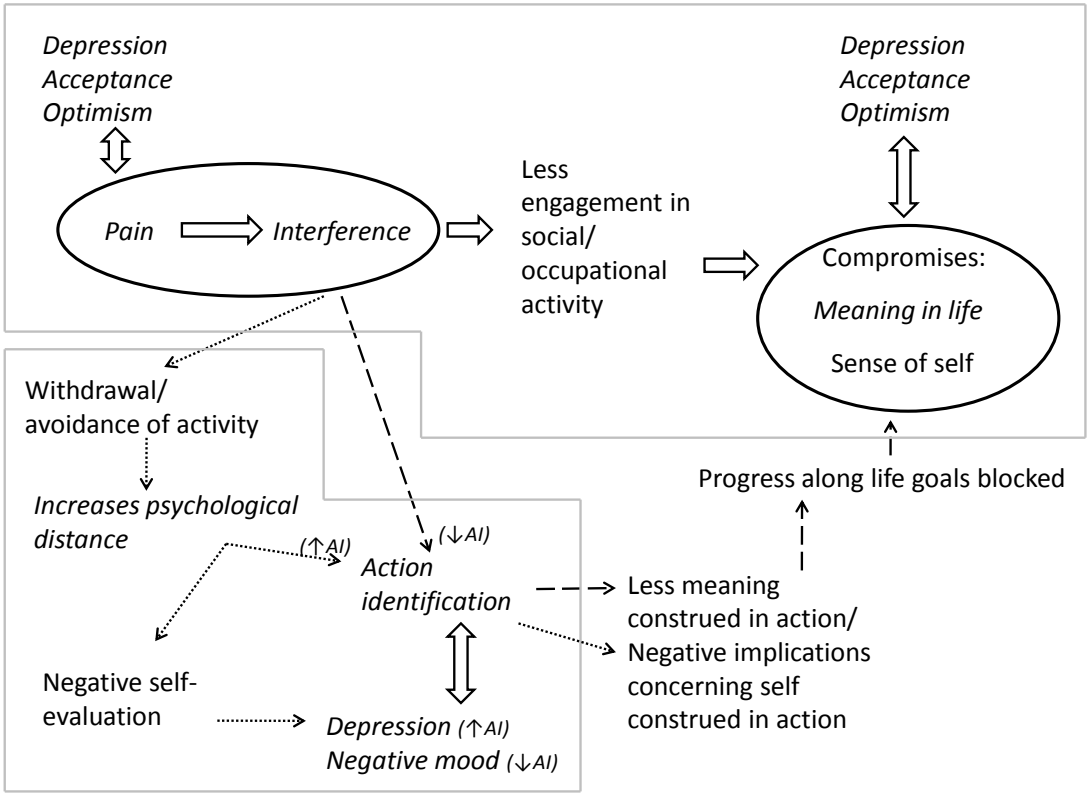


Figure 6: Hypothesised relationship between interference caused by pain and meaning in life; and relationships between interference, action identification and meaning
(Italicised text = variables measured in the current research; ↑*AI* = increase in action identification level; ↓*AI* = decrease in action identification level)

3.4.1 Pain Interference

As chronic pain interferes with everyday activity, and it is this interference to activity which is hypothesised to lower action identification level and compromise sense of meaning in life, a measure of interference was required. It was decided that a multidimensional assessment tool would be preferable so that variables such as pain intensity, site of pain and medications received could also be measured. One frequently used multidimensional measure is the West Haven-Yale Multidimensional Pain Inventory (WHYMPI, Kerns, et al., 1985). The WHYMPI is lengthy consisting 52 items divided into 3 parts. The first part contains items relating to an intensity scale (Cronbach's α = .72; test-re-test after 2 weeks, *r* = .82) and interference. However, the interference items form part of an interference-dissatisfaction scale (Cronbach's α = .90; test-re-test after 2 weeks, *r* = .86) and so do not have discriminate validity when considered alone.

The Brief Pain Inventory short form (BPI-sf, Cleeland, 1991) was selected (see Appendix F for BPI-sf). It is a commonly used assessment tool which provides a measure of

pain intensity and a measure of pain interference. For the intensity scale, the respondent is asked to rate their pain intensity over the past 24 hours at its worst, its least, their average pain intensity, and how much pain they have right now, on a 0 (no pain) to 10 (pain as bad as you can imagine) scale. An overall score for intensity is obtained by summing scores on these 4 items. Higher scores indicate more intense pain. For the interference scale, the respondent is asked how, during the past 24 hours, pain has interfered with their general activity, mood, walking ability, normal work, relations with other people, sleep, and enjoyment of life, on a 0 (does not interfere) to 10 (completely interferes) scale. An overall score for interference is obtained by summing scores on these 7 items. Higher scores indicate more interference. The BPI-sf also asks the respondent whether they have experienced pain today, where their pain is and what treatments or medications they are receiving for their pain. They are asked to rate how much relief treatment has provided in the last 24 hours on a 0% (no relief) to 100% (complete relief) scale.

The psychometric properties of the BPI-sf have been investigated in non-cancer patients. Satisfactory internal consistency for the intensity scale (Cronbach's $\alpha = .89$ and .82 in 2 separate samples) and the interference scale (Cronbach's $\alpha = .95$ and .93) has been demonstrated (Keller, et al., 2004). A factor analysis also supported the existence of these 2 scales.

3.4.2 Action Identification

The newly developed 40-item AIP (Appendix C) with satisfactory internal consistency (Cronbach's $\alpha = .80$) and a satisfactory estimate of test-retest reliability over a 2 to 3 week period ($r = .79$) was used. As discussed in the previous chapter, respondents are asked to select the identity (a or b) that they feel best describes the act, for each mid level item. High level alternatives are scored 1 and low level alternatives are scored 0. An action identification total score is calculated by summing items.

3.4.3 Meaning in Life

In order to find a suitable measure of meaning in life, a literature search was conducted. Independent searches using the title terms "measure of meaning", "sense of meaning" and "meaning scale" were run using the PsycINFO (1806 to March Week 2 2010) electronic database in OVID. Articles were read to obtain names of measures and to direct further reading and searches (title terms "meaning profile", "meaning index", "meaning measure", "measuring meaning in life", "purpose in life scale" and "sense of coherence scale"). Articles published in non-English language journals were excluded. Results included the Spiritual Meaning Scale (SMS, Mascaro, Rosen, & Morey, 2004), Life Regard Index (LRI, Battista & Almond, 1973), Personal Meaning Profile (PMP, Wong, 1998), Personal Meaning Index (PMI, Reker, 1992), Meaningful Life Measure (MLM, Morgan &

Farsides, 2009a), Purpose in Life Scale (PWP-B, Ryff, 1989), Meaning in Life Questionnaire (MLQ, Steger, et al., 2006), Purpose in Life Test (PIL, Crumbaugh & Maholick, 1964) and Sense of Coherence – Meaning Scale (SOC-M, Antonovsky, 1987).

According to Steger (2006) the 3 measures most often used in research are the PIL, LRI and SOC-M. Antonovsky (1987) advises against use of the SOC-M as a stand-alone scale however as its psychometric properties only apply when it is used in conjunction with its 2 associated subscales. To economically assess a wide range of theoretical dimensions, Morgan and Farsides (2009a) used exploratory factor analysis to identify latent constructs underlying the PIL, LRI and PWP-B to identify items to use in a brief yet comprehensive Meaningful Life Measure (MLM). It therefore seemed logical to choose the MLM for use in the current research (see Appendix G for MLM). Permission to use the MLM was obtained from one of its authors, Jessica Morgan (J. Morgan, personal communication, June 1, 2010).

The MLM has 23 items which are rated on a 1 (strongly disagree) to 7 (strongly agree) scale (with the exception of items 1, 2, 3, 16 and 17 for which the anchors are specific to the item). Table 8 lists some sample items. The items comprise 5 subscales: exciting life (items 1 - 5), accomplished life (items 6 – 10), principled life (items 11 – 15), purposeful life (items 16 – 19) and valued life (items 20 – 23). Subscale total scores are obtained by summing items (items 5, 9 and 19 are reverse-scored). By summing total scores for all subscales, an overall meaning in life value is obtained. It was anticipated that this value would be the one used in the current research. The higher this value is, the greater a person's sense of meaning in life. Each subscale has satisfactory internal consistency (Cronbach's α range from .85 - .88) and items load onto five factors representing their respective subscales at the first-order level, and a single personal meaning factor at the second-order level (Morgan & Farsides, 2009a, 2009b).

Table 8: Sample items of the MLM

1. Life to me seems ...completely routine (1); ... always exciting (7).
7. So far, I am pleased with what I have achieved in life....
12. I have a philosophy of life that really gives my living significance....
19. I tend to wander aimlessly through life, without much sense of purpose or direction....
21. My life is significant....

3.4.4 Depression and Negative Mood

There are a number of different questionnaire measures which are widely used in research and clinical practice to screen for depression. These include the Beck Depression Inventory (BDI, Beck, 1996), the Hospital Anxiety and Depression Scale (HADS, Zigmond

& Snaith, 1983) and the Patient Health Questionnaire (PHQ-9, Spitzer, Kroenke, & Williams, 1999). It has been suggested that since screening measures for depression all display similar sensitivity, then the decision of which one to use should be based on issues of feasibility, administration and scoring time, and the instrument's ability to serve additional purposes, such as monitoring severity (Williams, Pignone, Ramirez, & Stellato, 2002). As the PHQ-9 is quick and easy to administer and score, it was chosen for use in the current research (see Appendix H for PHQ-9). The PHQ-9 also offers interpretation of the total score in terms of level of depression.

The PHQ-9 asks respondents to rate on a 0 (not at all) to 3 (nearly every day) scale, how often over the last 2 weeks they have been bothered by 9 different problems. Table 9 lists some sample items. Responses are summed to give an overall depression severity score, whereby a score of 0 – 4 indicates no depression, 5 – 9 indicates mild depression, 10 – 14 indicates moderate depression, 15 – 19 indicates moderately severe depression and 20 – 27 indicates severe depression. In the current research, it was anticipated that the PHQ-9 would be used to yield a continuous score for depression and negative mood ranging from 0 – 27, as well as to differentiate between those with clinical level depression (i.e. 10 - 27) and those with non-clinical negative mood (i.e. 0 - 9).

The PHQ-9 also has an additional question which asks respondents to rate on a scale (not difficult at all to extremely difficult), how difficult any problems make it for them to do work, take care of things at home, or get along with other people. However, this question was not used in the current research. The PHQ-9 has been shown to have satisfactory internal consistency (Cronbach's α = .89 and .86 in 2 separate samples) and test-retest reliability (r = .84) over 48 hours (Kroenke, Spitzer, & Williams, 2001).

Table 9: Sample items of the PHQ-9

2. Feeling down, depressed, or hopeless....
5. Poor appetite or overeating....
6. Feeling bad about yourself – or that you are a failure or have let yourself or your family down....

3.4.5 Acceptance

The Chronic Pain Acceptance Questionnaire (CPAQ, Geiser, 1992) is a 34-item inventory widely used in research and clinical practice to measure a person's level of acceptance of pain. It has satisfactory internal consistency (Cronbach's α = .85) and correlates with standardised measures of distress and daily functioning supporting its validity as a measure of acceptance (Geiser, 1992; McCracken, 1998). A factor analysis

revealed a four-factor structure, however analyses of item variability, item correlation, internal consistency and predictive validity supported the use of the larger 2 factors only (McCracken, et al., 2004). Therefore, a slightly shorter (20-item) revised version (CPAQ-R, McCracken, et al., 2004) measuring only these 2 dimensions was selected (see Appendix I for CPAQ-R).

The 2 dimensions of the CPAQ-R are pursuit of life activities regardless of pain (activity engagement, items 1, 2, 3, 5, 6, 8, 9, 10, 12, 15 and 19) and recognition that avoidance and control are often unworkable methods of adapting to chronic pain (pain willingness, items 4, 7, 11, 13, 14, 16, 17, 18 and 20). Items are rated on a 0 (never true) to 6 (always true) scale. An activity engagement score is given by summing the items of this subscale. A pain willingness score is given by reverse scoring items of this subscale and then summing. A total acceptance score is given by summing the scores for the 2 subscales. It was anticipated that the total acceptance score would be used in the current research. Higher scores indicate higher levels of acceptance. The CPAQ-R has satisfactory internal consistency for both the activity engagement (Cronbach's α = .82) and pain willingness (Cronbach's α = .78) subscales (McCracken, et al., 2004). Table 10 lists some sample items of the CPAQ-R.

Table 10: Sample items of the CPAQ-R

1. I am getting on with the business of living no matter what my level of pain is....
7. I need to concentrate on getting rid of my pain....
8. There are many activities I do when I feel pain....
17. I avoid putting myself in situations where my pain might increase....

3.4.6 Optimism

The Life Orientation Test revised version (LOT-R, Scheier, et al., 1994) is the most often applied instrument to measure dispositional optimism, and the one chosen for the current research (see Appendix J for LOT-R). It is an improved version of the original Life Orientation Test (LOT, Scheier & Carver, 1985), particularly since its brevity better facilitates its use in research. Scheier and colleagues (1994) found the LOT-R has satisfactory internal consistency (Cronbach's α = .78) and test-re-test reliability (r = .68 at 4 months). It consists 10 items (items 2, 5, 6 and 8 are filler items), which are rated on a 4 (agree a lot) to 0 (disagree a lot) scale. 3 items are positively worded (affirmation of optimism, items 1, 4 and 10) and 3 are negatively worded and require reverse-coding before scoring (disaffirmation of pessimism, items 3, 7 and 9). While the LOT-R is best viewed as having a two-dimensional structure, optimism and pessimism may be highly correlated

(Kubzansky, et al., 2004) and the theoretical underpinnings of the separation are unclear (Segerstrom, Evans, & Eisenlohr-Moul, 2011). Therefore the LOT-R is best used to obtain an overall level of optimism by summing items. A higher score indicates a higher level of optimism. Table 11 lists some sample items.

Table 11: Sample items of the LOT-R

1. In uncertain times, I usually expect the best....
2. It's easy for me to relax....
3. If something can go wrong for me, it will....

3.4.7 Psychological Distance

When a person withdraws from or avoids activity, this increases the psychological distance between the person and activity. A measure of withdrawal was required as psychological distance is thought to increase action identification level (Liberman & Trope, 1998). It was intended for withdrawal from everyday activities to be measured, as these activities are the focus of the AIP. The simplest way to achieve this was to ask participants whether they had participated in each of the items (i.e. mid level stems) of the AIP in the last six months or not, scoring "Yes" responses as '1' and "No" responses as '0'. An overall score for withdrawal is obtained by summing scores, with lower scores indicating greater withdrawal and avoidance of activity i.e. increased psychological distance. Hereafter, this 'measure' will be referred to as AIP-withdrawal (see Appendix K).

3.5 Procedure

At the start of the interview, each participant was given a brief introduction to the research and offered the opportunity to ask any questions, or clarify any points from the NRES-approved information sheet. They were informed of their right to withdraw their participation (and their data destroyed) at any stage and reminded that they were not under any obligation to answer any questions that they did not wish to. Each participant was then asked to provide written consent using the NRES-approved forms and to provide the name of their General Practitioner and Surgery.

