The Language of Pain: New Understandings

Thesis by compilation

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i) CERTIFICATE OF ORIGINAL AUTHORSHIP

I, Imogene Munday, declare that this thesis is submitted in fulfilment of the requirements for the award of Doctor of Philosophy, in the Graduate School of Health at the University of Technology Sydney.

This thesis is wholly my own work unless otherwise referenced or acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

This document has not been submitted for qualifications at any other academic institution.

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(Abstract, Ch 1. Introduction, Preambles, Ch 6. Discussion, and Ch 7. Conclusions)

iii) THESIS BY COMPILATION

This thesis by compilation is structured as a single manuscript comprised of four published/publishable works (i.e. papers) and chapters, including an Introduction and Discussion. Linking text is provided to establish the relationship between each chapter and the following.

iv) LIST OF PAPERS/PUBLICATIONS INCLUDED

Chapter Two (Paper 1)

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v) PRESENTATIONS BY THE PHD CANDIDATE

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vi) ABSTRACT

Chronic pain is a prevalent and costly condition, and is associated with a wide range of comorbidities such as depression, anxiety, substance misuse, and suicidality. Although near universal, pain is an inherently private and subjective experience. In the absence of objective assessment measures, people with chronic pain rely primarily on language to communicate their experience.

The McGill Pain Questionnaire (MPQ) paved the way for incorporating language into pain assessment. However, it has received numerous criticisms because of its focus on adjectival, single-word descriptors that have been taken out of communicative context. An alternative naturalistic form of assessment and communication is that of metaphor, which may be a powerful tool for people with chronic pain.

Previous research has shown that metaphors are widely used by those with chronic pain and may have therapeutic value in this population. However, there is limited research in the area. The present study series addresses this gap in the literature through four empirical studies. The first study explored the language used by those with chronic pain to describe their pain experience. The second study used conceptual metaphor theory to analyse and catalogue the types of metaphors used by people with chronic pain. The third study explored the associations between metaphor use and chronic pain diagnosis and between metaphor use and adjustment to chronic pain. The final study examined health professionals’ experience with their patients’ use of metaphor in chronic pain consultations.

The results showed that people with chronic pain use a wide variety of metaphors in their pain communication, with the most frequently used category pertaining to metaphors of physical damage. Metaphor use was found to be associated with certain pain diagnoses, in particular endometriosis, complex regional pain syndrome, neuropathic pain, and hypermobility syndrome. Metaphor use was also associated with the extent to which pain interfered with daily life. However, its relationships with other aspects of adjustment such as pain intensity, depression, anxiety, or stress were not as strong. It was found that health professionals use metaphor in chronic pain consultations in a variety of interesting ways, for instance to inform their judgments about pain type, psychopathology, and understanding of pain.

Implications for clinical practice include the need for interdisciplinary care, education for health professionals on metaphor in chronic pain, and the integration of metaphor in the treatment of chronic pain. Areas for future research include metaphor and pain catastrophising and exploring metaphor as a treatment target.

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viii) ABBREVIATIONS

ACT	Acceptance and Commitment Therapy
BPI	Brief Pain Inventory
BNC	British National Corpus
CBT	Cognitive Behavioural Therapy
CI	Confidence Interval
CMT	Conceptual Metaphor Theory
COREQ	Consolidated Criteria for Reporting Qualitative Research
CRPS	Complex regional pain syndrome
DASS	Depression, Anxiety, Stress Scales
HPA	Hypothalamic–pituitary–adrenocortical (axis)
IASP	International Association for the Study of Pain
IPA	Interpretative Phenomenological Analysis
LANSS	Leeds Assessment of Neuropathic Symptoms and Signs
MPQ	McGill Pain Questionnaire
MSK	Musculoskeletal (pain)
OR	Odds Ratio
SD	Standard Deviation

1. INTRODUCTION

1.1 Preamble

Chronic pain is a widespread global condition with prevalence rates estimated to be 17.1% for males and 20% for females in Australia (Blyth et al., 2001). Similar rates have been found in Europe, India, and the US (Breivik et al., 2006; Saxena et al., 2018; Yong et al., 2021). Chronic pain is associated with depression and anxiety (Lerman et al., 2015; McWilliams et al., 2003), suicidal ideation (Tang & Crane, 2006), and difficulties with activities of daily living and social functioning (Blyth et al., 2001; Yong et al., 2021).

Chronic pain assessment is challenging because of the lack of objective measures. Observable pathology and objective diagnostic results frequently do not correlate well with reported pain levels. Severe pain is often reported without supporting diagnostic evidence, and similar spinal pathology has been reported for both patients with low back pain and those without pain (Michel et al., 1997; Tait et al., 2009). Given these difficulties, patient self-report is considered to be the basis of pain assessment (Turk & Melzack, 2011), providing the most comprehensive and reliable access to the pain of another (Sullivan & Derbyshire, 2015). That is, patients rely on language to communicate their pain experience and to obtain appropriate diagnoses and treatment.

The well-known McGill Pain Questionnaire (MPQ) (Melzack, 1975) was a seminal language-based measure developed to assess pain. The MPQ includes 78 single-word pain descriptors divided into sensory, affective, evaluative, and miscellaneous components. The MPQ may have a discriminant function; that is, it may reliably differentiate diagnostic groups (Dubuisson & Melzack, 1976; Kremer et al., 1983; Melzack et al., 1986), although this has not always been supported by research findings (Droz & Howard, 2011; Fordyce et al., 1978). In addition, the repertoire of descriptors featured in the MPQ has been criticised; for example, Wilson et al. (2009) concluded that the multidimensional chronic pain experience may not be adequately reflected by questionnaires that use single-word pain descriptors such as the MPQ.

The use of metaphor may present an alternative way of communicating and assessing pain. Research has found certain chronic pain populations, such as people with endometriosis and neuropathic pain, personify their pain as an attacker or metaphorically describe pain as physical damage, physical properties of elements, or as a transformative force (Bullo & Hearn, 2021; Hearn et al., 2016). A systematic review has also found that metaphor may have therapeutic value for people with chronic pain, for example, as a method to express themselves and enable understanding (Stewart & Ryan, 2020). Although some research has explored the interactions between pain and language (e.g. Lascaratou, 2007), research looking more specifically at metaphor and chronic pain remains limited. Further research into this area is warranted given the potential utility of metaphor in communication about chronic pain and therapy.

This introductory chapter explores the definition, prevalence, origins, and costs of chronic pain, and then describes the current and past pain models in the context of this thesis. The chapter further describes the difficulties involved in pain assessment and the link between language and pain, and reviews the existing literature on metaphor and chronic pain. It concludes with the specific aims of the thesis followed by an overview of each chapter.

1.2 Defining Chronic Pain

The International Association for the Study of Pain (IASP) defines pain as, “An unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage” (Raja et al., 2020, Text box 2). This definition also includes the following six Notes and the etymology of the word “pain” for further context (Raja et al., 2020, Text box 2).

- Pain is always a personal experience that is influenced to varying degrees by biological, psychological, and social factors.
- Pain and nociception are different phenomena. Pain cannot be inferred solely from activity in sensory neurons.
- Through their life experiences, individuals learn the concept of pain.
- A person’s report of an experience as pain should be respected.
- Although pain usually serves an adaptive role, it may have adverse effects on function and social and psychological well-being.
- Verbal description is only one of several behaviors to express pain; inability to communicate does not negate the possibility that a human or a nonhuman animal experiences pain.

This definition makes it clear that “A person’s report of an experience of pain should be respected” and draws attention to “verbal description” as a primary pain behaviour, while acknowledging that the inability to communicate does not negate the possibility of pain experience. Another much-quoted definition of pain is that “pain is whatever the experiencing person says it is, existing whenever he says it does" (McCaffery, 1968, p. 95). This definition is emblematic of the highly subjective, varied, and personal nature of pain.

Acute vs Chronic Pain

Acute pain has been defined as "the physiologic response and experience to noxious stimuli that can become pathologic, is normally sudden in onset, time limited, and motivates behaviours to avoid actual or potential tissue injuries" (Tighe et al., 2015, p. 1809). It is of limited duration and is generally linked to an injury or disease. By contrast, chronic pain has been defined as pain that persists beyond normal healing time (Merskey, 1986). Although chronic pain may be a symptom of a disease, it can also be a condition in its own right that often occurs without a clear organic cause (Cousins, 2007). For example, chronic pain may result from repeated stimulation of nociceptors in areas experiencing ongoing tissue damage, such as osteoarthritis. However, in the case of neuropathic chronic pain, the pain can be linked to maladaptive plasticity in the somatosensory nervous system in otherwise intact musculoskeletal structures (Costigan et al., 2009).

The most recent International Classification of Diseases (ICD-11) defines chronic pain as persistent or recurring pain lasting longer than three months (World Health Organization, 2021). Common chronic pain syndromes include but are not limited to back and leg pain, migraine and headache, post-surgical pain, fibromyalgia, myofascial pain syndrome, neuropathic pain, pelvic pain and endometriosis, complex regional pain syndrome (CRPS), phantom limb pain, and musculoskeletal conditions such as arthritis and osteoporosis (Deloitte Access Economics, 2019). It should be noted that throughout this thesis, ‘chronic pain’ is used to refer to chronic non-cancer pain.

1.3 Prevalence, Origins, and Economic Cost of Chronic Pain

In Australia, the prevalence rate for chronic pain is 17.1% for males and 20% for females. Rates generally increase with age and peak at 27% for males in the 65–69-year age group and at 31% for females in the 80–84-year age group (Blyth et al., 2001). The prevalence rate for chronic pain in Europe has been reported to be 19% across the age ranges and genders (Breivik et al., 2006), whereas in the US it has been estimated to be as high as 30.7% (males 26.7%, females 34.3%; Johannes et al., 2010). However, a more recent US prevalence study suggested a more conservative figure of 20.5% (Yong et al., 2021), which is closer to the global average. A recent study of chronic pain in South Africa found a prevalence rate of 18.3% in the adult population (males 15.8%, females 20.1%) and in increasing rate to 34.4% in the >65-year group (Kamerman et al., 2020). In India, the prevalence of chronic pain is estimated at 19.3% (Saxena et al., 2018). A meta-analysis reported an 18% prevalence rate in developing countries (Sá et al., 2019), which is similar to that in developed countries. The Global Burden of Disease Study (Vos et al., 2012) estimated that 21% of the global population is affected by tension type headache, 15% by migraine, 9% by lower back pain, and 5% by neck pain. Using the years lived with disability metric (determined by the prevalence of a sequela multiplied by the disability weight for that sequela), low back pain has the greatest contribution of all physical or mental health problems (Vos et al., 2012). On average, the global prevalence rates for chronic pain in both developed and developing countries are around 20% (Goldberg & McGee, 2011).

According to the electronic Persistent Pain Outcomes Collaborations program, which measures outcomes in pain services throughout Australia and New Zealand, the most common precipitating events for chronic pain are injury (36.7%), no obvious cause (17.5%), medical condition other than cancer (10.8%), post surgery (10.3%), motor vehicle accident (10.2%), cancer (1.6%), and other (12.9%) (Tardif et al., 2018).

Factoring in the medical costs, lost productivity, and income support, a report by Deloitte Access Economics for Painaustralia estimated that the total financial cost of chronic pain in Australia for 2018 was AUD73.2 billion. This total included AUD12.2 billion in health system costs, AUD48.3 billion in productivity losses, and AUD12.7 billion in other costs, such as aids and informal care (Deloitte Access Economics, 2019). In the US, the annual estimated cost of pain (USD560 to 635 billion) in 2010 dollars was greater than that of heart disease (USD309 billion) and cancer (USD243 billion), two of the nation's top health priorities (Gaskin & Richard, 2012).

1.4 Pain Models and Theories

The Biomedical Model of Pain

Nociception refers to the process of encoding and processing noxious stimuli. Nociceptors are specialised peripheral sensory neurons that alert to potentially damaging stimuli related to temperature, pressure, and chemical threats by transducing these stimuli into electrical signals that are transmitted via the spinal cord to higher brain centres (Dubin & Patapoutian, 2010). The two main types of nociceptors are group Aδ fibres and C fibres. Aδ nociceptors are thinly myelinated, have a faster conduction and response time, and are generally responsive to dangerously intense mechanical or mechanothermal stimuli. By contrast, the polymodal C fibres are unmyelinated, slower conducting, and tend to respond to thermal, mechanical, and chemical stimuli (Purves et al., 2001).

The historic model of pain was dualistic by conceptualising the body and mind as two separate and independent entities (Gatchel et al., 2007). In this model, pain and tissue injury share an isomorphic relationship, which suggests a predictable linear association between the two, and presumes a neurobiological hardwired connection between the damage site and the brain (Quintner et al., 2008). Nociception is a necessary precondition of pain in this model. When a site of nociception cannot be found, the patient's report of pain may be doubted and the expertise of their lived experience of pain excluded from the clinician's viewpoint (Quintner et al., 2008).

As has been noted by many, the unidimensional biomedical models of pain fail to explain many experimental and clinical observations, such as patients without identifiable organic pathology reporting severe pain, or pain-free people with objective, significant pathology (Dansie & Turk, 2013). This apparent paradox, in conjunction with the inadequacy of treatments based on these models, led to the development of more multifaceted, integrative pain models, such as the Gate Control Theory and Neuromatrix Theory.

The Gate Control Theory of Pain

The Gate Control Theory of Pain (Melzack & Wall, 1965) represented a radical shift in the way pain was conceptualised, by incorporating the effects of emotion and cognitive evaluation and moving away from unidimensional, linear models of pain. As proposed by Melzack and Wall (1996), this new theory of pain accounted for elements that previous theories could not explain, such as the following: “(1) the variable relationship between injury and pain; (2) non-noxious stimuli can sometimes produce pain; (3) the location of pain and tissue damage is sometimes different; (4) pain can persist long after tissue healing; (5) the nature of the pain and sometimes its location can change over time; (6) pain is a multi-dimensional experience; and (7) there is a lack of adequate pain treatments” (p. 165).