Each participant was asked some basic demographic and clinically-relevant questions: age, gender, duration of pain, clinical diagnosis or cause of pain. The clinical measures BPI-sf and PHQ-9 were then administered orally. It was decided to administer these clinical measures first as perception of pain and mood could be influenced by subsequent questioning. Next, the AIP was administered as a card-sort task in which participants were asked to place each card into one of two piles (A and B) depending on whether they preferred identity a or identity b of each item. The following verbal instructions were used:

> "Any act can be identified in many ways. For example, if I asked you what you are doing now you might reply "answering questions", or "talking to you", or "helping you with your research", or "sitting in a chair". There are any number of responses that you could give me. We are interested in your personal preference for how a number of different acts should be described. On the following cards you will find several different acts. After each act will be two choices of different ways in which the act might be identified. For example, the card might state the act "attending class" and the two identifications a, "sitting in a chair" and b, "learning new information". Your task is to choose the identification, a or b, that best describes the act for you. Simply place the cards into two piles depending on whether you prefer identification a or b. If you prefer identification a, put the card on pile A; if you prefer identification b, put the card on pile B. Of course, there are no right or wrong answers. People simply differ in their preferences for the different act descriptions, and we are interested in your personal preferences. Remember, choose the description that you personally believe is more appropriate in each pair."

Clarification was provided where necessary. It was decided that a card-sort task would encourage engagement with the task and reduce subject burden after already having answered demographic questions and questions of the BPI-sf and PHQ-9 (though some subjects chose to state their choice aloud instead of forming 2 piles of cards). Where participants engaged in a lot of conversation about an item of the AIP card-sort task, they were encouraged that this discussion would follow (with the AIP-withdrawal) and prompted to continue with the task. The AIP card-sort task was immediately followed by oral administration of the AIP-withdrawal. It had to be administered after the AIP (and not before) so that the items of the AIP were novel and the identities not primed in any way. Finally, the psychological measures MLM, CPAQ-R and LOT-R were administered orally. Participants were then thanked for their participation and once again given the opportunity to ask any questions. They were instructed on how to obtain information regarding the results of the research in the foreseeable future, should they wish to do so.

To facilitate oral administration of the typically self-administered questionnaires, participants were handed relevant response scales along which to indicate their responses to items. Contextual information (e.g. reasons given for particular response choices, additional comments made during administration, etc) thought to be useful in interpreting results was noted throughout.

3.6 Data analyses

First, data were examined to check distributions and potential outliers using the "Explore" routine of PASW. Second, summary statistics were computed to provide descriptive summaries of the sample and measures using the "One-Way ANOVA", "Descriptives", "Frequencies" and "Correlate" routines. Third, an item-analysis was conducted on the AIP using the "Frequencies", "Independent-Samples T-test", "Reliability analysis" and "Correlate" routines.

The fourth stage of analysis involved running initial tests of predicted relationships using the "Correlate" routine. The final stage was based on the significant relationships found. These determined which variables to enter simultaneously into multiple linear regression models (no theoretical reason to determine order of entry) using the "Regression" routine. This allowed statistical measurement of the amount of variance in the outcome variable accounted for by each predictor variable. Multiple regression involves finding the linear combination of predictors that correlate maximally with the outcome variable (Field, 2000). The linear model is fit to the data based on the lowest value of the sum of the squared differences between each observed value and that predicted by the model ('method of least squares').

Results are presented in the following Chapter.

CHAPTER 4: MAIN STUDY RESULTS

4.1 Overview

The research aims and hypotheses set in Chapter 1 are presented again in Box 4 below.

Aim 1. To develop a psychometrically sound measure of action identification in chronic pain.

Aim 2. To use the measure to investigate hypotheses regarding action identification in chronic pain:

- People who are more depressed will favour higher level act identification.
- People who have higher levels of non-clinical negative mood will favour lower level act identification.
- People who withdraw from or avoid activity (i.e. increasing psychological distance) will favour higher level act identification.
- People who experience greater pain interference will favour lower level act identification.

Aim 3. To investigate hypotheses regarding meaning in life in chronic pain:

- People who experience greater pain interference will perceive less meaning in life.
- People who favour higher level act identification will perceive more meaning in life.

Box 4: Research aims and hypotheses

Exploration of the data to identify and remove unusual cases and transformation of some variables allowed parametric statistics to be used. Summary statistics for the sample and measures indicated that means and patterns in the data were as would be expected based on previous research. This suggested that the sample might be reasonably representative of patients accessing these services. An item analysis was conducted on the AIP to validate the measure in the sample of pain patients (Research Aim 1). Correlation analyses involving all measures identified significant relationships between variables and determined which variables to include in exploratory multiple regression models (Research Aims 2 and 3).

4.2 Data Exploration and Transformation

4.2.1 Missing Data Values and Outliers

A few participants had not attempted all measures (n = 5) so in some analyses listwise deletion (i.e. dropping these cases) was necessary. For administered measures, there were very few missing data values across the entire dataset. They were substituted with the rounded average value for the measure so no deletion was necessary.

Box plots revealed participant number 30 as a consistent outlier with extreme values across measures therefore their data was removed from all subsequent analyses.

4.2.2 Normality

The majority of the data was measured at interval level and data from different subjects was independent, thus 2 of the assumptions of parametric statistics (interval data and independence) were met. Histograms and values of kurtosis and skewness were produced and Kolmogorov-Smirnov calculations run to test for a third assumption, normally distributed data. Histograms and Kolmogorov-Smirnov statistics revealed that data distributions for age (.088, $p > .05$, $n = 46$), pain intensity (.077, $p > .05$, $n = 46$), pain interference (.080, $p > .05$, $n = 46$), total action identification (.118, $p > .05$, $n = 46$), meaning in life (.112, $p > .05$, $n = 45$), depression and negative mood (.106, $p > .05$, $n = 46$), clinical level depression (.168, $p > .05$, $n = 22$), acceptance (.097, $p > .05$, $n = 41$) and optimism (.102, $p > .05$, $n = 41$), were not significantly different from normal.

The distributions for psychological distance (.160, $p < .01$, $n = 46$) and years experienced pain (.189, $p < .001$, $n = 46$) were significantly different from normal so various transformations were considered. For psychological distance, the data were negatively skewed (-1.159). The variable was reflected (skewness 1.159) and the logarithm (Log10) for each of the data points calculated. This new variable 'log psychological distance' which approximated a normal distribution was used instead of psychological distance for all further analyses. For years experienced pain, the data were positively skewed (.444). The square root (SQRT) of each of the data points was calculated which reduced skewness (-.008) to help normalise the distribution. The new variable 'SQRT years experienced pain' was used instead of years experienced pain for all further analyses. These transformations which normalised the data distributions allowed parametric statistics to be used. Parametric statistics are more powerful than non-parametric statistics (Field, 2000). While transforming a variable changes the differences between variables (by changing the units of measurement), it does not change the relationships between variables as the relative differences between subjects stay the same (Field, 2009). Therefore, for the purpose of correlation analyses (as in the current research) it is not necessary to transform all variables.

Only one non-normally distributed variable, non-clinical negative mood (.206, $p < .05$, $n = 24$), was unable to be transformed to approximate a normal distribution. The non-parametric statistic, Kendall's tau, will be reported for correlations involving this variable.

4.3 Summary Statistics

4.3.1 Sample

Most participants were recruited from Pain Nurse Specialist Clinics at St George's Centre (65.22%, n = 30) with some being recruited from Pain Nurse Specialist Clinics at Seacroft Hospital (19.57%, n = 9) and some from a nurse-led support group (15.22%, n = 7). One-way analyses of variance were run to compare means between the groups for age, SQRT years experienced pain and pain intensity. Variances in age were assumed to be equal across groups (Levene's test statistic = .835, $p > .05$) and there were no significant differences in age between the groups ($F_{(2, 43)} = 1.573$, $p = .219$). Similarly, variances in SQRT years experienced pain were assumed to be equal across groups (Levene's test statistic = 1.845, $p > .05$) and there were no significant differences in SQRT years experienced pain between the groups ($F_{(2, 43)} = 0.684$, $p = .510$). Variances in pain intensity were also assumed to be equal across groups (Levene's test statistic = .861, $p > .05$) and there were no significant differences in pain intensity between the groups ($F_{(2, 43)} = 1.584$, $p = .217$). Participants in the 3 groups were treated as a single sample hereafter.

There were 12 males (26.09%) and 34 females (73.91%). Ages ranged from 33 years to 85 years (M = 60.80 years, SD = 12.43). This is similar to a previous D. Clin. Psychol. thesis research sample (M = 58.88 years, SD = 14.99) recruited from similar clinics and using similar inclusion and exclusion criteria (Wells, 2010). Participants' reports of the length of time they had experienced chronic pain for ranged from 1 year to 39 years, with the mean time being 14.59 years (SD = 10.64). This was also very similar to Wells (2010) mean pain duration of 174.25 months (i.e. 14 years and 6 months; SD = 12.80).

The majority of participants (58.70%, n = 27) reported that their pain was experienced at multiple sites over their body. 9 participants (19.57%) said their primary site of pain was their back and 6 (13.04%) said it was their legs. Arms, feet, abdomen and shoulder were only reported by 1 participant each (2.17%) as the primary site of their pain.

When asked for a diagnosis or cause of pain, the most common response (47.83%, n = 22) was spinal damage of some sort (e.g. degenerative condition, nerve damage, fall, etc). This was also the most common response in Wells (2010) thesis. 12 participants (26.09%) reported a specific condition (e.g. amputation, fracture, hereditary neuropathy, multiple sclerosis, etc) and 10 participants (21.74%) reported a type of arthritis. Only 2 participants (4.35%) said that their pain was unexplained.

35 participants (76.09%) were taking pain medication (e.g. tablets, patches, injections) and 10 participants (21.74%) were combining pain medication with physiotherapy or manipulation (e.g. spinal cord stimulator or tens machine). 1 participant

(2.17%) was receiving no treatment at present. It is unknown whether the above sample statistics are representative of the chronic pain population or not.

4.3.2 Measures

Descriptive data for the pain measures and correlations with age and SQRT years experienced pain are displayed in Table 12.

Table 12: Descriptive data for pain variables and correlations with age and SQRT years experienced pain

					Pearson's *r*	
Variable	N	Mean	Standard deviation	Range	Age	SQRT years experienced pain
Intensity	46	21.44	6.26	9 - 34	-.192	.307*
Interference	46	38.02	15.46	0 - 64	-.272	.150

*** Correlation is significant at the 0.05 level.**

Mean pain intensity as measured by the BPI-sf intensity scale (0 – 40) was 21.44 (minimum = 9.00, maximum = 34.00, *SD* = 6.26). Intensity was significantly positively correlated with SQRT years experienced pain ($r = .307$, $p < .05$). The longer people had experienced pain for, the greater its perceived intensity. This relationship is consistent with previous research using an alternative measure of intensity (Wells, 2010). Pain intensity did not correlate with age in the current research.

Mean pain interference as measured by the BPI-sf interference scale (0 - 70) was 38.02 (minimum = 0.00, maximum = 64.00, *SD* = 15.46). While interference did not significantly correlate with age or SQRT years experienced pain in the current research, previous research using an alternative measure of interference found it negatively correlated with age and positively correlated with years experienced pain (Wells, 2010).

Descriptive data for the psychological variables and correlations with age and SQRT years experienced pain are displayed in Table 13.

Table 13: Descriptive data for psychological variables and correlations with age and SQRT years experienced pain

Variable	N	Mean	Standard deviation	Range	Correlation	
					Age	SQRT years experienced pain
Total action identification	46	26.35	5.54	16 - 38	-.016	-.046
Meaning in life	45	15.64	22.40	60 - 149	.367*	-.116
Depression and negative mood	46	10.41	6.63	1 - 26	-.368*	.064
Clinical level depression	22	15.91	5.15	10 - 26	.220	.041
Non-clinical negative mood	24	5.38	2.53	1 - 9	-.047	.100
Acceptance	41	57.20	14.66	22 - 95	.107	-.167
Optimism	41	3.12	4.46	0 - 23	.253	.021
Log psychological distance	46	0.84	0.28	0.00 - 1.36	-.198	.223

*** Correlation is significant at the 0.05 level.**

Mean total action identification as measured by the AIP (0 – 40) was 26.35 (minimum = 16.00, maximum = 38.00, *SD* = 5.54). Total action identification did not correlate significantly with age or SQRT years experienced pain. Mean meaning in life as measured by the MLM (23 – 161) was 115.64 (minimum = 60.00, maximum = 149.00, *SD* = 22.40). Meaning in life was significantly positively correlated with age ($r = .367$, $p < .05$) but not SQRT years experienced pain. The older someone was, the greater their sense of meaning in life. There is no existing research to compare mean total action identification and mean meaning in life to.

Mean depression and negative mood as measured by the PHQ-9 (0 – 27) was 10.41 (minimum = 1.00, maximum = 26.00, *SD* = 6.63). Depression and negative mood was significantly negatively correlated with age (Pearson's $r = -.368$, $p < .05$). The older someone was, the less they experienced symptoms of depression and negative mood. This

relationship was not found by Wells (2010) though a different measure of depression was used. The current research found no relationship between depression and negative mood and SQRT years experienced pain, which is consistent with Wells (2010). Participants were also grouped into clinical level depression and non-clinical negative mood. Mean clinical level depression as measured by the PHQ-9 (10 – 27) was 15.91 (minimum = 10.00, maximum = 26.00, *SD* = 5.15) and mean non-clinical negative mood was 5.38 (minimum = 1.00, maximum = 9, *SD* = 2.53). Neither clinical level depression nor non-clinical negative mood correlated significantly with age or SQRT years experienced pain.

Mean acceptance as measured by the CPAQ-R (0 – 120) was 57.20 (minimum = 22.00, maximum = 95.00, *SD* = 14.66). Acceptance did not correlate with age or SQRT years experienced pain. This mean and non-significant relationships with age or years experienced pain are consistent with previous research (Wells, 2010, though in this study the 2 scales of the CPAQ-R were treated separately).

Mean optimism as measured by the LOT-R (0 – 24) was 13.12 (minimum = 0.00, maximum = 23.00, *SD* = 4.46). Mean log psychological distance as measured by the AIP-withdrawal reflected variable logarithm was 0.84 (minimum = 0.00, maximum = 1.36, *SD* = 0.28). Neither optimism nor log psychological distance correlated with age or SQRT years experienced pain. There is no existing research to compare the means to.

With a few exceptions, summary statistics for the sample and measures were as expected based on a previous thesis research project which recruited participants from similar clinics. There were no theoretical reasons to believe that the differences on a few variables were problematic.

4.4 AIP Item Analysis

Analyses similar to those reported in Chapter 2 were run on the AIP data. This was intended to help validate the measure (Research Aim 1) and also to provide preliminary insight into the distribution of scores in chronic pain (though this investigation was for the purpose of exploration only due to the small sample size preventing generalisation to the wider population).

Table 14 lists the percentage of participants who selected each identity for each item of the AIP. The bracketed numbers are the percentages of the undergraduate students sample reported in Chapter 2.

Table 14: Percentage of participants who selected each identity for each item of the AIP (bracketed number = percentage of undergraduate students sample as reported in Chapter 2)

Stem	High level identity	Percentage	Low level identity	Percentage
Cleaning the house	showing one's concern for cleanliness	63.0 (27.5)	vacuuming the floor	37.0 (72.5)
Writing or typing	communicating	56.5 (37.5)	putting words on a page	43.5 (62.5)
Joking with family members	maintaining family relationships	39.1 (27.5)	listening and laughing	60.9 (72.5)
Visiting friends	maintaining friendships	63.0 (58.7)	talking to others	37.0 (41.3)
At the cinema	enjoying being entertained	52.2 (22.3)	watching a film	47.8 (77.7)
Communicating by gestures	emphasising a point	43.5 (58.4)	moving my hands	56.5 (41.6)
Lying down	looking after myself	71.7 (39.0)	being horizontal	28.3 (61.0)
Maintaining the garden	making the garden look tidy	80.4 (76.2)	pulling up weeds	19.6 (23.8)
Watching TV	being entertained	76.1 (66.2)	watching a screen	23.9 (33.8)
Doing the shopping	getting essential supplies	58.7 (90.3)	pushing a supermarket trolley	41.3 (9.7)
Using kitchen gadgets	cooking a meal	78.3 (78.1)	cutting up food	21.7 (21.9)
Paying bills	staying out of debt	84.8 (39.8)	handing over money	15.2 (60.2)

Stem	High level identity	Percentage	Low level identity	Percentage
Preparing a meal	meeting my nutritional requirements	47.8 (51.3)	peeling vegetables	52.2 (48.7)
Working on a needed house repair	taking pride in the house	84.8 (55.4)	using a screwdriver	15.2 (44.6)
Washing the car	taking pride in the car	65.2 (38.3)	removing dirt	34.8 (61.7)
Taking a holiday	having a break from routine	82.6 (85.5)	leaving home	17.4 (14.5)
Going to a party or social function	maintaining social networks	23.9 (42.4)	talking to others	76.1 (57.6)
Eating out	treating myself	80.4 (77.0)	paying for food	19.6 (23.0)
Doing chores around the house	maintaining the household	58.7 (39.0)	tidying things away	41.3 (61.0)
Laughing	expressing myself	91.3 (89.6)	making a noise	8.7 (10.4)
Dressing myself	getting ready to go out	26.1 (55.4)	putting on clothes	73.9 (44.6)
Going to a park or beach	getting some fresh air	56.5 (50.2)	being outside	43.5 (49.8)
Taking care of business affairs	getting organised	84.8 (93.7)	writing a cheque	15.2 (6.3)
Spending time with relatives	providing enjoyment	26.1 (30.9)	sitting with family	73.9 (69.1)
Doing leisure time activities	relaxing	60.9 (84.0)	watching TV	39.1 (16.0)
Listening to other people’s problems	showing kindness	89.1 (92.6)	not speaking	10.9 (7.4)

Stem	High level identity	Percentage	Low level identity	Percentage
Learning new things	becoming wiser	58.7 (78.1)	remembering instructions	41.3 (21.9)
Working on a budget	maintaining a lifestyle	78.3 (59.9)	adding up bills	21.7 (40.1)
Being affectionate	showing my love	87.0 (88.1)	holding hands	13.0 (11.9)
Walking up and down hills	taking exercise	58.7 (76.2)	putting one foot in front of the other	41.3 (23.8)
Sleeping	restoring my body and mind	54.3 (64.3)	closing my eyes	45.7 (35.7)
Carrying on a conversation	sharing thoughts with someone	67.4 (61.3)	talking	32.6 (38.7)
Feeding myself	gaining energy	67.4 (77.0)	using a knife and fork	32.6 (23.0)
Reading	gaining knowledge	76.1 (78.4)	following lines of print	23.9 (21.6)
Tidying up	making the house look neat	56.5 (60.6)	putting things away	43.5 (39.4)
Going out for entertainment	having fun	91.3 (87.7)	going to the pub	8.7 (12.3)
Mowing the lawn	maintaining the garden	78.3 (50.9)	pushing a mower	21.7 (49.1)
Concentrating	working something out	73.9 (92.6)	watching something	26.1 (7.4)
Caring for myself	maintaining my wellbeing	82.6 (87.7)	cleaning my teeth	17.4 (12.3)
Cleaning the windows	getting a better view	58.7 (39.4)	using a sponge	41.3 (60.6)

For 29 of the items pain patients and undergraduate students favoured the same identities. For 9 items ("Cleaning the house", "Writing or typing", "At the cinema", "Lying down", "Paying bills", "Washing the car", "Doing chores around the house", "Dressing myself" and "Cleaning the windows"), pain patients tended to pick the high level identity whereas undergraduate students tended to pick the low level identity. For 2 items ("Communicating by gestures" and "Preparing a meal") the reverse was true. The salience of the items and identities to each sample is unknown. An independent samples t-test (normality of data distributions previously established) revealed that mean total action identification was not significantly different between the pain patients sample (M = 26.35, SD = 5.54, n = 46) and the undergraduate students sample reported in Chapter 2 (M = 25.09, SD = 5.90, n = 269), $t_{(313)}$ = -1.349, p = .178.

The internal consistency of the AIP was investigated. Cronbach's α at .761 indicated that the AIP had satisfactory internal consistency based on the current sample of chronic pain patients. Furthermore, α was not altered significantly by removing any of the items from the analysis. This statistic was similar to that obtained in the undergraduate students sample reported in Chapter 2 (α = .803).

The relationship between withdrawal from a specific activity and identification level for that activity was investigated across items of the AIP to examine whether any action-specific relationship between psychological distance and action identification level could be demonstrated. Table 15 lists the mean action identification score and mean psychological distance score for each item of the AIP. A high psychological distance score indicates less withdrawal and avoidance of that activity i.e. it is more psychologically close.

Table 15: Mean action identification score and mean psychological distance score for each item of the AIP

AIP item	Mean action identification score	Mean psychological distance score
Cleaning the house	0.63	0.87
Writing or typing	0.57	0.89
Joking with family members	0.39	0.98
Visiting friends	0.68	0.78
At the cinema	0.52	0.39
Communicating by gestures	0.43	0.85
Lying down	0.72	0.98
Maintaining the garden	0.80	0.50
Watching TV	0.76	1.00
Doing the shopping	0.59	0.83
Using kitchen gadgets	0.78	0.93
Paying bills	0.85	0.85
Preparing a meal	0.48	0.83
Working on a needed house repair	0.85	0.28
Washing the car	0.65	0.13
Taking a holiday	0.83	0.48
Going to a party or social function	0.24	0.65
Eating out	0.80	0.87
Doing chores around the house	0.59	0.91
Laughing	0.91	1.00
Dressing myself	0.26	0.91
Going to a park or beach	0.57	0.51
Taking care of business affairs	0.85	0.61
Spending time with relatives	0.26	0.96
Doing leisure time activities	0.61	0.76
Listening to other people’s problems	0.89	0.93
Learning new things	0.59	0.72

Working on a budget	0.78	0.83
Being affectionate	0.87	0.98
Walking up and down hills	0.59	0.48
Sleeping	0.54	0.96
Carrying on a conversation	0.67	1.00
Feeding myself	0.67	0.98
Reading	0.76	0.96
Tidying up	0.57	0.91
Going out for entertainment	0.91	0.83
Mowing the lawn	0.78	0.04
Concentrating	0.74	0.96
Caring for myself	0.83	0.98
Cleaning the windows	0.59	0.46

The distribution in mean action identification scores for each item was assumed to be normal (Kolmogorov-Smirnov statistics at .112, $p > .05$). However, the distribution in mean psychological distance scores for each item deviated significantly from normal (Kolmogorov-Smirnov statistics at .246, $p < .001$). The data were strongly negatively skewed (-1.222) and transformation was not possible. A non-parametric statistic, Kendall's tau, was used to investigate whether mean action identification score for each item was related to mean psychological distance score for each item. Contrary to existing literature which states that more psychologically distant acts are construed at a higher level of meaning (Liberman & Trope, 1998), no significant correlation was found ($_T = .044$, $p = .699$). The current finding is discussed in more detail in Chapter 5.

4.5 Correlation Analyses

Correlations between all interval level variables are displayed in Table 16. These will be discussed in relation to Research Aims 2 and 3 and the specific hypotheses.

Table 16: Correlations between all interval level variables (* Correlation is significant at the 0.05 level; ** Correlation is significant at the 0.01 level)

	Mean	Standard deviation	SQRT years experienced pain	Pain intensity	Pain interference	Acceptance	Depression and negative mood	Optimism	Meaning in life	Total action identification	Log psychological distance	Clinical level depression	Non-clinical negative mood
Age (years)	60.80	12.43	-.096	-.192	-.272	.107	-.368*	.253	.367*	-.016	-.198	-.220	-.047
SQRT years experienced pain	3.52	1.49		.307*	.150	-.167	.064	.021	-.116	-.046	.223	.041	.100
Pain intensity	21.44	6.26			.396**	.094	.345*	-.222	-.085	.092	.181	.280	.095
Pain interference	38.02	15.46				-.373*	.730**	-.325*	-.386**	-.071	.473**	.555**	.234
Acceptance	57.20	14.66					-.348*	.226	.457**	.103	-.193	-.440	-.137
Depression and negative mood	10.41	6.63						-.270	-.533**	-.157	.281		
Optimism	13.12	4.46							.541**	.373*	-.078	-.085	.183
Meaning in life	115.64	22.40								.308*	-.195	-.126	-.349*
Total action identification	26.35	5.54									-.274	-.077	-.044
Log psychological distance	.84	.28										.160	.024
Clinical level depression	15.91	5.15											
Non-clinical negative mood	5.38	2.53											

4.5.1 Research Aim 2

Depression and negative mood did not correlate with total action identification. This is not surprising given that clinical level depression and non-clinical negative mood may have opposing effects on action identification level (Watkins, 2011). However, no significant correlations with total action identification were found when clinical level depression and non-clinical negative mood were considered individually. Furthermore, a Mann-Whitney test found no significant difference in mean total action identification between the clinical level depression group and the non-clinical negative mood group (U = 212.500, z = -1.136, p = .256). The lack of relationships between clinical level depression and total action identification, and non-clinical negative mood and total action identification, which is contrary to the research hypotheses, will be discussed further in Chapter 5.

Log psychological distance (i.e. overall level of withdrawal and avoidance of activity) did not correlate significantly with total action identification. This was contrary to the research hypothesis. Similarly pain interference did not correlate significantly with total action identification. Again this was contrary to the research hypothesis. Potential explanations for these results are considered in Chapter 5. The lack of significant relationships between the AIP and constructs thought to correlate with action identification potentially threatens the concurrent validity of the AIP. This will also be discussed in Chapter 5.

Interestingly, optimism positively correlated with total action identification (r = .373, p < .05). This finding will be discussed in Chapter 5.

4.5.2 Research Aim 3

As hypothesised, pain interference was negatively correlated with meaning in life (r = -.386, p < .01). As the literature suggests (McCracken, 1998), people who experienced more pain interference perceived less meaning in life. Also as hypothesised, total action identification was positively correlated with meaning in life (r = .308, p < .05). This was as would be predicted based on the literature on AIT (Vallacher & Wegner, 1989; Vallacher, Wegner, & Frederick, 1987). People who identified action at a higher level of meaning experienced a greater sense of meaning in life. This finding demonstrates concurrent validity of the AIP.

4.5.3 Additional Findings

Other significant correlations were consistent with the existing literature reviewed in Chapter 1 and thus consistent with the hypothesised model discussed in Chapter 1. In short, pain interference was positively correlated with pain intensity (r = .396, p < .01) and log psychological distance (r = .473, p < .01, that is, the more interference, the more withdrawal and greater avoidance of activity). Depression and negative mood was positively correlated

with pain intensity (r = .345, p < .05) and pain interference (r = .730, p < .01), and negatively correlated with acceptance (r = -.348, p < .05) and meaning in life (r = -.533, p < .01). Acceptance was negatively correlated with pain interference (r = -.373, p < .05) and positively correlated with meaning in life (r = .457, p < .01). Optimism was negatively correlated with pain interference (r = -.325, p < .05) and positively correlated with meaning in life (r = .541, p < .01).

4.6 Exploratory Multiple Regression Analyses

Multiple regression analyses to further investigate Research Aim 2 were not necessary. Preliminary correlation analyses had failed to find significant relationships between hypothesised predictors of action identification level (clinical level depression, non-clinical negative mood, log psychological distance and interference) and total action identification score.

With regards to Research Aim 3, the preliminary correlations indicated that pain interference negatively correlated with meaning in life and total action identification positively correlated with meaning in life, as had been hypothesised. In order to see if these variables significantly contributed to variance in meaning in life they were entered into regression models with other known predictors of meaning in life. These known predictors are acceptance, depression and optimism as reviewed in Chapter 1 (see Ho, et al., 2010; McCracken, 1998; Owens, et al., 2009; Viane, et al., 2003). Due to the small sample size (n = 41), this was intended as a preliminary, exploratory analysis only.

The accuracy of each model in the sample was adequate. Standardised residuals were all less than 3 indicating that the models predicted all data points adequately and there were no outliers (Field, 2000). Furthermore, Cook's distances were all less than 1 suggesting that no single cases were exerting too big an influence on the models.

Assumptions which must be met in order to generalise each model to the wider population were considered (however, generalising the models was not an aim of this exploratory analysis). For all models, the outcome variable and predictors were all continuous and did not have zero variances. All values of the outcome variable came from different people (i.e. they were independent) and error terms were uncorrelated (Durbin-Watson statistics close to 2). There was no perfect collinearity between predictors, all tolerance statistics were greater than 0.2 and variance proportions were small and distributed across different eigenvalues, which suggested that predictors were not highly correlated i.e. multicollinearity was not biasing the results (Field, 2000). A scatter plot of the standardised errors and the standardised predicted values of the outcome variable for each model indicated that assumptions of linearity and homoscedasticity were met (i.e. no curves in the graphs and as predictor value changes, spread of scores on the outcome variable remains

roughly the same). Histograms and normal probability plots indicated that errors were normally distributed.

The results are displayed in Tables 17, 18 and 19.

Table 17: Multiple regression results when pain interference is entered as a predictor of meaning in life

	Beta (*b*)	Standard error *b*	Standardised beta (β)	Part correlation
$F_{(4, 36)} = 9.290$, $p < .001$				
$R^2 = .508$				
Adjusted $R^2 = .453$				
Constant	67.908	17.420		
Pain interference	0.288	0.251	.197	.135
Acceptance	0.431	0.193	.285*	.261
Depression and negative mood	-1.548	0.601	-.430*	-.301
Optimism	2.108	0.619	.425**	.398

*** Correlation is significant at the 0.05 level; ** Correlation is significant at the 0.01 level.**

Table 18: Multiple regression results when total action identification is entered as a predictor of meaning in life

	Beta (*b*)	Standard error *b*	Standardised beta (β)	Part correlation
$F_{(4, 36)} = 9.112$, $p < .001$				
$R^2 = .503$				
Adjusted $R^2 = .448$				
Constant	67.110	17.420		
Total action identification	0.507	0.517	.124	.115
Acceptance	0.393	0.191	.260*	.241
Depression and negative mood	-1.077	0.462	-.299*	-.274
Optimism	1.764	0.652	.355**	.318

*** Correlation is significant at the 0.05 level; ** Correlation is significant at the 0.01 level.**

Table 19: Multiple regression results when pain interference and total action identification are entered as predictors of meaning in life

	Beta (*b*)	Standard error *b*	Standardised beta (β)	Part correlation
$F_{(5, 35)} = 7.475$, $p < .001$				
$R^2 = .516$				
Adjusted $R^2 = .447$				
Constant	60.486	19.917		
Pain interference	0.252	0.256	.172	.115
Total action identification	0.412	0.516	.101	.092
Acceptance	0.426	0.194	.282*	.257
Depression and negative mood	-1.471	0.612	-.409*	-.282
Optimism	1.913	0.670	.385**	.335

*** Correlation is significant at the 0.05 level; ** Correlation is significant at the 0.01 level.**

When pain interference was entered into the model (Table 17), the model accounted for 50.8% of variance in meaning in life scores in the current sample (adjusted R^2 suggests that the cross-validity of the model may be limited). Statistically depression and negative mood was the biggest predictor (β = -.430), followed by optimism (β = .425), then acceptance (β = .285). Pain interference did not significantly contribute to variance in meaning in life.

When total action identification was entered into the model (Table 18), the model accounted for 50.3% of variance in meaning in life scores in the current sample (similarly adjusted R^2 suggests that the cross-validity of the model may be limited). Statistically optimism was the biggest predictor (β = .355), followed by depression and negative mood (β = -.299), then acceptance (β = .260). Total action identification did not significantly contribute to variance in meaning in life.

When both pain interference and total action identification were entered into the model (Table 19), it accounted for 51.6% of variance in meaning in life scores in the current sample (again adjusted R^2 suggests that the cross-validity of the model may be limited). Statistically depression and negative mood was the biggest predictor (β = -.409), followed by optimism (β = .385), then acceptance (β = .282). Pain interference and total action identification did not significantly contribute to variance in meaning in life.