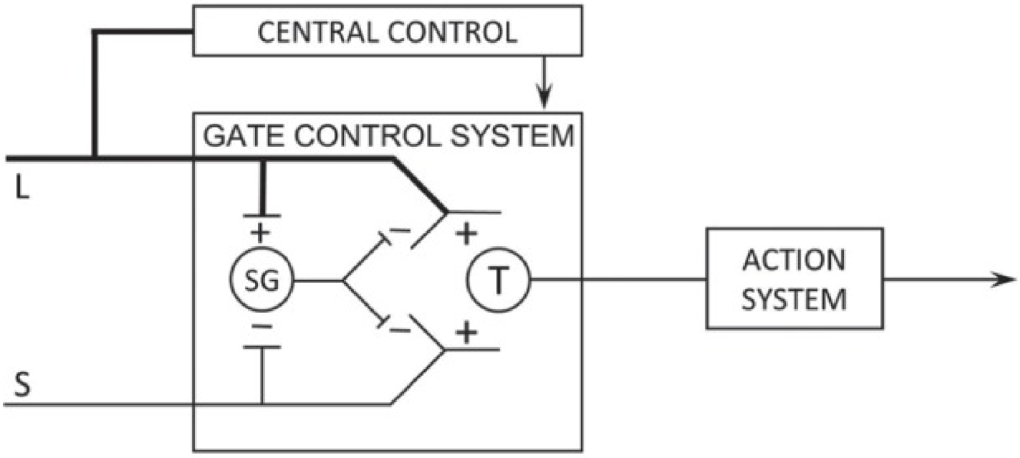

Figure 1. Schematic illustration of the gate control theory from “Pain mechanisms: A new theory” by R. Melzack & Wall, PD, 1965, Science. 150(3699), p. 975 (https://doi.org/10.1126/science.150.3699.971). Copyright 1965 by the American Association for the Advancement of Science.

The Gate Control Theory of Pain as shown in Figure 1 posits that a chemical gating mechanism within the dorsal horn of the spinal cord modulates transmission of nerve impulses from afferent fibres to transmission cells in the spinal cord. This proposed mechanism modulates how pain signals are passed along to the brain via the interplay of small nerve fibres, large nerve fibres, and inhibitory interneurons within the dorsal horn (Melzack & Wall, 1965). The gating mechanism is affected by relative activity in large and small diameter fibres. Activity in large-diameter fibres (responsible for non-nociceptive stimuli such as touch and pressure) inhibits transmission, or closes the ‘gate’, and activity in small-diameter fibres (nociceptors) facilitates transmission, or opens the gate.

Importantly, the Gate Control Theory also states that higher cortical functions contribute to the gating mechanism, which allows for the incorporation of psychological phenomena in the pain experience (Melzack & Wall, 1965). The theory posits that descending electrical messages from the brain, via neurons in the brainstem and cortex, can also open and close the gate. Development of the gate theory meant that, for the first time, psychological factors such as mood, distraction, fear, and anxiety were accepted as all playing a role in all forms of pain experience whether acute or chronic, and whether observable tissue damage was present or not. This meant that these factors were considered to be more than just reactions to pain, and were instead viewed as integral to the processing of pain-related information (Katz & Rosenbloom, 2015). This integration of psychological variables in pain perception and the dynamic role of the brain in pain processing was revolutionary, and paved the way for a plethora of research on how pain is viewed and clinically managed by healthcare practitioners (Katz & Rosenbloom, 2015).

Neuromatrix Theory of Pain

The Neuromatrix Theory is in many ways an extension of the Gate Control Theory of Pain and was developed, in part, because the latter alone could not explain the specific phenomenon of phantom limb pain. This theory presents pain as a multidimensional experience that is produced by a characteristic neurosignature generated by a widely distributed brain neural network known as the body-self neuromatrix (Melzack, 2001, 2005).

As seen in Figure 2, the body-self neuromatrix incorporates input from cognitive–evaluative, sensory–discriminative, and motivational–affective components, whereas output involves pain perception, behavioural responses, and homeostatic systems (Melzack, 2001). Importantly, it is not the direct response to sensory input following tissue damage or injury that constitutes pain, but rather the output of this widely distributed brain neural network (Gatchel et al., 2007).

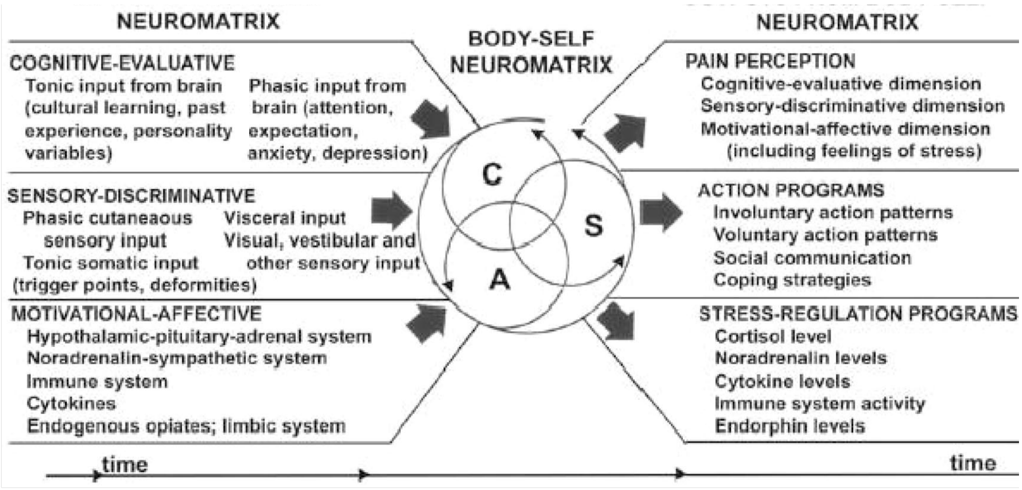

Figure 2. Melzack's body-self neuromatrix model of pain. From "Pain and the Neuromatrix in the Brain," by R. Melzack, 2001, Journal of Dental Education, 65(12), p. 1382 (https://doi.org/10.1002/j.0022-0337.2001.65.12.tb03497.x). Copyright 2001 by the American Dental Education Association.

The Body Matrix

The concept of a body matrix arose from investigation of bodily illusions, such as the well-studied rubber hand illusion, wherein the sensation of ownership of an artificial limb is rapidly and easily invoked experimentally (Makin et al., 2008). In this illusion, viewing a dummy hand being stroked by a paintbrush, whilst their own occluded hand is stroked synchronously results in both a feeling of ownership and a displacement of the felt location of touch towards the dummy hand (Botvinick & Cohen, 1998). Such psychophysiological illusions reveal complex relationships between body awareness, tactile processing, and autonomic control. It is the disruption to these relationships that is thought to underlie the problem of chronic pain (Moseley et al., 2012). Moseley et al. (2012) developed Melzack's Gate Control and Neuromatrix Theories further by positing the existence of a body matrix to explain these relationships; they defined the body matrix as "a body-centred coarse neural representation of our body and of the space around it" (p. 43). This multisensory representation is thought to be involved in maintaining the integrity of the body at the homeostatic and psychological levels, , and of adapting to changes in body structure and orientation (Moseley et al., 2012).

Biopsychosocial Theory of Pain

Although the neuromatrix theory of pain incorporates cognitive and emotional elements, it does not explicitly account for the contribution of social constructs to pain. Now widely accepted as the most comprehensive model of chronic pain (Bevers et al., 2016), the biopsychosocial model was first proposed in the 1970s as a contrast to the biomedical model (Engel, 1977). The biopsychosocial model views physical illness (such as pain) as the result of a complex and dynamic interaction among physiological, psychological, and social factors that can perpetuate or antagonise the clinical presentation (Gatchel et al., 2007). Individual pain experience can vary widely because of the range and interaction of these factors, which renders pain unique to each person. It is thus necessary to examine the interrelationships between the biological changes, psychological status, and sociocultural context to obtain a comprehensive understanding of a person's pain experience. Models or theories that neglect any of these areas are considered inadequate, as are assessments that do not address all pain components (Dansie & Turk, 2013). The components of the biopsychosocial model as they pertain to chronic pain are briefly outlined in Figure 3 and described in further detail below.