4.7 Summary

4.7.1 Research Aim 1

The AIP demonstrated internal consistency in the sample of 46 pain patients. Mean total action identification score in this sample was not significantly different from that reported in Chapter 2 with undergraduate students.

4.7.2 Research Aim 2

Clinical level depression, non-clinical negative mood, log psychological distance and pain interference did not significantly correlate with total action identification in the current sample.

4.7.3 Research Aim 3

Pain interference negatively correlated with meaning in life. Total action identification positively correlated with meaning in life. However, neither pain interference, nor total action identification, significantly contributed to variance in meaning in life when the variance explained by acceptance, depression and negative mood, and optimism was controlled for.

All results are discussed in full in the next chapter.

CHAPTER 5: GENERAL DISCUSSION

5.1 Overview

A summary of the existing literature on chronic pain and meaning in life, and a comprehensive review of AIT, led to the generation of ambitious research aims and a complex hypothesised model of meaning in life in chronic pain (Chapter 1). In this chapter, the results are considered in relation to the specific research aims and hypotheses. Strengths and limitations of the research are discussed. Clinical implications are considered and further directions suggested. Finally, concluding remarks are presented.

5.2 Summary of Results

The research had three main aims and some associated hypotheses:

- Aim 1: to develop a psychometrically sound measure of action identification in chronic pain.
- Aim 2: to use the measure to investigate hypotheses regarding action identification in chronic pain:
    - People who are more depressed will favour higher level act identification.
    - People who have higher levels of non-clinical negative mood will favour lower level act identification.
    - People who withdraw from or avoid activity (i.e. increasing psychological distance) will favour higher level act identification.
    - People who experience greater pain interference will favour lower level act identification.
- Aim 3: to investigate hypotheses regarding meaning in life in chronic pain:
    - People who experience greater pain interference will perceive less meaning in life.
    - People who favour higher level act identification will perceive more meaning in life.

Each of these research aims and corresponding hypotheses will be discussed in relation to the findings and existing literature.

5.2.1 Research Aim 1

A fit-for-use measure of action identification in chronic pain was developed. Items of the AIP were derived following a systematic review of existing measures of disability and functioning in chronic pain and developed in accordance with AIT and the BIF; therefore a degree of content validity is built in. This is an improvement over the BIF insofar as greater

suitability for use in chronic pain. The AIP has comparable psychometric properties to the BIF. It demonstrated satisfactory internal consistency in three independent samples and a principal component analysis revealed the existence of one primary factor and 13 minor factors. This is interpreted as evidence that the AIP is a scale which reliably measures level of meaning construed in action, but that additional sources of identity level variance (e.g. proficiency, familiarity, action complexity, etc) influence action identification level for individual items (Vallacher & Wegner, 1987). A rough estimate of test-retest reliability provided preliminary evidence that the AIP consistently measures action identification over a 2 to 3 week period.

No significant difference in total action identification level was found between the chronic pain patients sample and the sample of undergraduate students reported in Chapter 2. This does not mean that the factors influencing the level at which action is identified in chronic pain patients are the same as for other populations however (hence Research Aim 2). As the pain patients sample was small with a relatively high average age, this finding cannot be generalised beyond the immediate sample. The sample did however have more females than males which is consistent with literature which suggests that the prevalence of chronic pain is higher for females than males (Breivik, et al., 2006).

5.2.2 Research Aim 2

Investigation of the variables which relate to action identification in chronic pain was based on the above mentioned sample and interpretation relates to the sample only. No significant correlations were found between total action identification and the variables clinical level depression, non-clinical negative mood, psychological distance and pain interference. One explanation for this is that linear relationships were masked or 'cancelled out' because these variables exerted multiple opposing effects on action identification level (this complexity was alluded to in the hypothesised model in Chapter 1). For example, pain interference was hypothesised to negatively relate to action identification level (Vallacher & Wegner, 1985). However, interference also results in withdrawal and avoidance of activity which increases psychological distance between the individual and that act; and increased psychological distance is hypothesised to positively associate with action identification level (Liberman & Trope, 1998). Clinical level depression has also been associated with an increase in action identification level (Watkins, 2011). Alternative explanations are discussed considering each of the variables in turn.

5.2.2.1 Depression and Negative Mood

A shortcoming of use of the PHQ-9 to differentiate non-clinical negative mood from clinical level depression offers an alternative explanation for the lack of significant associations of these variables with total action identification (and the lack of significant

difference in total action identification between the two groups). People scoring between 0 and 4 (no depression), or 5 and 9 (mild depression) were placed in the category 'non-clinical negative mood'. People scoring between 10 and 14 (moderate depression), 15 and 19 (moderately severe depression), or 20 and 27 (severe depression) were placed in the category 'clinical level depression'. As this categorising was somewhat arbitrary (albeit based on classifications determined by the authors of the PHQ-9) it may not have been accurate enough to distinguish between non-clinical negative mood and clinical level depression. In reality, clinical level depression and non-clinical negative mood are unlikely to be mutually exclusive, though diagnosis of clinical level depression is generally accepted to be reliable if it is based on thorough assessment. Furthermore, categorisation into 2 groups reduced the already small sample size making significant correlations or difference between the two groups harder to detect.

5.2.2.2 Psychological Distance

There were no significant correlations between total action identification and either total psychological distance (i.e. total level of withdrawal and avoidance of activity), or action-specific psychological distance (i.e. the likelihood of the individual engaging in that particular act). Although withdrawal from an activity increases psychological distance, which is thought to increase action identification level (Liberman & Trope, 1998), it also decreases familiarity with, and experience in, that activity. Decreased familiarity and experience have been associated with a decrease in action identification level (Wegner & Vallacher, 1983, see Vallacher & Wegner, 1987). The effects of act familiarity and experience were not considered however they make the AIP-withdrawal flawed as a unidimensional measure of psychological distance. Furthermore, as items of the AIP concerned necessity or mundane tasks, the AIP-withdrawal received a high level of endorsement of most acts as having been engaged in in the last 6 months. Therefore subtle relationships in any direction would be very difficult to detect.

5.2.2.3 Pain Interference

An alternative explanation for the lack of significant relationship between overall level of pain interference and total action identification is that there was a relationship, but that the relationship was in fact action-specific (Vallacher & Wegner, 1985, 1987, 1989). The current measure of interference (BPI-sf interference scale) did not allow detection (or not) of such a relationship. However, spontaneous comments by participants whilst completing some items of the AIP card-sort task indicated that an action-specific relationship might exist. In relation to the item "Walking up and down hills" (a, "taking exercise"; or b, "putting one foot in front of the other"), comments such as "I used to like going for walks but I can't do it anymore so I'll have to say b", were common. Similarly for

the item "Doing the shopping" (a, "getting essential supplies; or b, "pushing a supermarket trolley"), participants who chose identity 'b' often stated "I need the trolley to lean on". Participants seemed to be attributing their preference for the low level identity to the interference caused by pain. This attribution did not tend to be the case for items concerning actions which were less physical and so perhaps less overtly disrupted by pain (e.g. "Joking with family members") or those which were not engaged in at all because of the pain (e.g. "Cleaning the windows"). Again in support of an action-specific relationship, participants who reported that their pain had decreased in severity over recent months sometimes commented "It used to be [e.g. putting one foot in front of the other] when I was at my worst but now I'd say [e.g. taking exercise]". Unfortunately however, comments made by participants regarding their response decisions were not consistently recorded or formally analysed so the claim of an action-specific relationship remains a hypothesis.

The presence of several equally plausible explanations for the current results makes it impossible to confidently reject the original research hypotheses. For this reason, the results are not interpreted as a threat to the concurrent validity of the AIP.

5.2.3 Research Aim 3

Again results were interpreted in relation to the current sample only. As hypothesised, pain interference significantly negatively correlated with meaning in life, and total action identification significantly positively correlated with meaning in life. Chronic pain of moderate to severe intensity can seriously interfere with ability to fulfil social and occupational activities (Breivik, et al., 2006). As engagement in such valued and worthwhile activities has been linked to sense of meaning in life (Morgan & Farsides, 2009a), it is logical to assume that interference to meaningful activity can negatively impact on sense of meaning in life. In contrast, higher levels of action identification are said to hold a greater level of meaning (concerning the goals and implications of action) and self-defining potential than lower levels of identification (Vallacher & Wegner, 1985).

The significance of these correlation coefficients was explored further via multiple regression analyses. Neither pain interference nor total action identification significantly contributed to variance in meaning in life when the effects of acceptance, depression and negative mood, and optimism were held constant. Whether the small sample size prevented subtle yet statistically significant contributions to variance from being detected, or whether in fact these variables per se truly account for no statistically significant variance, is unknown. Possible explanations for the results will be discussed in relation to each variable.

5.2.3.1 Pain Interference

Consistent with the observed results, pain interference may not significantly contribute to variance in meaning in life and the significant bivariate correlation explained

by the ‘third variable’ problem. It could be that the correlation between interference and meaning in life is partly accounted for by pain willingness. Pain willingness is a prerequisite of acceptance (McCracken, et al., 2004) and has been found to independently negatively predict reported level of pain interference (Richardson, et al., 2010). In the current research, pain interference did significantly negatively correlate with acceptance (and acceptance significantly contributed to variance in meaning in life).

Depression and negative mood may also have accounted for some of the variance in the correlation between pain interference and meaning in life. Depression can exacerbate pain interference (Gatchel, et al., 2007). A significant positive correlation was observed between pain interference and depression and negative mood (and depression and negative mood significantly contributed to variance in meaning in life), making this suggestion also plausible.

Pain interference was also significantly negatively correlated with optimism (and optimism significantly contributed to variance in meaning in life). It is also plausible therefore that capacity to anticipate a positive future and to ‘look on the bright side’ enhanced perceived level of functioning (i.e. less reported interference). There is no existing research to directly support or refute this claim, however optimism has been shown to correlate with active coping (Andersson, 1996).

An important consideration is that pain interference per se should not necessarily compromise meaning in life. It is the interference to action consistent with personal values, which is likely to affect sense of meaning (Robinson, Wicksell, & Olsson, 2004). The current research did not investigate personally valued behaviour as defined by the participant and perceived interference to this. Therefore it is not possible to say whether measurement of interference generally as opposed to interference to valued behaviour, explains the lack of significant contribution to variance in meaning in life.

5.2.3.2 Total Action Identification

As the results indicated, action identification might not significantly contribute to variance in meaning in life. The significant bivariate correlation between total action identification and meaning in life may be the result of a third variable operating. A significant positive correlation was found between total action identification and optimism. People who identified action at a higher level displayed more dispositional optimism. Perhaps then high level identities of the AIP were seen as more positive than low level identities (as they were more goal-like in nature) and so more likely to be selected by optimists. Thus dispositional optimism, rather than a greater level of meaning construed, may explain some variance in the positive correlation between total action identification and meaning in life. There is no existing research to support or refute this suggestion however.

An alternative explanation for the lack of significant contribution of action identification to variance in meaning in life concerns the multi-faceted nature of the construct meaning in life. Successful attainment of goals and valued outcomes and avoidance of negative mood (i.e. hedonic perspective) as well as personal growth, self-acceptance and self-realisation (i.e. eudemonic perspective) are necessary for wellbeing and to derive a sense of meaning in life (Ryan & Deci, 2001). The MLM measures many of the different aspects of meaning via its 5 subscales: exciting life, accomplished life, principled life, purposeful life and valued life (Morgan & Farsides, 2009a). The AIP however measures only meaning construed in action. The contribution of meaning construed in action to overall sense of meaning in life is likely to be small and so difficult to detect when considered alongside multiple other sources of meaning.

All above explanations are speculative based on a small sample size thus further research is necessary to substantiate any of the claims made.

5.2.4 Additional Findings

5.2.4.1 Significant Correlations

Intuitively, pain interference was positively correlated with pain intensity and with increased psychological distance. The greater the pain interference, the greater its reported intensity and the more withdrawal and avoidance of activity. A positive correlation was also found between age and meaning in life. The literature suggests that those at later life stages report a greater presence of meaning in their lives and less of a search for meaning (Steger, Oishi, & Kashdan, 2009).

Depression and chronic pain often co-occur (Bair, et al., 2003). The current research found depression and negative mood was positively correlated with pain intensity. The greater the endorsement of symptoms of depression, the greater the level of pain intensity reported. Vendrig and Lousberg (1997) using a longitudinal correlational design found a significant negative within-person correlation between pain intensity and mood, for many subjects. They measured both intensity and mood along likert scales whereby 0 indicated ‘no pain’ and 6 indicated ‘very much pain’; and 0 indicated ‘very negative mood’ and 6 indicated ‘very positive mood’ respectively.

Depression and negative mood was also found to negatively correlate with acceptance, which is consistent with existing research into acceptance of pain and emotional adjustment. For example, McCracken (1998) found that greater acceptance (measured by the CPAQ) was associated with less depression (measured by the BDI). A similar result was found by Viane and colleagues (2003). More recently it has been suggested that general acceptance, beyond acceptance of pain, contributes to reduced levels of depression in people

with chronic pain (McCracken & Gutierrez-Martinez, 2011; McCracken & Zhao-O'Brien, 2010). While some of the items of the PHQ-9 could have been contaminated by symptoms of pain (e.g. "Trouble falling or staying asleep, or sleeping too much"; "Trouble concentrating on things, such as reading the newspaper or watching television), these significant correlations in the expected directions imply that bias was minimal and the PHQ-9 was measuring symptoms of depression.

The above correlations which fit with the existing literature indicate that the data constituted a realistic picture of the experience of chronic pain in the current sample.

5.2.4.2 Variance in Meaning in Life

Acceptance was found to significantly contribute to variance in meaning in life. This is logical given that many correlates of greater acceptance and acceptance-based treatments (e.g. less distress, less impairment to psychosocial functioning, as discussed in Chapter 1) are prerequisites of ability to perceive purpose in life and pursue valued goals. It is these qualities and the accompanying sense of fulfilment and attainment of worthwhile goals which give rise to a sense of meaning in life (Reker, 2000).

Depression and negative mood significantly contributed to variance in meaning in life. This is consistent with the existing literature. For example, depression has been found to be a significant negative predictor of meaning in life in cancer survivors (Jim, Richardson, Golden-Kreutz, & Andersen, 2006) and adults in the general population (Scannell, Allen, & Burton, 2002). Positive affect has been found to be a significant positive predictor of meaning in life in undergraduate students (King, Hicks, Krull, & Del Gaiso, 2006) and adults in the general population (Scannell, et al., 2002). Scannell and colleagues (2002) found that positive wellbeing was in fact a stronger predictor than negative wellbeing. In the current research, when participants were separated into the categories clinical level depression and non-clinical negative mood, the correlation between non-clinical negative mood and meaning in life remained significant whereas that between clinical level depression and meaning in life did not. Given that this categorisation reduced an already small sample size, subtle effects were unlikely to have been detected. Perhaps non-clinical negative mood allowed for differing levels of reduced positive wellbeing, whereas clinical level depression was associated with an absence of positive wellbeing, thus detection of an effect of positive wellbeing accounts for the fact that only non-clinical negative mood maintained a significant relationship with meaning in life. This interpretation is purely speculative however.

Optimism was also found to significantly contribute to variance in meaning in life. There is no existing literature which explicitly investigates the power of dispositional optimism to predict meaning in life. However, the current finding is consistent with existing

literature insofar as optimism and meaning in life are positively associated (Ho, et al., 2010; Krause, 2003).

The significant contributions of variables to variance in meaning in life, which are consistent with the literature, suggest that the MLM was a true measure of meaning in life. For this reason, one item which was potentially contaminated by pain ("Facing my daily tasks is...a painful and boring experience *1*; ...a source of pleasure and satisfaction *7*) was not considered problematic. A realistic picture of meaning in life seems to have been achieved in the current sample of chronic pain patients.

5.3 Strengths and Limitations

Strengths and limitations of the current research are discussed in detail below. The formal process by which the AIP was developed, the novelty and feasibility of the research design, and the use of measures with established psychometric properties, were considered relative strengths. Limitations include the absence of tests of convergent validity for the AIP, and the small sample size preventing generalisation of results to the wider population. Potential shortcomings of some of the measures used, the likely existence of unmeasured variables, and issues of causality are also discussed.

5.3.1 Strengths

5.3.1.1 AIP

In developing the AIP, guidelines on scale construction and psychometric evaluation were closely adhered to. Correct statistical procedures were used. The psychometric properties were established prior to the main study supporting use of the AIP in its entirety in subsequent analyses. There was no reason to believe that the card-sort administration altered the validity or reliability of the AIP as the order of items remained the same.

5.3.1.2 Research Design

The research was approached from a novel perspective. No other research has applied AIT to investigate the way in which people with chronic pain derive meaning in their day-to-day lives. Furthermore, the multi-layered experience of chronic pain was captured via comparing possible associations of a large number of variables each known to be influential. This is the first time that the current combination of variables has been explicitly related to the construct meaning in life in the context of chronic pain.

Self-reported data was necessary given that chronic pain is such an intensely personal experience (thus it was decided that necessity for personal insight outweighed the threat of social desirability bias). The use of questionnaires provided quantitative data so that relationships between variables could be investigated efficiently. A qualitative research design would not have permitted this. Participants did not seem to struggle with

retrospective recall of thoughts or feelings experienced over the recent past (though it is acknowledged that retrospective recall is an unavoidable threat to the validity and reliability of results in any non-in-vivo design).

Interview-style administration of questionnaires allowed clarification of participants' responses when they seemed inconsistent. Some participants asked for clarification from the interviewer, particularly where responses to items resulted in double negatives which were said to be confusing (e.g. "Never true [of me]" in response to the item "It's not necessary for me to control my pain in order to handle my life well"). The process of clarification ensured that response choices selected were as intended by participants and not the result of misunderstandings.

5.3.1.3 Measures

With exception of the AIP and the AIP-withdrawal, all measures used were those which are commonly used in clinical and research settings and have established psychometric properties. Thus in this respect they were fit-for-purpose. In some instances, the use of standardised measures allowed comparison of results with those published in the literature to indicate results were valid insofar as means and significant correlations had been replicated.

5.3.2 Limitations

5.3.2.1 AIP

The convergent validity of the AIP was not investigated (this was in part due to the lack of an existing well established measure of action identification). Whether the AIP correlates with other measures of action identification is unknown.

5.3.2.2 Sample

The age distribution, average years experienced pain and most common diagnosis or cause of pain in the current sample are similar to a previous sample recruited from similar clinics (Wells, 2010). This suggests that the sample might be reasonably representative of patients accessing these services. However, the demographics of those patients visiting the clinics who chose not to take part, or who cancelled or did not attend for their interview, were not recorded. Therefore it is unknown whether the sample is typical of the wider population or not. The small size of the sample and its relatively high average age pose additional threats to the generalisability of the results. It is because of these limitations of the sample that the results were interpreted in relation to the sample only. The distribution of scores in the chronic pain population cannot be assumed based on the 47 people who participated. Further work involving several larger samples of pain patients recruited from a

wider variety of pain clinics and covering the full adult age range is necessary to produce normative data for the AIP and to further investigate meaning in life in chronic pain.

Various different 'rules of thumb' for determining the sample size required for a multiple linear regression exist. It is generally agreed that sample sizes for testing the statistical significance of a multiple correlation coefficient need not be as big as when aiming to obtain a useful regression equation (Knofczynski & Mundfrom, 2008). The sample size of 41 used in the current research meets the bare minimum requirement of 5 subjects per predictor (Tabachnick & Fidell, 1989). However, it does not meet other estimates for minimum number of subjects necessary to prevent bias (e.g. Harris, 1985; Nunnally, 1978). These estimates typically range from 50 to 100 subjects for a small number of predictors (2 or 3), but can be as large as 400 subjects for a large number of predictors (9 or 10). Further work is necessary with a much larger sample to reliably determine whether chronic pain interference and total action identification significantly contribute to variance in meaning in life.

5.3.2.3 Measures

For each participant, all measures were completed in one session to provide a snapshot perspective on how several variables relate at one point in time. However, not all measures were asking respondents to think back over the same period of time. For example, the BPI-sf predominantly refers to the previous 24 hours, the PHQ-9 refers to the past 2 weeks, the AIP-withdrawal refers to the last 6 months and the AIP, MLM, CPAQ-R and LOT-R do not stipulate a specific period of time so are assumed to refer to 'now' (though whether respondents interpreted items in terms of 'now' and even what timeframe constitutes 'now' are unknown). Whether this affected the results in any way is unknown. However, use of the BPI-sf in particular may have been problematic given that people with chronic pain often report "good days and bad days" and so pain experienced over the past 24 hours may not be as representative a measure as say typical level of interference over the past few weeks.

Potential additional shortcomings associated with the use of the BPI-sf interference scale in the current research, as well as the PHQ-9 and AIP-withdrawal, have been mentioned already. Consideration must also be given to the suitability of the MLM. Steger (2006) notes how many measures of meaning are confounded on an item level with many of the variables they correlate with in their research applications (e.g. purpose, efficacy, self-worth, etc). The MLM included items which may have been 'contaminated' by depression (e.g. "My life is worthwhile" and "I hold my own life in high regard") thus potentially biasing investigation of correlates with and predictors of meaning in life. This was not

considered during selection of the measure, where the primary concern had been selection of a comprehensive yet brief measure.

5.3.2.4 Measured and Unmeasured Variables

In any bivariate correlation, there may be other measured or unmeasured variables affecting the results (Field, 2000). The preliminary correlation analyses in the current research did not control for this. For many of the significant correlations, the amount of variability in one variable explained by the other was not calculated.

With regard to research aim 3, when all the variables were entered into the regression model, it accounted for 51.6% of variance in meaning in life scores. Therefore, other unmeasured variables must have been affecting meaning in life. Steger (2006) comments how attributes such as having a coherent life narrative and self-transcendence (i.e. freeing oneself from limiting aspects of personality and behaviour) have been suggested as necessary to achieve a sense of meaning in life. Such attributes may be particularly important in the experience of chronic pain where disability and loss of valued roles can challenge a person's assumed life trajectory (though this has never explicitly been investigated). Such attributes are worthy of consideration in future studies.

Modification of maladaptive cognitions is integral to cognitive-behavioural interventions aimed at improving engagement in valued aspects of life and reducing levels of distress in chronic pain patients. However, the current research did not consider the influence of cognitions such as fear-avoidance beliefs. Catastrophic perceptions of the pain experience are thought to trigger chronicity, as well as initiate a vicious cycle of fear about pain and re-injury. This results in attempts to avoid re-injury by avoidance of activity and hypervigilance to pain symptoms (Vlaeyen & Linton, 2000). Fear-avoidance beliefs therefore negatively impact on functional capacity and increase disability (Basler, Luckmann, Wolf, & Quint, 2008; Lee, Chiu, & Lam, 2007). Furthermore, preliminary data has found reduced pain-related anxiety to be a predictor of reduced depression and reduced pain interference following treatment (McCracken, Gross, & Eccleston, 2002). It is therefore likely that fear-avoidance beliefs and pain-related anxiety also influence meaning in life in chronic pain.

5.3.2.5 Cause-Effect Relationships and Within-Person Correlations

No variables were manipulated and they were all measured at one point in time only. Therefore it was not possible to investigate cause-effect relationships. However, studies which artificially primed action identification level have found that action identification level can have an effect on task performance and affect (Ferguson & Sheldon, 2010; Vallacher, et al., 1989; Watkins, et al., 2008) as well as vice versa. This suggests that the

relationships between many variables considered in the current research and action identification are likely to be bidirectional.

Despite chronic pain being an internalised experience, the current research focussed on between-person correlations only. This is somewhat reductionist in assuming commonality between individuals. Vendrig and Lousberg (1997) stress the importance of within-person correlations suggesting that within-person level associations may have a different meaning than between-person level associations. Vendrig and Lousberg also point out that longitudinal within-person correlations can highlight important patterns such as the diurnal variation in association between pain intensity and mood. Investigation of cause-effect relationships and within-person correlations should be a future goal once the predictors of action identification and meaning in life in chronic pain have been more reliably established.

5.4 Clinical Implications

The AIP has proved to be psychometrically sound, sensitive to individual variation in action identification level and quick and easy to administer and score. It can be administered to various audiences in a number of different settings and using a number of different styles of delivery. Further work using the AIP is necessary to reliably understand the process of action identification in chronic pain and thus determine any clinical utility of the construct in this population.

Despite the small sample size, acceptance, depression and negative mood and optimism consistently contributed significantly to variance in meaning in life when different additional variables were entered into the regression analyses. This suggests that these findings may be relatively robust. The significant contribution of acceptance in particular is consistent with the growing body of evidence in support of acceptance and commitment based interventions (for a review of recent acceptance-based treatment outcome studies see McCracken & Gutierrez-Martinez, 2011). Acceptance and Commitment Therapy (ACT) with chronic pain patients aims to help patients see that elimination or control of pain are unworkable strategies (which result in isolation from work and social activities) and replace this with a willingness to experience thoughts and feelings associated with pain. In other words, ACT aims to increase psychological flexibility. ACT also concretely focuses on behavioural changes necessary to create a more meaningful life via engagement in patterns of committed action that are consistent with personal values (Robinson, et al., 2004). Therefore, promoting a sense of meaning in life may not necessarily be about encouraging the chronic pain patient to ‘do more’ or to be aware of ‘why they are doing’ (interference did not significantly contribute to variance in meaning in life, nor did level of meaning

construed in action), rather it may be about ‘doing differently’ to bring one’s existence in line with personal values and goals. Future studies should investigate this hypothesis.

As optimism significantly contributed to variance in meaning in life, optimism training may be another intervention with the potential to increase meaning in life in chronic pain. Optimism training has been found to be effective with students. Meevissen, Peters and Alberts (2011) asked students to imagine their ‘best possible self’ according to personal, relational and professional domains, for 5 minutes every day for 2 weeks. This best possible self imagery lead to a greater increase in optimism over the 2 week period, than in a control group who were asked to imagine their daily activities. The effect was independent of mood. Similar effects of increased optimism have been found with experimental manipulations such as answering questions designed to activate thoughts of success (i.e. encouraging positive outcome expectancies), or creating grammatically correct sentences from scrambled words containing optimism-related prime words (Fosnaugh, Geers, & Wellman, 2009). Further work is necessary to investigate the potential use of optimism training in increasing meaning in life in chronic pain patients (particularly since optimism may also be related to a higher level of action identification, which, as discussed in Chapter 1, has benefits).

To date there have been no reported interventions specifically targeting optimism in chronic pain patients. However, Professor Madelon Peters (Maastricht University) is exploring whether best possible self imagery over 6 weeks (in combination with some other positive psychology techniques) is helpful for increasing wellbeing in chronic pain (M. L. Peters, personal communication, June 10, 2011). This work involves a repeated single-case trial in Orebro (Sweden), run in collaboration with Professor Steven Linton (Orebro University). The next step will involve developing an internet-based intervention for increasing optimism.

5.5 Further Directions

The above discussion has highlighted the need for further investigation of action identification and meaning in life in chronic pain with several larger, more representative samples. This would also allow further validation of the AIP. Several ways in which the current methodology could be improved are also proposed (though the list is not exhaustive):

- Use of more stringently defined non-clinical and clinical samples and experimental manipulation of negative mood to investigate the relationships between non-clinical negative mood and action identification, and clinical level depression and action identification (e.g. determine groups via psychometric evaluation and clinical interview and induce negative affect via reading a sad vignette).

- Inclusion of a measure able to distinguish between psychological distance and action familiarity (e.g. ask respondents to rate the likelihood of them engaging in an act in the foreseeable future, as well as the number of times they have engaged in it in the recent past).
- Inclusion of a measure of pain interference which uses a broader time-scale (e.g. the Pain Disability Index, PDI, Pollard, 1984, which refers to typical level of interference experienced in various life domains).
- Inclusion of a measure of action-specific interference to further investigate the relationship between pain interference and action identification level (e.g. ask participants to rate the level of pain interference for each item of the AIP).
- Investigation of the reasons for selecting particular identities on the AIP, in order to further investigate action-specific factors influencing action identification level such as interference (e.g. ask participants to provide a reason for their response choice and then group responses into themes).
- Investigation of personally valued behaviours and interference to these (e.g. ask participants to rank-order a list of behaviours according to how much they value each and to rate the level of interference to each).
- Use of a measure of meaning in life which is less contaminated by items relating to depression (e.g. Meaning in Life Questionnaire, MLQ, Steger, et al., 2006, which was found to be free from inordinate covariance with other measures of wellbeing).
- Consider measurement of other variables which contribute to variance in meaning in life (e.g. self-transcendence as measured by the Temperament and Character Inventory, TCI, Cloninger, 1999).
- Consider measurement of other variables associated with functioning in chronic pain (e.g. fear-avoidance beliefs as measured by the Fear-Avoidance Beliefs Questionnaire, FABQ, Waddell, Newton, Henderson, & Somerville, 1993).

5.6 Conclusions

The current research has introduced a new direction for study in the field of chronic pain. A psychometrically sound measure of action identification has been developed to aid future investigation of the level of meaning construed in action. Methodological limitations prevent firm conclusions from being drawn and further work is necessary to reliably understand the process of action identification in chronic pain.

The preliminary results corroborate existing literature on the association of acceptance of pain with perceived meaning in life. This finding supports the use of clinical interventions aimed at increasing acceptance of pain while bringing patterns of behaviour in line with personal values (e.g. ACT). Optimism was also found to contribute to variance in

meaning in life which indicates that interventions aimed at training optimism may also be helpful in increasing meaning in life in chronic pain.

REFERENCES

Allison, P. J., Guichard, C., & Gilain, L. (2000). A prospective investigation of dispositional optimism as a predictor of health-related quality of life in head and neck cancer patients. *Quality of Life Research: An International Journal of Quality of Life Aspects of Treatment, Care and Rehabilitation, 9*(8), 951-960.

Andersson, G. (1996). The benefits of optimism: a meta-analytic review of the life orientation test. *Personality and Individual Differences, 21*(5), 719-725.

Antonovsky, A. (1979). *Health, stress and coping*. San Francisco, CA: Jossey-Bass Publishers.

Antonovsky, A. (1987). *Unravelling the mystery of health: how people manage stress and stay well*. London: Josey-Bass Ltd.

Bair, M. J., Robinson, R. L., Katon, W., & Kroenke, K. (2003). Depression and pain comorbidity: a literature review. *Archives of International Medicine, 163*(10), 2433-2445.

Bandura, A. (2001). Social cognitive theory: an agentic perspective. *Annual Review of Psychology, 52*, 1-26.

Basler, H. D., Luckmann, J., Wolf, U., & Quint, S. (2008). Fear-avoidance beliefs, physical activity, and disability in elderly individuals with chronic low back pain and healthy controls. *The Clinical Journal of pain, 24*(7), 604-610.

Battista, J., & Almond, R. (1973). The development of meaning in life. *Psychiatry: Journal for the Study of Interpersonal Processes, 36*(4), 409-427.

Beck, A. T. (1996). *Manual for the Beck Depression Inventory - BDI-II*. San Antonio, TX: Psychological Corporation.

Benyamini, Y. (2004). Can high optimism and high pessimism co-exist? Findings from arthritis patients coping with pain. *Personality and Individual Differences, 38*(6), 1463-1473.

Bergner, M., Bobbit, R. A., Carter, W. B., & Gibson, B. S. (1981). The sickness impact profile: development and final revision of a health status scale. *Medical Care, 19*(8), 787-805.