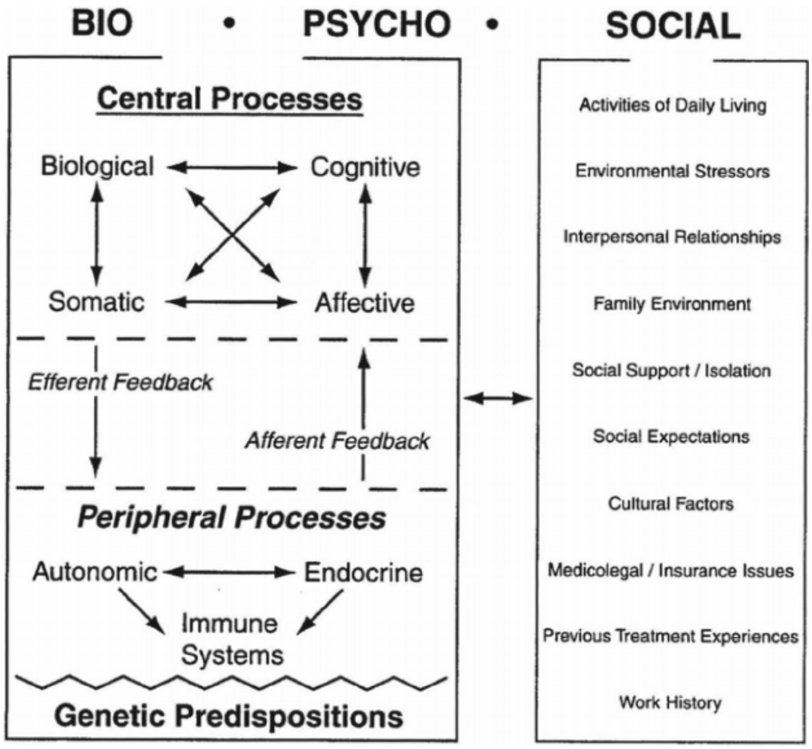

Figure 3. A conceptual model of the biopsychosocial interactive processes involved in health and illness. From "Comorbidity of Chronic Mental and Physical Health Conditions: The Biopsychosocial Perspective," by R. J. Gatchel, American Psychologist, 59(8), 798 (https://doi.org/10.1037/0003-066X.59.8.795). Copyright 2004 by the American Psychological Association.

Biological Factors

Multiple physiological processes are known to play a role in chronic pain. For example, the Neuromatrix Theory of pain highlights the importance of the hypothalamic–pituitary–adrenocortical (HPA) axis and stress system to pain (Melzack, 2001, 2005). Chronic pain is a stressor that leads to increased production of stress hormones such as cortisol by the HPA system. Prolonged secretion of cortisol can lead to muscle atrophy, immune system suppression, and impairment of growth and tissue repair, among other negative effects (Gatchel et al., 2007). Research has shown that HPA dysfunction can occur with chronic pain conditions such as fibromyalgia and chronic fatigue syndrome (Tanriverdi et al., 2007). Further, excessive adipose tissue, associated with a higher body mass index, can lead to a metabolic shift whereby systemic chronic inflammation develops and promotes musculoskeletal pain in certain patients (Seaman, 2013). Chronic pain interventions that include exercise have been found to reduce this systemic inflammation that contributes to chronic pain (Paley & Johnson, 2016).

Research in neuroscience has increased understanding of the neural and biochemical mechanisms involved in pain processing. Two neurotransmitters involved in mood disorders (norepinephrine and serotonin) are also implicated in the processing of pain signals (Marks et al., 2009). Neuroplasticity, which is defined as “the ability of the nervous system to respond to intrinsic and extrinsic stimuli by reorganizing its structure, function and connections” (Cramer et al., 2011, p. 1592), is also recognised as a key factor in the maintenance of chronic pain. The rubber hand illusion mentioned previously is a simple demonstration of neuroplasticity in a healthy central nervous system. Detection of thermal, mechanical, or chemical stimuli by the nervous system can generate acute pain; however, both peripheral and central nervous system components of the pain transmission pathway are capable of great plasticity and can augment pain signals and result in hypersensitivity (Basbaum et al., 2009). Recent research has focused on the role of neuroinflammation in the neuroplasticity of nociceptive pathways, as well as the generation, amplification, and mislocation of pain (Sandkühler, 2017). An increasing awareness of neuroplasticity amongst clinicians, for example as illustrated in educational videos such as *Tame the Beast* and *Mysterious Science of Pain* (Pate et al., 2020), has helped to counteract sentiments such as “It’s all in your head”, which can indicate imaginary pain when a pathology is not detected.

The role of genetic factors in chronic pain has been explored. One study has identified three genetic variants (haplotypes) of the gene encoding catecholamine-*O*-methyltransferase and designated as low, average, or high pain sensitivity. Five combinations of these haplotypes were shown to be significantly associated with variation in sensitivity to experimentally induced pain, and the presence of a single low-pain sensitivity haplotype was found to diminish the risk of developing myogenous temporomandibular joint disorder by 2.3 times (Diatchenko et al., 2005).

Psychological Factors

The IASP definition of pain states explicitly that pain is an emotional experience (Raja et al., 2020). This domain encompasses both emotion and cognition; emotion is the more immediate reaction to nociception, and thoughts function to attach meaning to the emotional experience. These attached meanings may trigger further emotional reactions, which can amplify the pain experience and maintain a damaging cycle of nociception, pain, distress, and disability (Gatchel et al., 2007).

Prevalence studies have found that chronic pain is often associated with psychological difficulties (Blyth et al., 2001; Breivik et al., 2006), including depression, anxiety, panic disorder, and post-traumatic stress disorder (McWilliams et al., 2003). Anxiety may lead to heightened vigilance and monitoring of pain, which, when coupled with maladaptive beliefs about pain's significance and threat, may lead to avoidance of physical activity (Boersma & Linton, 2006). Negative affective states such as depression and anger can augment the pain experience, thereby worsening pain and pain-related disability (Lerman et al., 2015). Chronic pain is also associated with the increased risk of suicide (Hitchcock et al., 1994; Hooley et al., 2014; Racine, 2018). The prevalence of suicidal ideation in people with chronic pain is around 20%, and the risk of death by suicide has been identified as at least double in people with chronic pain relative to controls (Tang & Crane, 2006).

Pre-existing psychological factors can also influence the experience of chronic pain. Fibromyalgia patients with a history of abuse had greater depression, anxiety, pain severity, and catastrophising, and worse physical functioning and pain interference than those without a history of abuse (Nicol et al., 2016). Cumulative adverse events in childhood are associated with a 1.2–1.3-fold increase in the odds of developing chronic pain (You et al., 2019).

Cognitive factors are important to the experience of chronic pain. These include aspects such as pain appraisal and beliefs, catastrophising and fear avoidance, and perceived control and self-efficacy. Catastrophising, defined as “an exaggerated negative ‘mental set’ brought to bear during actual or anticipated painful experience” (Sullivan et al., 2001, p. 53) is significantly associated with increased psychological distress and pain interference levels (Quartana et al., 2009; Turner et al., 2002). Another study found that pain beliefs were associated with physical disability and depression, coping scores were associated with physical disability, and catastrophising was associated with depression (Turner et al., 2000). Cognitive behavioural therapy (CBT), which targets maladaptive cognitions, has a strong evidence base and is now a first-line treatment for treating chronic pain (Ehde et al., 2014). Changes in acceptance and catastrophising following a CBT-informed interdisciplinary treatment program account for significant variance in treatment outcomes independent of pain intensity (Vowles et al., 2007).

Social Factors

The social environment of the person includes interpersonal relationships, social support or lack thereof, cultural factors, and environmental stressors, each of which can interact with the bio-psycho dimensions that affect the experience of chronic pain (Gatchel et al., 2007). Multiple studies have found that chronic pain is a significant obstacle to maintaining work capacity, impacts quality of life, and creates additional stress for the person in pain. In one study, 61% of people with chronic pain reported reduced ability or inability to perform work outside the home (Breivik et al., 2006). In another study, the probability of being unemployed was twice as high for people with chronic pain (Landmark et al., 2013). A recent US prevalence study found that, compared with those without chronic pain, people with chronic pain reported increased difficulty with activities of daily living (21.5% vs 4.9%) and with social engagement (25.4% vs 5.7%), as well as an increase in work limitations (48.8% vs 15%) (Yong et al., 2021). A large European study of pain in 16 countries found that for most people with chronic pain, their pain severely affected their sleep, ability to exercise, walk, do household chores, attend social activities, maintain an independent lifestyle, and maintain relationships with family and friends (Breivik et al., 2006). These detrimental effects of chronic pain on functioning can further influence mood and contribute to the negative psychological states known to exacerbate pain (Lerman et al., 2015). Reductions in exercise and social activity over the long term may also contribute to an increased body mass index, which as described above, can influence pain through systemic inflammation (Seaman, 2013).

Interpersonal relationships and chronic pain have also been examined. A study of 105 couples, in which one partner had chronic pain, found that spousal criticism and hostility may be a factor in the maintenance and worsening of chronic pain, and significantly predicted pain intensity in the 3 hours after a criticism episode (Burns et al., 2013). Partner empathy and validation have also been found to play a role in the pain experience. For instance, Cano et al. (2012) found that spousal expression of invalidation was associated with greater helplessness, catastrophising, and affective distress about pain for people with chronic pain. Validation training for spouses of people with chronic pain results in increased validating, decreased invalidating responses, and decreased negative affect for people with chronic pain (Edlund et al., 2015).

The biopsychosocial model makes it clear that chronic pain is an impactful, complex phenomenon that encompasses a variety of biological, psychological, cognitive, and social elements. Assessment, treatment, and communication need to take this complexity into account.

Psychological Theories of Chronic Pain

Operant Behavioural Model

A further challenge to the dominant biomedical model of pain was put forward by Fordyce (1976) who proposed a behavioural model that highlighted the importance of learning processes in the development and maintenance of pain chronicity, without disregarding the role played by biological factors. The focus of this model is pain behaviours, which are the observable aspects of pain. In operant learning theory, behaviour is a function of its consequences (Skinner, 1965). Behaviours will be more likely to occur either when followed by a desirable outcome (positive reinforcement) or by the removal of an unpleasant outcome (negative reinforcement). On the other hand, behaviours will be less likely to occur when followed by a negative outcome (positive punishment) or the removal of a positive outcome (negative punishment). When applied to chronic pain, the operant behavioural model posits that reinforcement of pain behaviours works to maintain them, whereas lack of reinforcement or punishment of healthy behaviours makes these less likely to occur. Examples of reinforcing outcomes include reduction of pain intensity, inhibition of pain-related fear, and positive feelings of rest (Gatzounis et al., 2012). For example, resting is likely to result in pain relief, a reinforcing consequence likely to increase the frequency of using rest as a strategy. On the other hand, physical activity often increases pain, constituting a punishing consequence likely to decrease activity levels in the future.

The role of spousal responses has also been explored in relation to the operant behavioural model through the notion of partner 'solicitousness', which accounts for the contribution of reinforcement of pain behaviours and lack of reinforcement for healthy behaviours to the pain experience. Reinforcement of pain behaviours includes consolation and comfort, which may take the form of sympathy, carrying out a pain-relieving activity such as providing pain medication or giving a massage, or the avoidance of undesired activities such as housework (Newton-John, 2013). Punishing partner responses may include frustration and irritation in response to pain behaviours. In one study of 121 couples, partner behaviours explained 31% of the variance in patients' nonverbal pain behaviours and 14% of the variance in verbal pain behaviours, and negative partner responses were associated negatively with the rates of patients' nonverbal pain behaviours (Romano et al., 2000). Furthermore, partner solicitousness and negative responses to pain behaviours are associated with poorer patient functioning, and negative responses to well behaviour are related to greater patient physical dysfunction (Raichle et al., 2011; Romano et al., 1995). The effects of partner responses appear to be mediated by gender, although in both women and men, spousal solicitousness is associated with greater pain severity (Fillingim et al., 2003).

In the context of this thesis, it is important to note that "pain talk" or patient verbal reports of pain are classified as pain behaviours in this model and are therefore targeted in treatment for extinction by non-reinforcement of the behaviour (Newton-John & Williams, 2006). However, in addition to finding that novel categories of partner responses to pain displays (e.g. ‘hostile-solicitousness’) go beyond the prevailing solicitous, punishing, or distracting response categories, Newton-John and Williams (2006) found that marital satisfaction was significantly higher in patients who spoke more frequently about their pain.

Fear-Avoidance Model

The operant behavioural model has been criticised for its failure to incorporate cognitive variables and its restricted focus on overt behaviour (Sharp, 2001). As shown in Figure 4, the fear-avoidance model is a different cognitive behavioural model that explains why chronic low back pain develops in a minority of patients experiencing acute low back pain (Vlaeyen & Linton, 2000).

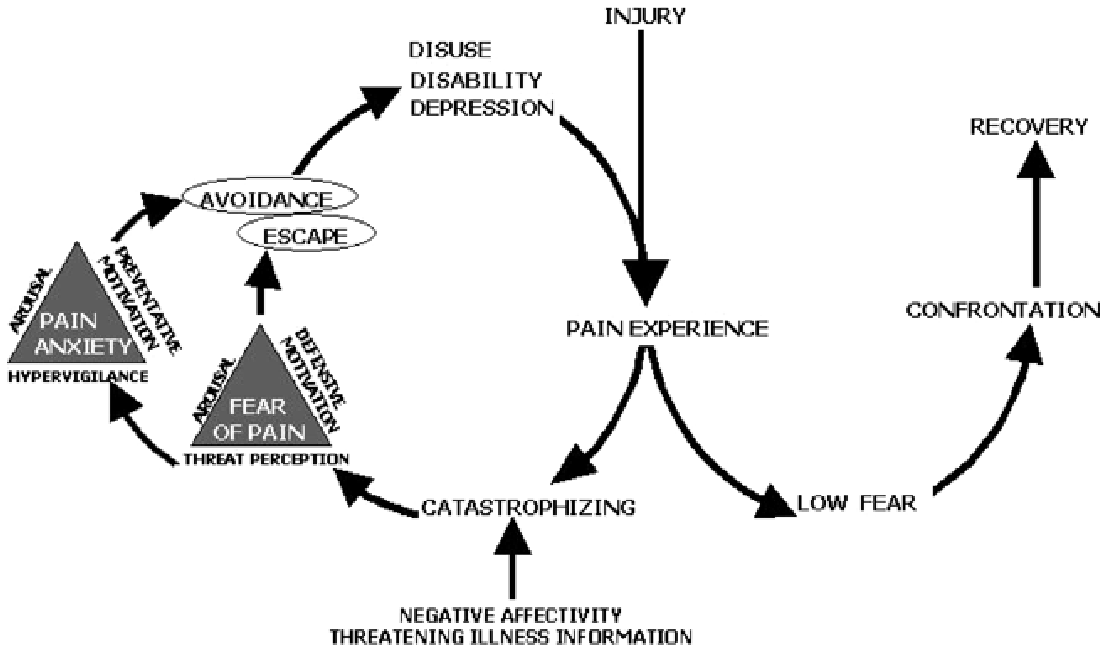

Figure 4. The fear-avoidance model of chronic pain. From “The Fear-Avoidance Model of Musculoskeletal Pain: Current State of Scientific Evidence,” by Leeuw et. al, 2006, Journal of Behavioural Medicine, 30, p. 79 (https://doi.org/10.1007/s10865-006-9085-0). Copyright 2006 by Springer Nature Switzerland AG.