Bishop, D. I., Thomas, R. W., & Peper, B. M. (2000). Levels of personal agency among academic majors. *Psychological Reports, 86*(1), 221-224.

Bond, F. W., Flaxman, P. E., & Bunce, D. (2008). The influence of psychological flexibility on work redesign: mediated moderation of a work reorganisation intervention. *Journal of Applied Psychology, 93*(3), 645-654.

BOS (2006). Bristol Online Surveys BEG 41. from http://www.survey.bris.ac.uk

Bradley, L. A., & McKendree-Smith, N. L. (2001). Assessment of psychological status using interviews and self-report instruments. In D. C. Turk & R. Melzack (Eds.), *Handbook of pain assessment* (2nd ed., pp. 292-319). New York, NY: Guilford Press.

Breivik, H., Collett, B., Ventafridda, V., Cohen, R., & Gallacher, D. (2006). Survey of chronic pain in Europe: prevalence, impact on daily life, and treatment. *European Journal of Pain, 10*(4), 287-333.

Carver, C. S., & Scheier, M. F. (1981). *Attention and self-regulation: a control-theory approach to human behaviour*. New York, NY: Springer-Verlag.

Carver, C. S., & Scheier, M. F. (1990). Origins and functions of positive and negative affect: a control-process view. *Psychological Review, 97*(1), 19-35.

Carver, C. S., & Scheier, M. F. (1999). Control theory: a useful conceptual framework for personality-social, clinical, and health psychology. In R. F. Baumeister (Ed.), *The self in social psychology* (pp. 299-316). Philadelphia, PA: Psychology Press.

Clark, A. E., & Semin, G. R. (2008). Receivers' expectations for abstract versus concrete construal: conversational relevance as a determinant of construal level. *Journal of Language and Social Psychology, 27*(2), 155-167.

Cleeland, C. S. (1991). Pain assessment in cancer. In D. Osoba (Ed.), *Effect of cancer on quality of life* (pp. 293-305). Boca Raton, FL: CRC Press Inc.

Cloninger, C. R. (1999). *The Temperament and Character Inventory - Revised*. St. Louis, MO: Washington University, Centre for Psychobiology of personality.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika, 16*(3), 297-334.

Crumbaugh, J. C., & Maholick, L. T. (1964). An experimental study in existentialism: the psychometric approach to Frankl's concept of noogenic neurosis. *Journal of Clinical Psychology, 20*(2), 200-207.

Dahl, J., Wilson, K. G., & Luciano, C. (2005). *Acceptance and commitment therapy for chronic pain*. Reno, NV: Context Press.

Dahl, J., Wilson, K. G., & Nilsson, A. (2004). Acceptance and commitment therapy and the treatment of persons at risk for long-term disability resulting from stress and pain symptoms: a preliminary randomised trial. *Behaviour Therapy, 35*(4), 785-802.

Ferguson, Y. L., & Sheldon, K. M. (2010). Should goal-strivers think about "why" or "how" to strive? *Motivation and Emotion, 34*(3), 253-265.

Field, A. (2000). *Discovering statistics using SPSS for Windows*. London: SAGE Publications.

Field, A. P. (2009). *Discovering statistics using SPSS: and sex and drugs and rock 'n' roll* (3rd ed.). London: SAGE Publications.

Fosnaugh, J., Geers, A. L., & Wellman, J. A. (2009). Giving off a rosy glow: the manipulation of an optimistic orientation. *The Journal of Social Psychology, 149*(3), 249-263.

Frankl, V. (1963). *Man's search for meaning*. London: Hodder & Stoughton.

Freitas, A. L., Clark, S. L., Kim, J. Y., & Levy, S. R. (2009). Action-construal levels and perceived conflict among ongoing goals: implications for positive affect. *Journal of Research in Personality, 43*(5), 938-941.

Freitas, A. L., Salovey, P., & Liberman, N. (2001). Abstract and concrete self-evaluative goals. *Journal of Personality and Social Psychology, 80*(3), 410-424.

Gatchel, R. J. (1996). Psychological disorders and chronic pain: cause and effect relationships. In R. J. Gatchel & D. C. Turk (Eds.), *Psychological approaches to pain management: a practitioner's handbook* (pp. 33-54). New York, NY: Guilford Publications.

Gatchel, R. J., Peng, Y. B., Peters, M. L., Fuchs, P. N., & Turk, D. C. (2007). The biopsychosocial approach to chronic pain: scientific advances and future directions. *Psychological Bulletin, 133*(4), 581-624.

Geers, A. L., Wellman, J. A., Heifer, S. G., Fowler, S. L., & France, C. R. (2008). Dispositional optimism and thoughts of well-being determine sensitivity to an experimental pain task. *Annals of Behavioural Medicine, 36*(3), 304-313.

Geiser, D. S. (1992). A comparison of acceptance-focused and control-focused psychological treatments in a chronic pain treatment centre. University of Nevada.

Halama, P., & Dedova, M. (2007). Meaning in life and hope as predictors of positive mental health: do they explain residual variance not predicted by personality traits? *Studia Psychologica, 49*(3), 191-200.

Harris, L. R., & Brown, G. T. L. (2010). Mixing interview and questionnaire methods: practical problems in aligning data. *Practical Assessment, Research and Evaluation, 15*(1), 1-19.

Harris, R. J. (1985). *A primer of multivariate statistics* (2nd ed.). Orlando, FL: Academic.

Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (1999). *Acceptance and commitment therapy: an experiential approach to behaviour change*. New York, NY: Guildford.

Ho, M. Y., Cheung, F. M., & Cheung, S. F. (2010). The role of meaning in life and optimism in promoting well-being. *Personality and Individual Differences, 48*(5), 658-663.

Hoffman, B. M., Chatkoff, D. K., Papas, R. K., & Kerns, R. D. (2007). Meta-analysis of psychological interventions for chronic low back pain. *Health Psychology, 26*(1), 1-9.

Horley, J. (2000). Value assessment and everyday activities. *Journal of Constructivist Psychology, 13*(1), 67-73.

IBM (2009). PASW statistics 18. New York, NY: IBM.

Jensen, M. P. (2010). Chronic pain. In A. F. Barabasz, K. Olness, R. Boland & S. Kahn (Eds.), *Medical hypnosis primer: clinical and research evidence* (pp. 25-32). New York, NY: Routledge/Taylor & Francis Group.

Jim, H. S., Richardson, S. A., Golden-Kreutz, D. M., & Andersen, B. L. (2006). Strategies used in coping with a cancer diagnosis predict meaning in life for survivors. *Health Psychology, 25*(6), 753-761.

Johnston, M., Foster, M., Shennan, J., Starkey, N. J., & Johnson, A. (2010). The effectiveness of an acceptance and commitment therapy self-help intervention for chronic pain. *Clinical Journal of Pain, 26*(5), 393-402.

Kaiser, H. F. (1960). The application of electronic computers to factor analysis. *Educational and Psychological Measurement, 20*(1), 141-151.

Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika, 39*(1), 31-36.

Kames, L. D., Naliboff, B. D., Heinrich, R. L., & Schag, C. C. (1984). The chronic illness problem inventory: problem-orientated psychosocial assessment of patients with chronic illness. *International Journal of Psychiatry in Medicine, 14*(1), 65-75.

Keller, S., Bann, C. M., Dodd, S., Schein, J., Mendoza, T. R., & Cleeland, C. S. (2004). Validity of the Brief Pain Inventory for use in documenting the outcomes of patients with noncancer pain. *Clinical Journal of Pain, 20*(5), 309-318.

Kempen, G. I. J. M., & Suurmeijer, T. P. B. M. (1990). The development of a hierarchical polychotomous ADL-IADL scale for noninstitutionalized elders. *The Gerontologist, 30*(4), 497-502.

Kerns, R. D., Turk, D. C., & Rudy, T. E. (1985). The West Haven-Yale Multidimensional Pain Inventory (WHYMPI). *Pain, 23*(4), 345-356.

King, L. A., Hicks, J. A., Krull, J. L., & Del Gaiso, A. K. (2006). Positive affect and the experience of meaning in life. *Journal of Personality and Social Psychology, 90*(1), 179-196.

Knofczynski, G. T., & Mundfrom, D. (2008). Sample sizes when using multiple linear regression for prediction. *Psychological Measurement, 68*(3), 431-442.

Koffka, K. (1935). *The principles of gestalt psychology*. New York, NY: Harcourt.

Krause, N. (2003). Religious meaning and subjective well-being in late life. *The Journals of Gerontology: Series B: Psychological Sciences and Social Sciences, 58B*(3), S160-S170.

Kroenke, K., Spitzer, R. L., & Williams, J. B. W. (2001). The PHQ-9: validity of a brief depression severity measure. *Journal of General Internal Medicine, 16*(9), 606-613.

Kubzansky, L. D., Kubzansky, P. E., & Maselko, J. (2004). Optimism and pessimism in the context of health: bipolar opposites or separate constructs? *Personality and Social Psychology Bulletin, 30*(8), 943-956.

Lee, K. C., Chiu, T. T. W., & Lam, T. H. (2007). The role of fear-avoidance beliefs in patients with neck pain: relationships with current and future disability and work capacity. *Clinical Rehabilitation, 21*(9), 812-821.

Libby, L. K., Shaeffer, E. M., & Eibach, R. P. (2009). Seeing meaning in action: a bidirectional link between visual perspective and action identification level. *Journal of Experimental Psychology: General, 138*(4), 503-516.

Liberman, N., & Trope, Y. (1998). The role of feasibility and desirability considerations in near and distant future decisions: a test of temporal construal theory. *Journal of Personality and Social Psychology, 75*(1), 5-18.

Mahler, H. I. M., & Kulik, J. A. (2000). Optimism, pessimism and recovery from coronary bypass surgery: prediction of affect, pain and functional status. *Psychology, Health and Medicine, 5*(4), 347-358.

Mascaro, N., Rosen, D. H., & Morey, L. C. (2004). The development, construct validity, and clinical utility of the spiritual meaning scale. *Personality and Individual Differences, 37*(4), 845-860.

McCracken, L. M. (1998). Learning to live with the pain: acceptance of pain predicts adjustment in persons with chronic pain. *Pain, 74*(1), 21-27.

McCracken, L. M., Gross, R. T., & Eccleston, C. (2002). Multimethod assessment of treatment process in chronic low back pain: comparison of reported pain-related anxiety with directly measured physical capacity. *Behaviour Research and Therapy, 40*(5), 585-594.

McCracken, L. M., & Gutierrez-Martinez, O. (2011). Processes of change in psychological flexibility in an interdisciplinary group-based treatment for chronic pain based on acceptance and commitment therapy. *Behaviour Research and Therapy, 49*(4), 267-274.

McCracken, L. M., Vowles, K. E., & Eccleston, C. (2004). Acceptance of chronic pain: component analysis and a revised assessment method. *Pain, 107*(1-2), 159-166.

McCracken, L. M., Vowles, K. E., & Eccleston, C. (2005). Acceptance-based treatment for persons with complex, long standing chronic pain: a preliminary analysis of treatment outcome in comparison to a waiting phase. *Behaviour Research and Therapy, 43*(10), 1335-1346.

McCracken, L. M., & Yang, S. Y. (2006). The role of values in a contextual cognitive-behavioural approach to chronic pain. *Pain, 123*(1-2), 137-145.

McCracken, L. M., & Zhao-O'Brien, J. (2010). General psychological acceptance and chronic pain: there is more to accept than the pain itself. *European Journal of Pain, 14*(2), 170-175.

Meenan, R. F., Mason, J. H., Anderson, J. J., Guccione, A. A., & Kazis, L. E. (1992). AIMS2: the content and properties of a revised and expanded Arthritis Impact Measurement Scales health status questionnaire. *Arthritis and Rheumatism, 35*(1), 1-10.

Meevissen, Y. M. C., Peters, M. L., & Alberts, H. J. E. M. (2011). Become more optimistic by imagining a best possible self: effects of a two week intervention. *Journal of Behaviour Therapy and Experimental Psychiatry, 42*(3), 371-378.

Merskey, H., & Bogduk, N. (1994). *Classification of chronic pain: descriptions of chronic pain syndromes and definitions of pain terms*. Seattle, WA: IASP Press.

Millard, R. W. (1991). A critical review of questionnaires for assessing pain-related disability. *Journal of Occupational Rehabilitation, 1*(4), 289-302.

Morgan, J., & Farsides, T. (2009a). Measuring meaning in life. *Journal of Happiness Studies, 10*(2), 197-214.

Morgan, J., & Farsides, T. (2009b). Psychometric evaluation of the meaningful life measure. *Journal of Happiness Studies, 10*(3), 351-366.

Morley, S., Davies, C., & Barton, S. (2005). Possible selves in chronic pain: self-pain enmeshment, adjustment and acceptance. *Pain, 115*(1-2), 84-94.

Morley, S., Eccleston, C., & Williams, A. (1999). A systematic review and meta-analysis of randomised controlled trials of cognitive behaviour therapy and behaviour therapy for chronic pain in adults, excluding headache. *Pain, 80*(1-2), 1-13.

Naufel, K. Z., & Beike, D. R. (2009). Abstract thought emphasises goal performance; concrete thought emphasises goal completion. *North American Journal of Psychology, 11*(1), 97-110.

Nunnally, J. C. (1978). *Psychometric theory* (2nd ed.). New York, NY: McGraw-Hill.

Olesovsky, P. (2003). Meaning in life, and depression: a comparative study of the relation between them across the life span. *Dissertation Abstracts International: Section B: The Sciences and Engineering, 64*(2-B), 972.

Owens, G. P., Steger, M. F., Whitesell, A. A., & Herrera, C. J. (2009). Posttraumatic stress disorder, guilt, depression, and meaning in life among military veterans. *Journal of Traumatic Stress, 22*(6), 654-657.

Pincus, T., & Morley, S. (2001). Cognitive-processing bias in chronic pain: a review and integration. *Psychological Bulletin, 127*(5), 599-617.

Pollard, C. A. (1984). Preliminary validity study of the pain disability index. *Perceptual and Motor Skills, 59*(3), 974.

Reker, G. T. (1992). *Manual of the life attitude profile-revised*. Peterborough, ON: Student Psychologists Press.

Reker, G. T. (2000). Theoretical perspectives, dimensions and measurement of existential meaning. In G. T. Reker & K. Chamberlain (Eds.), *Exploring existential meaning: optimising human development across the life span* (pp. 39-55). Thousand Oaks, CA: Sage.

Richardson, E. J., Ness, T. J., Doleys, D. M., Banos, J. H., Cianfrini, L., & Richards, J. S. (2010). Catastrophising, Acceptance, and interference: laboratory findings, subjective report, and pain willingness as a moderator. *Health Psychology, 29*(3), 299-306.

Riichiro, I., & Masahiko, O. (2006). Effects of a firm purpose in life on anxiety and sympathetic nervous activity caused by emotional stress: assessment by psycho-physiological method. *Stress and health, 22*(4), 275-281.

Ritts, V., & Patterson, M. L. (1996). Effects of social anxiety and action identification on impressions and thoughts interaction. *Journal of Social and Clinical Psychology, 15*(2), 191-205.

Robinson, P., Wicksell, R. K., & Olsson, G. L. (2004). ACT with chronic pain patients. In S. C. Hayes & K. D. Strosahl (Eds.), *A practical guide to acceptance and commitment therapy* (pp. 315-345). New York, NY: Springer Science+Business media Inc.

Rudy, T. E., Kerns, R. D., & Turk, D. C. (1988). Chronic pain and depression: toward a cognitive-behavioural mediation model. *Pain, 35*(2), 129-140.

Ryan, R. M., & Deci, E. L. (2001). On happiness and human potentials: a review of research on hedonic and eudemonic well-being. *Annual Review of Psychology, 52*(1), 141-166.

Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology, 57*(6), 1069-1081.