There are two main pathways in this model. In the first, acute pain is perceived as non-threatening, which means that patients are more likely to remain engaged in daily activities, and functional recovery is promoted (Leeuw et al., 2007). In the second pathway, however, catastrophic interpretations of pain results in pain-related fear, and associated safety-seeking behaviours such as avoidance/escape of physical activity and hypervigilance. These catastrophic interpretations have long-term consequences such as disability and disuse, which lower the threshold for the subsequent experience of pain (Leeuw et al., 2007). A vicious cycle can ensue that maintains the chronicity of pain. Crombez et al. (2012) have proposed to extend the fear-avoidance model by adopting a motivation perspective, from which the dysfunctional pattern described in the model is reimagined as the persistent but futile attempt to solve pain-related problems and restore life goals.

Research has provided support for the role of pain-related fear in the transition of pain from acute to chronic and in the maintenance of a chronic pain condition (Leeuw et al., 2007). Specifically in terms of language, threatening diagnostic labels used by healthcare providers may activate the fear network (Boston & Sharpe, 2005). The language used by clinicians may also contribute to maladaptive beliefs, such as the need for a patient’s back to be protected, which can in turn contribute to increased vigilance and worry and, ultimately, further pain (Darlow et al., 2013).

Psychological Therapy and Chronic Pain

Consistent with the recognition that psychological factors contribute to chronic pain, psychological treatments have been developed as interventions. Most prominent among these is CBT, which for chronic pain focuses on identifying and changing maladaptive thoughts and behaviours. The evidence for CBT has evolved over the years. A 2009 systematic review concluded that CBT has weak effects in improving pain and minimal effects on pain-related disability, but is effective in improving mood (Eccleston et al., 2009). The review was first updated in 2012 and concluded that, compared with active controls, CBT has small positive effects on disability and catastrophising but not on pain or mood (Williams et al., 2012). The most recent update concluded that there was enough evidence over a large evidence base that CBT has small or very small beneficial effects for reducing pain, disability, and distress (Williams et al., 2020). Criticism has been directed at the lack of clarity regarding which specific treatment processes within CBT for chronic pain lead to patient improvement (McCracken & Vowles, 2014).

Acceptance and commitment therapy (ACT) is considered a third-wave CBT, that is, a therapy with foundation in CBT principles in terms of the prominence given to a person's thoughts and behaviours but that extends to include the underpinning philosophy and strategies for change (Feliu-Soler et al., 2018). ACT includes a combination of acceptance and mindfulness methods alongside behavioural activation and change methods (Hayes et al., 2011). Unlike CBT, which aims to change the *content* of thoughts, emotions, or sensations (including pain), ACT aims to change the patient's awareness of and relationship to these. In other words, ACT focuses on "not the removal of pain, but abandonment of the struggle to avoid or reduce pain, disentanglement from pain-related thought, deepened conscious contact with the present moment, and the construction of larger and larger patterns of effective action linked to chosen values" (Hayes & Duckworth, 2006, p. 185). This represents a major shift in the treatment of chronic pain and has profound implications, particularly with respect to the acceptance of chronic pain. Research demonstrates that acceptance of chronic pain is associated with less pain, disability, depression, and pain-related anxiety, and higher physical and vocational functioning (McCracken & Eccleston, 2003). ACT works on the potential of both experiencing pain *and* living a valued life without the need for pain to be reduced or eliminated before moving forward with life. A recent systematic review and meta-analysis of 11 trials reported medium to large effect sizes for measures of pain acceptance and psychological flexibility, and that ACT is more clinically effective than controls on changing measures of adaptive functioning, anxiety, and depression (Hughes et al., 2017). Williams et al. (2020) found large benefits of ACT for pain compared with treatment as usual, but not when compared to an active control. The evidence quality for studies was however rated as very low, which combined with the low number of studies evaluating ACT means results should be interpreted with caution.

Of particular relevance to this thesis is the ACT approach to language. ACT is based on Relational Frame Theory, which asserts that much of human suffering derives from the bidirectional and evaluative nature of language (Hayes et al., 2001). Relational Frame Theory focuses on our "ability to learn to relate events under arbitrary contextual control" (Hayes, 2004, p. 648) utilising 'relational frames' which consist of three properties: mutual entailment, combinatorial entailment, and transformation of stimulus functions. For example, in mutual entailment, when told that hot is the same as boiling, a person can derive that boiling is the same as hot (Hayes, 2004). ACT posits that literal language may create problems by creating psychological inflexibility through "entanglement with verbal rules and the traps of language" (Stoddard & Afari, 2014, p. 2). On the other hand, language can be used in an experiential way to increase contact with non-arbitrary features of the environment, including the mental environment (Stoddard & Afari, 2014). Metaphor is a tool frequently used in ACT as an experiential use of language because a metaphor can make abstract concepts concrete, with the story-like quality of metaphors "providing instructive lessons that are rich in emotional and perceptual detail, mimicking direct contact with the environment and making the experience more memorable" (Stoddard & Afari, 2014, p. 17). Metaphors such as the quicksand metaphor (Hayes, 2005) can highlight the problematic functions of behaviours such as avoidance, and instead promote acceptance. In this metaphor, the more one struggles to escape the quicksand, the deeper one sinks, while paradoxically, lying out on the quicksand and not attempting to escape lessens the risk of sinking. This is akin to struggling with one's unwanted thoughts and emotions, which tends to exacerbate them. ACT uses a wealth of metaphors such as this one to highlight its six core therapeutic processes: contacting the present moment, defusion, acceptance, self-as-context, values, and committed action.

1.5 Pain Assessment

Pain presents many obstacles to assessment, including a lack of objective measures and potential issues associated with the patient–clinician interaction. Clinicians may be uncertain about the diagnosis because of the lack of objective measures of pain itself, which can lead them to rely on situational features such as other medical evidence (Tait et al., 2009). However, identifiable pathology and objective diagnostic results often do not correlate highly with pain level or disability. For example, studies have found evidence of spine degeneration, including disc bulges or protrusions, in high proportions of asymptomatic individuals (Brinjikji et al., 2015; Jensen et al., 1994). Pain has also been reported as severe without supporting diagnostic evidence (Michel et al., 1997). The tendency to depend on objective measures of pathology presents difficulties when applied to chronic pain, and severe pain is often reported with little or even no discernible pathology (Melzack, 2001).

Clinicians relying on objective measures of pathology may underestimate pain when such evidence is missing or deemed non-severe. This propensity has been demonstrated in medical students, who ascribe higher judgments of pain and disability to chronic pain patients in the presence than in the absence of medical evidence (Chibnall et al., 1997). Practising clinicians have also been found to augment reports of low pain levels when supporting medical evidence is present, but to discount reports of high pain levels when such evidence is absent (Tait & Chibnall, 1997). A recent comprehensive review of 80 studies, found that, compared with assessment by patients, healthcare professionals underestimated pain in 78% of the studies and that this tendency is more pronounced with severe pain (Seers et al., 2018). The tendency to underestimate pain also intersects with race, with participants in one study significantly underestimating pain in Black faces compared to White faces (Plouffe-Demers et al., 2021). Another study found that physicians were twice as likely to underestimate pain in Black patients in comparison to all other ethnicities (Staton et al., 2007).

It is perhaps unsurprising then that people with chronic pain have reported feeling disbelieved and dismissed by health professionals (Munday, Kneebone, & Newton-John, 2021; Upshur et al., 2010). In addition to potentially underestimating pain, research has shown that health professionals often view patients in chronic pain in a more negative light than other types of patients. For example, in one study, 73% of 45 primary care clinicians treating patients with chronic pain moderately or strongly agreed that these patients were a major source of frustration (Dobscha et al., 2008). A qualitative study of first-year medical students’ perceptions of pain-related patient encounters in primary healthcare settings found these encounters generated the most negativity (Corrigan et al., 2011). One participant described a patient with chronic pain interaction in the following way, highlighting the difficulty in chronic pain assessment.

> I hear about the increase in the amount of chronic care patients in recent years. I hear about *the difficulty identifying the drug seekers from those with ‘true’ chronic pain.* I hear about the difficulty in setting limits. After spending 2 weeks in clinic, I have one coherent thought—I'm not sure how I feel about treating these patients or, honestly, if I ever want to. (emphasis added, Corrigan et al., 2011, p. 1218).

1.6 Pain and Language

Given the lack of objective measurement of pain or unique physiological indices of pain, it has been suggested that pain language may provide the best tool to evaluate pain and assess pain relief (Melzack & Torgerson, 1971). Self-report using various measures or clinical interview are, by necessity, the foundation of pain assessment (Turk & Melzack, 2011). The only other way of expressing pain is through non-verbal pain behaviours, for example guarding or grimacing; however, these are often inaccurately decoded by others and retain an element of subjectivity (Prkachin et al., 1994). Patients and clinicians rely predominantly on the patient's language for pain communication and assessment.

Pain and Language in Philosophy according to Wittgenstein

The fundamental link between pain and language has been explored by both philosophers and empirical researchers. The philosopher Wittgenstein asserts that "you learned the concept 'pain' when you learned language" (Wittgenstein, cited in Sullivan, 1995, p. 5). This work has informed research based on the concept that the expression of pain is an essential part of the pain itself, rather than a separate phenomenon (Waddie, 1996). In *Philosophical Investigations*, Wittgenstein (1953, p. 88) argues that the notion of a private language, in which words "… refer to what only the speaker can know – to his immediate private sensations…" is an impossibility. For language to be meaningful, there must be the possibility of judging the correctness of its use, and a private language is considered to be incapable of supplying this. For Wittgenstein, it follows that all language must therefore be public and dependent on the life forms speaking it and governed by certain rules. This is a concept Wittgenstein termed 'language-games.' When applied to pain, a language of pain built solely on private experience cannot provide a basis for the individuation and identification of sensations as such (Sullivan, 1995). That is, pain is not given meaning by reference to the internal sensation felt only by an individual but is instead determined by the use people make of the term. To make this clearer, Wittgenstein proposed a thought experiment known as the beetle-in-a-box experiment. In this experiment, he asks readers to imagine a community where each individual has a box containing a beetle. However, “no one can look into anyone else’s box, and everyone says he knows what a beetle is only by looking at his beetle” (Wittgenstein, 1953, p. 100). If the word “beetle” had a use in these people’s language, it could not be as the name of a thing, for it is possible that everyone has something different in their box, or even that the box may be empty. He concludes that “…if we construe the grammar of the expression of sensation on the model of ‘object and designation’ the object drops out of consideration as irrelevant” (Wittgenstein, 1953, p. 100). That is, it is the public usage of the word beetle or pain that is important and gives meaning to the term. In this way, people can use language and talk intelligibly about pain without the need to directly experience another’s subjective sensations.

The McGill Pain Questionnaire (MPQ) and Language-based Pain Questionnaires

The incorporation of language into pain research owes much to the development of the MPQ (Melzack, 1975). Prior research in pain had been dominated by the view of pain as a purely sensory experience, whereas single-item scales have assumed pain to be a unidimensional construct (Katz & Melzack, 2011). The development of the MPQ aimed to overcome this by using a multidimensional assessment of pain. The questionnaire is a word-based instrument used in medical contexts to diagnose, measure, and assess pain. It features 78 descriptors of pain such as “stinging”, “stabbing”, “tearing”, and “torturing”, and is divided into sensory, affective, evaluative, and miscellaneous components. A short-form version has also been developed (Melzack, 1987) as well as more recent a second variation, the SF-MPQ-2, which has been revised for use with people with neuropathic and non-neuropathic pain conditions (Dworkin et al., 2009). The MPQ has been translated into over 25 languages, whilst the SF-MPQ is available in over 30 languages (Melzack & Katz, 2013).

The MPQ was revolutionary in focusing on pain descriptors and offering a multidimensional assessment of pain, including the intensity, emotional impact, and significance to the person in pain (Main, 2016). It remains in wide clinical and research use, and is used in research to determine whether pain language has diagnostic potential. For instance, Dubuisson and Melzack (1976) found a high degree of specificity in pain language among a variety of diagnostic categories and correctly classified 77% of their patients into their diagnostic categories using pain descriptors. Using the MPQ, seven descriptors correctly classified 91% of patients with trigeminal neuralgia and atypical facial pain (Melzack et al., 1986). Kremer et al. (1983) also found that the number of affective descriptors endorsed using the MPQ was the best predictor of psychiatric disturbance in patients with chronic pain. Boureau et al. (1990) found that seven descriptors from the Questionnaire Douleur Saint-Antoine, a French language measure similar to the MPQ, were able to classify correctly 77% of patients with neuropathic pain and 81% of those with non-neuropathic pain.

However, one study failed to find relationships between single-word pain descriptors and pain-related disability or scores on psychological measures (Fordyce et al., 1978). More recently, a study of whether the MPQ-SF could be used as a diagnostic tool for women with chronic pelvic pain found that specificity remained low when the sensitivity of a descriptor was high, that, for all descriptors, positive predictive values were low, and that only negative predictive values for several descriptors had any diagnostic utility. They concluded that, overall, MPQ descriptors do not have significant diagnostic value in this patient group (Droz & Howard, 2011). Gender differences in MPQ usage have also been identified in a study of a recalled pain narrative task that found that women used more MPQ descriptors as well as more graphic language and had greater focus on the sensory aspects of the pain experience than men (Strong et al., 2009).

Although the MPQ has been praised for incorporating language into pain assessment and highlighting pain's multidimensionality, other criticisms have been noted. By basing its approach almost entirely on single-word adjectives taken out of any social or communicative context, the MPQ makes a number of implicit assumptions which, as Sussex (2009) points out, need linguistic and semantic verification. An analysis of 51 studies using the MPQ found that only 19 of the original 78 descriptor words were used by more than 20% of those completing the tool (Wilkie et al., 1990). Another study that used a recalled pain narrative found that participants did not use 35 of the MPQ descriptors (45%) at all (Strong et al., 2009). In addition, a systematic review of 41 articles found that pain descriptors vary widely, lack consistent attentional bias towards certain descriptors, and are inconsistently categorised into domains of pain (Wilson et al., 2009). The authors concluded that the descriptors used in the studies, most of which were derived from the MPQ, may not reflect those used by people with chronic pain if asked to describe their pain (Wilson et al., 2009). Thus, the MPQ menu of pain descriptors appears to be equivocal at best and in need of further development.