Ryff, C. D., & Singer, B. (1998). The contours of positive human health. *Psychological Inquiry, 9*(1).

Scannell, E. D., Allen, F. C. L., & Burton, J. (2002). Meaning in life and positive and negative well-being. *North American Journal of Psychology, 4*(1), 93-112.

Scheier, M. F., & Carver, C. S. (1985). Optimism, coping, and health: assessment and implications of generalized outcome expectancies. *Health Psychology, 4*(3), 219-247.

Scheier, M. F., Carver, C. S., & Bridges, M. W. (1994). Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): a re-evaluation of the life orientation test. *Journal of Personality and Social Psychology, 67*(6), 1063-1078.

Segerstrom, S. C., Evans, D. R., & Eisenlohr-Moul, T. A. (2011). Optimism and pessimism dimensions of the Life Orientation Test-Revised: method and meaning. *Journal of Research in Personality, 45*(1), 126-129.

Shepperd, J. A., Maroto, J. J., & Pbert, L. A. (1996). Dispositional optimism as a predictor of health changes among cardiac patients. *Journal of Research in Personality, 30*(4), 517-534.

Siedel, S. D., Stasser, G. L., & Collier, S. A. (1998). Action identification theory as an explanation of social performance. *Group Dynamics: Theory, Research and Practice, 2*(3), 147-154.

Skinner, B. F. (1953). *Science and human behaviour*. New York, NY: Macmillan.

Spector, P. E. (1992). *Summated rating scale construction*. London: SAGE Publications.

Spitzer, R. L., Kroenke, K., & Williams, J. B. W. (1999). Validation and utility of a self-report version of PRIME-MD: the PHQ primary care study. *Journal of the American Medical Association, 282*(10), 1773-1774.

Steger, M. F. (2006). An illustration of issues in factor extraction and identification of dimensionality in psychological assessment data. *Journal of Personality Assessment, 86*(3), 263-272.

Steger, M. F., Frazier, P., Oishi, S., & Kaler, M. (2006). The meaning in life questionnaire: assessing the presence of and search for meaning in life. *Journal of Counselling Psychology, 53*(1), 80-93.

Steger, M. F., Mann, J. R., Michels, P., & Cooper, T. C. (2009). Meaning in life, anxiety, depression, and general health among smoking cessation patients. *Journal of Psychosomatic Research, 67*(4), 353-358.

Steger, M. F., Oishi, S., & Kashdan, T. B. (2009). Meaning in life across the life span: levels and correlates of meaning in life from emerging adulthood to older adulthood. *The Journal of Positive Psychology, 4*(1), 43-52.

Strack, S., Carver, C. S., & Blaney, P. H. (1987). Predicting successful completion of an aftercare programme following treatment for alcoholism: the role of dispositional optimism. *Journal of Personality and Social Psychology, 53*(3), 579-584.

Sutherland, R., & Morley, S. (2008). Self-pain enmeshment: future possible selves, sociotropy, autonomy and adjustment to chronic pain. *Pain, 137*(3), 366-377.

Tabachnick, B. G., & Fidell, L. S. (1989). *Using multivariate statistics*. Cambridge, MA: Harper & Row.

Tang, N. K. Y., Goodchild, C. E., Hester, J., & Salkovskis, P. M. (2010). Mental defeat is linked to interference, distress and disability in chronic pain. *Pain, 149*(3), 547-555.

Tang, N. K. Y., Salkovskis, P. M., & Hanna, M. (2007). Mental defeat in chronic pain: initial exploration of the concept. *Clinical Journal of Pain, 23*(3), 222-232.

Torelli, C. J., & Kaikati, A. M. (2009). Values as predictors of judgements and behaviours: the role of abstract and concrete mindsets. *Journal of Personality and Social Psychology, 96*(1), 231-247.

Turk, D. C., & Okifuji, A. (2002). Psychological factors in chronic pain: evolution and revolution. *Journal of Consulting and Clinical Psychology, 70*(3), 678-690.

Turner, J. A., Holtzman, S., & Mancl, L. (2007). Mediators, moderators, and predictors of therapeutic change in cognitive-behavioral therapy for chronic pain. *Pain, 127*(3), 276-286.

Vallacher, R. R., & Wegner, D. M. (1985). *A theory of action identification*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Vallacher, R. R., & Wegner, D. M. (1987). What do people think they're doing? Action identification and human behaviour. *Psychological Review, 94*(1), 3-15.

Vallacher, R. R., & Wegner, D. M. (1989). Levels of personal agency: individual variation in action identification. *Journal of Personality and Social Psychology, 57*(4), 660-671.

Vallacher, R. R., Wegner, D. M., & Frederick, J. (1981). Experience and the identification of action. *Unpublished research data*.

Vallacher, R. R., Wegner, D. M., & Frederick, J. (1987). The presentation of self through action identification. *Social Cognition, 5*(3), 301-322.

Vallacher, R. R., Wegner, D. M., & Somoza, M. P. (1989). That's easy for you to say: action identification and speech fluency. *Journal of Personality and Social Psychology, 56*(2), 199-208.

Vendrig, A. A., & Lousberg, R. (1997). Within-person relationships among pain intensity, mood and physical activity in chronic pain: a naturalistic approach. *Pain, 73*(1), 71-76.

Viane, I., Crombez, G., Eccleston, C., Poppe, C., Devulder, J., van Houdenhove, B., et al. (2003). Acceptance of pain is an independent predictor of mental well-being in patients with chronic pain: empirical evidence and reappraisal. *Pain, 106*(1-2), 65-72.

Vlaeyen, J. W., & Linton, S. J. (2000). Fear-avoidance and its consequences in chronic musculoskeletal pain: a state of the art. *Pain, 85*(3), 317-332.

Vowles, K. E., & McCracken, L. M. (2008). Acceptance and values-based action in chronic pain: a study of treatment effectiveness and process. *Journal of Consulting and Clinical Psychology, 76*(3), 397-407.

Waddell, G., Newton, M., Henderson, I., & Somerville, D. (1993). A fear-avoidance beliefs questionnaire (FABQ) and the role of fear-avoidance beliefs in chronic low back pain and disability. *Pain, 52*(2), 157-168.

Watkins, E. (2011). Dysregulation in level of goal and action identification across psychological disorders. *Clinical Psychology Review, 31*(2), 260-278.

Watkins, E., Moberly, N. J., & Moulds, M. L. (2008). Processing mode causally influences emotional reactivity: distinct effects of abstract versus concrete construal on emotional response. *Emotion, 8*(3), 364-378.

Watkins, K. W., Shifren, K., Park, D. C., & Morrell, R. W. (1999). Age, pain, and coping with rheumatoid arthritis. *Pain, 82*(3), 217-228.

Wegner, D. M., Connally, D., Shearer, D., & Vallacher, R. R. (1983). Disruption and identifications of the act of eating. *Unpublished research data*.

Wegner, D. M., Gould, J., & Vallacher, R. R. (1983). Action identification level and behaviour consistency. *Unpublished research data*.

Wegner, D. M., & Vallacher, R. R. (1983). Action identification level and maintenance indicator ratings. *Unpublished research data*.

Wegner, D. M., & Vallacher, R. R. (1986). Action identification. In R. M. Sorrentino & E. T. Higgins (Eds.), *Handbook of motivation and cognition: foundations of social behaviour* (pp. 550-582). New York: Guilford.

Wegner, D. M., Vallacher, R. R., & Kelly, M. (1983). Identification of the act of getting married. *Unpublished research data*.

Wegner, D. M., Vallacher, R. R., Kiersted, G. W., & Dizadji, D. (1986). Action identification in the emergence of social behaviour. *Social Cognition, 4*, 18-38.

Wegner, D. M., Vallacher, R. R., Macomber, G., Wood, R., & Arps, K. (1984). The emergence of action. *Journal of Personality and Social Psychology, 46*(2), 269-279.

Wells, C. E. (2010). Persistence with non-functional problem solving in chronic pain. Unpublished D. Clin. Psychol. thesis. University of Leeds.

Wicksell, R. K., Ahlqvist, J., Bring, A., Melin, L., & Olsson, G. L. (2008). Can exposure and acceptance strategies improve functioning and life satisfaction in people with chronic pain and whiplash-associated disorders (WAD)? A randomised controlled trial. *Cognitive Behaviour Therapy, 37*(3), 169-182.

Williams, J. W., Pignone, M., Ramirez, G., & Stellato, C. P. (2002). Identifying depression in primary care: a literature synthesis of case-finding instruments. *General Hospital Psychiatry, 24*(4), 225-237.

Wong, P. T. P. (1998). Implicit theories of meaningful life and the development of the personal meaning profile. In P. T. P. Wong & P. S. Fry (Eds.), *The human quest for meaning: a handbook of psychological research and clinical applications* (pp. 111-140). Mahwah, NJ: Lawrence Erlbaum Associates Publishers.

Wrosch, C., & Scheier, M. F. (2003). Personality and quality of life: the importance of optimism and goal adjustment. *Quality of Life Research: An International Journal of Quality of Life Aspects of Treatment, Care and Rehabilitation, 12*(Suppl 1), 59-72.

Zigmond, A. S., & Snaith, R. P. (1983). The hospital anxiety and depression scale. *Acta Psychiatrica Scandinavica, 67*(6), 361-370.

APPENDICES

Appendix A: Behaviour Identification Form

1. Making a list
a. Getting organized[a]
b. Writing things down

2. Reading
a. Following lines of print
b. Gaining knowledge[a]

3. Joining the Army
a. Helping the Nation's defense[a]
b. Signing up

4. Washing clothes
a. Removing odors from clothes[a]
b. Putting clothes into the machine

5. Picking an apple
a. Getting something to eat[a]
b. Pulling an apple off a branch

6. Chopping down a tree
a. Wielding an axe
b. Getting firewood[a]

7. Measuring a room for carpeting
a. Getting ready to remodel[a]
b. Using a yard stick

8. Cleaning the house
a. Showing one's cleanliness[a]
b. Vacuuming the floor

9. Painting a room
a. Applying brush strokes
b. Making the room look fresh[a]

10. Paying the rent
a. Maintaining a place to live[a]
b. Writing a check

11. Caring for houseplants
a. Watering plants
b. Making the room look nice[a]

12. Locking a door
a. Putting a key in the lock
b. Securing the house[a]

13. Voting
a. Influencing the election[a]
b. Marking a ballot

14. Climbing a tree
a. Getting a good view[a]
b. Holding on to branches

15. Filling out a personality test
a. Answering questions
b. Revealing what you're like[a]

16. Toothbrushing
a. Preventing tooth decay[a]
b. Moving a brush around in one's mouth

17. Taking a test
a. Answering questions
b. Showing one's knowledge[a]

18. Greeting someone
a. Saying hello
b. Showing friendliness[a]

19. Resisting temptation
a. Saying "no"
b. Showing moral courage[a]

20. Eating
a. Getting nutrition[a]
b. Chewing and swallowing

21. Growing a garden
a. Planting seeds
b. Getting fresh vegetables[a]

22. Traveling by car
a. Following a map
b. Seeing countryside[a]

23. Having a cavity filled

a. Protecting your teeth[a]
b. Going to the dentist

24. Talking to a child
a. Teaching a child something[a]
b. Using simple words

25. Pushing a doorbell
a. Moving a finger
b. Seeing if someone's home[a]

Appendix B: LIHS/LIGHT ethical approval letter

Faculty of Medicine and Health
Research Office

Room 10.110, Level 10
Worsley Building
Clarendon Way
Leeds LS2 9NL

T (General Enquiries) +44 (0) 113 343 4361
F +44 (0) 113 343 4373

UNIVERSITY OF LEEDS

Helen Robinson
Programme in Clinical Psychology
Leeds Institute of Health Sciences
University of Leeds
Charles Thakrah Building
101 Clarendon Road
LEEDS LS2 9LJ

22 June 2010

Dear Helen

Re ref no: **HSLT/09/025**

Title: **Developing a measure of action identification**

I am pleased to inform you that the above research application has been reviewed by the Leeds Institute of Health Sciences and Leeds Institute of Genetics, Health and Therapeutics (LIHS/LIGHT) joint ethics committee and following receipt of the amendments requested, I can confirm a favourable ethical opinion on the basis described in the application form, protocol and supporting documentation at submitted at date of this letter.

Please notify the committee if you intend to make any amendments to the original research as submitted at date of this approval. This includes recruitment methodology and all changes must be ethically approved prior to implementation. Please contact the Faculty Research Ethics and Governance Administrator for further information (r.e.desouza@leeds.ac.uk)

I wish you every success with the project.

Yours sincerely

Laura Stroud

Professor Alastair Hay/Mrs Laura Stroud
Chairs, LIHS/LIGHT REC

Appendix C: Action Identification for Pain

1. Cleaning the house _a. vacuuming the floor _____ _b. showing one's concern for cleanliness _____
2. Writing or typing _a. putting words on a page _____ _b. communicating _____
3. Joking with family members _a. maintaining family relationships _____ _b. listening and laughing _____
4. Visiting friends _a. talking to others _____ _b. maintaining friendships _____
5. At the cinema _a. enjoying being entertained _____ _b. watching a film _____
6. Communicating by gestures _a. moving my hands _____ _b. emphasising a point _____
7. Lying down _a. looking after myself _____ _b. being horizontal _____
8. Maintaining the garden _a. making the garden look tidy _____ _b. pulling up weeds _____

9. Watching TV _a. watching a screen _____ _b. being entertained _____
10. Doing the shopping _a. getting essential supplies _____ _b. pushing a supermarket trolley _____
11. Using kitchen gadgets _a. cutting up food _____ _b. cooking a meal _____
12. Paying bills _a. handing over money _____ _b. staying out of debt _____
13. Preparing a meal _a. meeting my nutritional requirements _____ _b. peeling vegetables _____
14. Working on a needed house repair _a. using a screwdriver _____ _b. taking pride in the house _____
15. Washing the car _a. taking pride in the car _____ _b. removing dirt _____
16. Taking a holiday _a. leaving home _____ _b. having a break from routine _____

17. Going to a party or social function	
_a. maintaining social networks	_____
_b. talking to others	_____
18. Eating out	
_a. paying for food	_____
_b. treating myself	_____
19. Doing chores around the house	
_a. tidying things away	_____
_b. maintaining the household	_____
20. Laughing	
_a. expressing myself	_____
_b. making a noise	_____
21. Dressing myself	
_a. putting on clothes	_____
_b. getting ready to go out	_____
22. Going to a park or beach	
_a. getting some fresh air	_____
_b. being outside	_____
23. Taking care of business affairs	
_a. getting organised	_____
_b. writing a cheque	_____
24. Spending time with relatives	
_a. sitting with family	_____
_b. providing enjoyment	_____

25. Doing leisure time activities _a. watching TV _____ _b. relaxing _____
26. Listening to other people's problems _a. showing kindness _____ _b. not speaking _____
27. Learning new things _a. remembering instructions _____ _b. becoming wiser _____
28. Working on a budget _a. maintaining a lifestyle _____ _b. adding up bills _____
29. Being affectionate _a. holding hands _____ _b. showing my love _____
30. Walking up and down hills _a. taking exercise _____ _b. putting one foot in front of the other _____
31. Sleeping _a. closing my eyes _____ _b. restoring my body and mind _____
32. Carrying on a conversation _a. sharing thoughts with someone _____ _b. talking _____

33. Feeding myself	
_a. gaining energy	_____
_b. using a knife and fork	_____
34. Reading	
_a. following lines of print	_____
_b. gaining knowledge	_____
35. Tidying up	
_a. making the house look neat	_____
_b. putting things away	_____
36. Going out for entertainment	
_a. going to the pub	_____
_b. having fun	_____
37. Mowing the lawn	
_a. pushing a mower	_____
_b. maintaining the garden	_____
38. Concentrating	
_a. working something out	_____
_b. watching something	_____
39. Caring for myself	
_a. maintaining my wellbeing	_____
_b. cleaning my teeth	_____
40. Cleaning the windows	
_a. using a sponge	_____
_b. getting a better view	_____

Appendix D: NRES ethical approval letter

NHS
National Research Ethics Service
Leeds (East) Research Ethics Committee
Yorkshire and Humber REC Office
First Floor, Millside
Mill Pond Lane
Meanwood
Leeds
LS6 4RA

Telephone: 0113 2065652
Facsimile: 0113 2066772

02 September 2010

Miss Helen Robinson
Psychologist in Clinical Training
Leeds Teaching Hospitals NHS Trust
Leeds Institute of Health Sciences
Charles Thackrah Building
101 Clarendon Road
Leeds
LS2 9LJ

Dear Miss Robinson

Study Title: **Action identification in chronic pain - how do people construct meaning in action?**
REC reference number: **10/H1306/53**

Thank you for your letter of 23 August 2010, responding to the Committee's request for further information on the above research and submitting revised documentation.

The further information has been considered on behalf of the Committee by the Chair.

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 documentation as revised, subject to the conditions specified below.

Ethical review of research sites

The favourable opinion applies to all NHS sites taking part in the study, subject to management permission being obtained from the NHS/HSC R&D office prior to the start of the study (see "Conditions of the favourable opinion" below).

Conditions of the favourable opinion

The favourable opinion is subject to the following conditions being met prior to the start of the study.

Management permission or approval must be obtained from each host organisation prior to the start of the study at the site concerned.

For NHS research sites only, management permission for research ("R&D approval") should be obtained from the relevant care organisation(s) in accordance with NHS research

governance arrangements. Guidance on applying for NHS permission for research is available in the Integrated Research Application System or at http://www.rdforum.nhs.uk.

Where the only involvement of the NHS organisation is as a Participant Identification Centre (PIC), management permission for research is not required but the R&D office should be notified of the study and agree to the organisation's involvement. Guidance on procedures for PICs is available in IRAS. Further advice should be sought from the R&D office where necessary.

Sponsors are not required to notify the Committee of approvals from host organisations.

It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).

Approved documents

The final list of documents reviewed and approved by the Committee is as follows:

Document	*Version*	*Date*
Investigator CV	1	01 June 2010
Protocol	1	01 June 2010
Academic Supervisor CV		
Letter responding to points raised in provisional opinion letter		20 August 2010
REC application		01 July 2010
Covering Letter		01 June 2010
Questionnaire: Brief Pain Inventory (Short Form)		
Participant Information Sheet	2	20 August 2010
Response to Request for Further Information		23 August 2010
Participant Consent Form	1	01 June 2010
Questionnaire: Patient Health Questionnaire (PHQ-9)		
Questionnaire: Life Orientation Test - Revised (LOT-R)		
Questionnaire: The Meaningful Life Measure (MLM)		
Questionnaire: Personal Agency Measure		
Information letter about Trainee Clinical Psychology Research		
GP Letter	1	20 August 2010
Research Panel Constitution		
Evidence of insurance or indemnity		08 October 2009

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

After ethical review

Now that you have completed the application process please visit the National Research Ethics Service website > After Review

You are invited to give your view of the service that you have received from the National Research Ethics Service and the application procedure. If you wish to make your views known please use the feedback form available on the website.

The attached document *"After ethical review – guidance for researchers"* gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators
- Progress and safety reports
- Notifying the end of the study

The NRES website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

We would also like to inform you that we consult regularly with stakeholders to improve our service. If you would like to join our Reference Group please email referencegroup@nres.npsa.nhs.uk.

10/H1306/53	**Please quote this number on all correspondence**

Yours sincerely

J Brown

pp **Dr Carol Chu**
Chair

Email: ann.tunley@leedsth.nhs.uk

Enclosures: "After ethical review – guidance for researchers" SL-AR2

Copy to: *Mrs Rachel E de Souza, Faculty Research Office, Room 10.110, Level 10, Worsley Building, Clarendon Way, Leeds, LS2 9LN*

Dr Derek Norfolk, Leeds Teaching Hospitals NHS Trust, Dept of Research & Development, 34 Hyde Terrace, Leeds, LS2 9LN

Appendix E: NRES amendment approval letter

NHS

National Research Ethics Service

Leeds (East) Research Ethics Committee

Yorkshire and Humber REC Office
First Floor, Millside
Mill Pond Lane
Meanwood
Leeds
LS6 4RA

Tel: 0113 3050108

Miss Helen Robinson
Leeds Teaching Hospitals NHS Trust
Leeds Institute of Health Sciences
Charles Thakrah Building
101 Clarendon Road
Leeds
LS2 9LJ

01 November 2010

Dear MISS ROBINSON

Study title: **Action identification in chronic pain - how do people construct meaning in action?**
REC reference: **10/H1306/53**
Amendment number: **3.0**
Amendment date: **20 September 2010**

The above amendment was reviewed at the meeting of the Sub-Committee held on 21 October 2010.

Ethical opinion

The members of the Committee taking part in the review gave a favourable ethical opinion of the amendment on the basis described in the notice of amendment form and supporting documentation.

Approved documents

The documents reviewed and approved at the meeting were:

Document	Version	Date
Questionnaire		
Participant Information Sheet	3	01 September 2010
Protocol	2	01 September 2010
Notice of Substantial Amendment (non-CTIMPs)	3.0	20 September 2010

Membership of the Committee

The members of the Committee who took part in the review are listed on the attached sheet.

Leeds (East) Research Ethics Committee

Attendance at Sub-Committee of the REC meeting on 21 October 2010

Name	*Profession*	*Capacity*
Prof Alan Ebbutt	Statistician	Expert
Prof Sally Kinsey	Professor of Paediatric Haematology	Expert

R&D approval

All investigators and research collaborators in the NHS should notify the R&D office for the relevant NHS care organisation of this amendment and check whether it affects R&D approval of the research.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

10/H1306/53:	**Please quote this number on all correspondence**

Yours sincerely

Miss Jade Thorpe
Assistant Committee Co-ordinator

E-mail: jade.thorpe@leedspft.nhs.uk

Enclosures: *List of names and professions of members who took part in the review*

Copy to: *Mrs Rachel de Souza*

Appendix F: Brief Pain Inventory short form

1903

Date: ___ / ___ / ___ (month) (day) (year)

Subject's Initials : _____

Study Subject #: _____

PLEASE USE BLACK INK PEN

Study Name: _____

Protocol #: _____

PI: _____

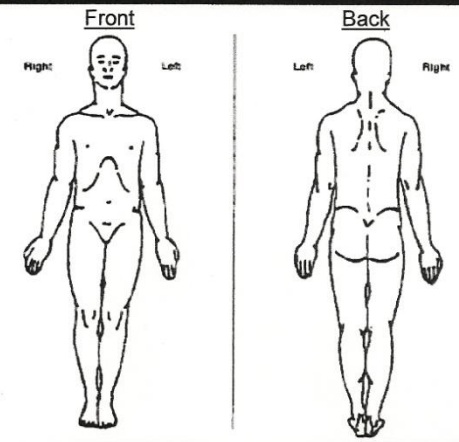
Revision: 07/01/05

Brief Pain Inventory (Short Form)

1. Throughout our lives, most of us have had pain from time to time (such as minor headaches, sprains, and toothaches). Have you had pain other than these everyday kinds of pain today?

☐ Yes ☐ No

2. On the diagram, shade in the areas where you feel pain. Put an X on the area that hurts the most.



3. Please rate your pain by marking the box beside the number that best describes your pain at its **worst** in the last 24 hours.

☐0 ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐10

No Pain — Pain As Bad As You Can Imagine

4. Please rate your pain by marking the box beside the number that best describes your pain at its **least** in the last 24 hours.

☐0 ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐10

No Pain — Pain As Bad As You Can Imagine

5. Please rate your pain by marking the box beside the number that best describes your pain on the **average.**

☐0 ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐10

No Pain — Pain As Bad As You Can Imagine

6. Please rate your pain by marking the box beside the number that tells how much pain you have **right now.**

☐0 ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐10

No Pain — Pain As Bad As You Can Imagine

Page 1 of 2

Copyright 1991 Charles S. Cleeland, PhD
Pain Research Group
All rights reserved

1903

Date: (month) / (day) / (year)

Subject's Initials : _____

Study Subject #:

Study Name: _____

Protocol #: _____

PI: _____

Revision: 07/01/05

PLEASE USE BLACK INK PEN

7. What treatments or medications are you receiving for your pain?

8. In the last 24 hours, how much relief have pain treatments or medications provided? Please mark the box below the percentage that most shows how much relief you have received.

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
☐ No Relief	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐ Complete Relief

9. Mark the box beside the number that describes how, during the past 24 hours, pain has interfered with your:

A. General Activity

☐ 0 Does Not Interfere ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 Completely Interferes

B. Mood

☐ 0 Does Not Interfere ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 Completely Interferes

C. Walking ability

☐ 0 Does Not Interfere ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 Completely Interferes

D. Normal Work (includes both work outside the home and housework)

☐ 0 Does Not Interfere ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 Completely Interferes

E. Relations with other people

☐ 0 Does Not Interfere ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 Completely Interferes

F. Sleep

☐ 0 Does Not Interfere ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 Completely Interferes

G. Enjoyment of life

☐ 0 Does Not Interfere ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 Completely Interferes

Copyright 1991 Charles S. Cleeland, PhD
Pain Research Group
All rights reserved

Appendix G: Meaningful Life Measure

Please read each of the following statements carefully and then write the appropriate number to indicate your opinion in the space next to the statement. Please answer according to the scale below, unless otherwise stated.

Strongly disagree	Disagree	Slightly disagree	Neither agree or disagree	Slightly agree	Agree	Strongly agree
1	2	3	4	5	6	7

1. Life to me seems: …completely routine (1); …always exciting (7). _____
2. Every day is: …exactly the same (1); …constantly new and different (7). _____
3. Facing my daily tasks is: …a painful and boring experience (1); …a source of pleasure and satisfaction (7). _____
4. My life interests and excites me. _____
5. My daily living is dull and routine. _____
6. I find it satisfying to think about what I have accomplished in life. _____
7. So far, I am pleased with what I have achieved in life. _____
8. I have been very successful in achieving certain things. _____
9. I have failed to accomplish much in life. _____
10. I feel good when I think of the things I have accomplished in life. _____
11. I have a system or framework that allows me to truly understand my being alive. _____

12. I have a philosophy of life that really gives my living significance. _____
13. I have a personal value system that makes my living worthwhile. _____
14. The beliefs I hold about the world enable me to make sense out of my existence. _____
15. I hold certain values which I feel greatly enrich my life with significance. _____
16. In my life I have: …no goals or aims at all (1); …very clear goals and aims (7). _____
17. I have discovered: …no mission or purpose in life (1); …clear-cut goals and a satisfying life purpose (7). _____
18. I have a clear idea of what my future goals and aims are. _____
19. I tend to wander aimlessly through life, without much sense of purpose or direction. _____
20. My life is worthwhile. _____
21. My life is significant. _____
22. I really value my life. _____
23. I hold my own life in high regard. _____

Appendix H: Patient Health Questionnaire

PATIENT HEALTH QUESTIONNAIRE (PHQ-9)

NAME: _____ **DATE:** _____

Over the *last 2 weeks,* how often have you been bothered by any of the following problems? *(use "✓" to indicate your answer)*	Not at all	Several days	More than half the days	Nearly every day
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself—or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed. Or the opposite—being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9. Thoughts that you would be better off dead, or of hurting yourself in some way	0	1	2	3
	add columns:	+	+	+

(Healthcare professional: For interpretation of TOTAL, please refer to accompanying scoring card.) **TOTAL:**

10. If you checked off *any* problems, how *difficult* have these problems made it for you to do your work, take care of things at home, or get along with other people?	**Not difficult at all** _____ **Somewhat difficult** _____ **Very difficult** _____ **Extremely difficult** _____

PHQ-9 is adapted from PRIME MD TODAY, developed by Drs Robert L. Spitzer, Janet B.W. Williams, Kurt Kroenke, and colleagues, with an educational grant from Pfizer Inc. For research information, contact Dr Spitzer at rls8@columbia.edu. Use of the PHQ-9 may only be made in accordance with the Terms of Use available at *http://www.pfizer.com*. Copyright ©1999 Pfizer Inc. All rights reserved. PRIME MD TODAY is a trademark of Pfizer Inc.

Appendix I: Chronic Pain Acceptance Questionnaire revised version

Instructions

Below you will find a list of statements. Please rate the truth of each statement as it applies to you. Use the following rating scale to make your choices. For instance, if you believe a statement is 'Always True,' you would write a 6 in the blank next to that statement.

0	**1**	**2**	**3**	**4**	**5**	**6**
Never true	Very rarely true	Seldom true	Sometimes true	Often true	Almost always true	Always true

---

1. I am getting on with the business of living no matter what my level of pain is……
2. My life is going well, even though I have chronic pain……
3. It's OK to experience pain……
4. I would gladly sacrifice important things in my life to control this pain better……
5. It's not necessary for me to control my pain in order to handle my life well……
6. Although things have changed, I am living a normal life despite my chronic pain……
7. I need to concentrate on getting rid of my pain……
8. There are many activities I do when I feel pain……
9. I lead a full life even though I have chronic pain……
10. Controlling pain is less important than any other goals in my life……

11. My thoughts and feelings about pain must change before I can take important steps in my life……
12. Despite the pain, I am now sticking to a certain course in my life……
13. Keeping my pain level under control takes first priority whenever I'm doing something……
14. Before I can make any serious plans, I have to get some control over my pain……
15. When my pain increases, I can still take care of my responsibilities……
16. I will have better control over my life if I can control my negative thoughts about pain……
17. I avoid putting myself in situations where my pain might increase……
18. My worries and fears about what pain will do to me are true……
19. It's a relief to realize that I don't have to change my pain to get on with my life……
20. I have to struggle to do things when I have pain……

Appendix J: Life Orientation Test revised version

Please be as honest and accurate as you can throughout. Try not to let your response to one statement influence your responses to other statements. There are no "correct" or "incorrect" answers. Answer according to your own feelings, rather than how you think "most people" would answer.

Please tick the degree to which you agree with each statement.

	I agree a lot	I agree a little	I neither agree nor disagree	I disagree a little	I disagree a lot
1. In uncertain times, I usually expect the best.					
2. It's easy for me to relax.					
3. If something can go wrong for me, it will.					
4. I'm always optimistic about my future.					
5. I enjoy my friends a lot.					
6. It's important for me to keep busy.					
7. I hardly ever expect things to go my way.					
8. I don't get upset too easily.					
9. I rarely count on good things happening to me.					
10. Overall, I expect more good things to happen to me than bad.					

Appendix K: AIP-withdrawal

Simply tick either yes or no for each activity.

Have you done the activity in the last 6 months?.....

	Yes	No
41. Cleaning the house		
42. Writing or typing		
43. Joking with family members		
44. Visiting friends		
45. At the cinema		
46. Communicating by gestures		
47. Lying down		
48. Maintaining the garden		
49. Watching TV		
50. Doing the shopping		
51. Using kitchen gadgets		
52. Paying bills		
53. Preparing a meal		
54. Working on a needed house repair		
55. Washing the car		
56. Taking a holiday		
57. Going to a party or social function		
58. Eating out		
59. Doing chores around the house		
60. Laughing		

61. Dressing myself		
62. Going to a park or beach		
63. Taking care of business affairs		
64. Spending time with relatives		
65. Doing leisure time activities		
66. Listening to other people's problems		
67. Learning new things		
68. Working on a budget		
69. Being affectionate		
70. Walking up and down hills		
71. Sleeping		
72. Carrying on a conversation		
73. Feeding myself		
74. Reading		
75. Tidying up		
76. Going out for entertainment		
77. Mowing the lawn		
78. Concentrating		
79. Caring for myself		
80. Cleaning the windows		