Another multidimensional pain questionnaire that incorporates pain descriptors is the Massachusetts General Hospital Pain Centre's Pain Assessment Form (Ballantyne et al., 2002). In addition to general questions about pain including its location, duration, aggravating activities, and medications, it also includes a pain quality section. This section features words to describe the pain and to rank its intensity using options that are similar to those in the MPQ, such as “throbbing”, “aching”, “fearful”, and “hot-burning.”

In addition to these two questionnaires, the main pain assessment tools that include language and pain descriptors are those developed to screen for neuropathic pain (May & Serpell, 2009). For example, the Leeds Assessment of Neuropathic Symptoms and Signs (LANSS; Bennett, 2001) includes a bedside examination of sensory dysfunction as well as an analysis of sensory pain descriptors featuring terms such as “pins and needles”, “electric shocks”, and “burning.” Emphasising the importance of language in the assessment of pain, a number of other questionnaires that include sensory descriptors for the assessment of neuropathic pain have been developed, including the Neuropathic Pain Questionnaire (Krause & Backonja, 2003), painDETECT (Freynhagen et al., 2006), and the Douleur Neuropathique en 4 Questions (Bouhassira et al., 2005). Table 1 summarises the measures discussed in this section.

Table 1

Example language-based pain questionnaires

Questionnaire	Items	Domains/Subscales	Example Descriptors	Psychometrics
MPQ (Melzack, 1975)	78	Sensory, affective, evaluative, misc. /Pain Rating Index, Present Pain Index	Stinging, stabbing, tearing, torturing	High internal consistency (correlations of 0.89 – 0.90), test-retest reliability 70.3%
MGH* (Ballantyne et al., 2002)	15	N/A	Throbbing, aching, fearful, hot-burning	Not available
LANSS (Bennett, 2001)	7	N/A	Pins and needles, ‘bursting’ or ‘jumping’ sensations, burning	Good inter-rater reliability (Kappa values between 0.6 and 0.88), internal consistency (Cronbach’s alpha 0.74), each item significantly associated with neuropathic pain.
NPQ (Krause & Backonja, 2003)	12	N/A	Burning, shooting, electric, overwhelming	High internal consistency for original 32 item questionnaire (Cronbach’s alpha 0.95)
painDETECT (Freynhagen et al., 2006)	9	N/A	Electric shocks, crawling ants, stinging nettles	Good internal consistency (Cronbach’s alpha 0.83), bivariate correlations between items to grade pain all significant ($p < 0.001$)
DN4 (Bouassira et al., 2005)	10	N/A	Brûlure (burning), picotements (pins and needles)	Good face validity (90-95%), inter-rater reliability (Kappa values between 0.7 and 0.96, except for item 16 – 0.66)

Note. * pain quality section only, MPQ: McGill Pain Questionnaire, MGH: Massachusetts General Hospital Pain Assessment Form, LANNS: Leeds Assessment of Neuropathic Symptoms and Signs, NPQ: Neuropathic Pain Questionnaire, DN4: Douleur Neuropathique en 4 Questions. Psychometric details are from the original papers as cited in the table.

1.7 Metaphor and Chronic Pain

The metaphor may provide an alternative to the MPQ approach. According to conceptual metaphor theory (CMT) (Lakoff & Johnson, 1980), metaphor is not simply a literary adornment but rather a powerful conceptual tool that can be used to structure, restructure, or create reality. Metaphor is pervasive throughout life, whether used deliberately or non-deliberately, and is easily seen in the language of neutral conversations, newspapers, radio, and television, as well as in the interior world of thought (Lakoff & Johnson, 1980). Put simply, a conceptual metaphor comprises the understanding of one domain of experience in terms of another. These domains are referred to as the "target" and "source" domain respectively. The target domain is the conceptual area one attempts to understand and is typically abstract, whereas the source domain is the conceptual domain from which one draws knowledge and metaphorical expressions, and is typically concrete. Common examples of such metaphors include "life is a journey", "theories are buildings", "anger is fire", "argument is war", "love is madness" or, in health care, "disease is war." As an example, the conceptual metaphor "ideas are plants" may be seen in phrases such as "His ideas came to *fruition*", "That's a *budding* theory", "Mathematics has many *branches*", and "She has a *fertile* imagination" (Lakoff & Johnson, 1980, p. 48).

As explained by Kövecses (2016), a conceptual metaphor can be described more technically as a systematic set of mappings between two domains of experience. This example of the conceptual metaphor "anger is fire" is taken from Kövecses (2016, pp. 14-15), who first addresses linguistic examples:

> That *kindled* my ire.
> Those were *inflammatory* remarks.
> *Smoke* was *coming out* of his ears.
> She was *burning* with anger.
> He was *spitting fire.*
> The incident *set* the people *ablaze* with anger.

From these, the following set of mappings is proposed by Kövecses (2016):

> The cause of fire → the cause of anger
> Causing the fire → causing the anger
> The thing on fire → the angry person

The fire → the anger
The intensity of fire → the intensity of anger.

These mappings help explain why the linguistic metaphors listed above represent and mean what they do, are systematic, and act as an articulate expression of fire mapped onto anger (Kövecses, 2016).

CMT posits that conceptual metaphors play a central role in defining one's everyday realities and structuring how one perceives the world, although most people are not normally aware of this conceptual system (Lakoff & Johnson, 1980). For instance, consider the example of "argument is war" by Lakoff and Johnson (1980). They consider that, by using this conceptual metaphor, a person views and enacts arguments as something to win or lose, views the other person as an opponent, attacks the other's positions and defends their own. That is, one does not simply speak about arguments as war but perform them in a way that the metaphor structures the actions executed in arguing. Lakoff and Johnson (1980) contrast this with a hypothetical society with the conceptual metaphor "argument is a dance", through which participants are performers and the end result is a balanced, aesthetically pleasing ritual. Here, people would view, enact, and experience arguments completely differently.

Another example of how metaphor can govern the way one thinks and acts is given by the conceptual metaphor "life is a journey." By viewing life in this way, one can set goals to reach, make plans for the journey, prepare for obstacles, and choose different paths. By viewing life instead as a theatre play, in the vein of Shakespeare's well-known lines “All the world is a stage/and all men and women are merely players”, one would construct a very different view of life, in essence an alternate reality (Kövecses, 2016).

There are of course a wide variety of other linguistic tropes available to us. These include not only metaphor, but hyperbole, synecdoche, and metonym, to name a few. This thesis focusses on metaphor over other linguistic devices due to its value as a powerful conceptual tool, as shown in CMT, as well as its links with pain, discussed below. However, an important point to discuss here is the relationship between metaphor and simile. The debate in the cognitive linguistics literature regarding similes and metaphors is complex and ongoing, dating back to Aristotle. There are two main viewpoints to the debate: the equivalence view and the non-equivalence view. The Aristotlean tradition regards similes and metaphors as equivalent, variants of a unique conceptual process of analogy. The non-equivalence view states that metaphor is a categorisation assertion, whilst a simile is a claim of similitude, alongside other cognitive and discursive differences (Romano, 2017). There is evidence both supporting (Chiappe & Kennedy, 2000) and refuting (Aisenman, 1999) the equivalence view. CMT’s conceptual approach however follows the equivalence view. In CMT, metaphor is not a linguistic phenomenon, but a conceptual one consisting of a mapping process between the source and target domains. Thus, any difference between similes and metaphors are rejected due to the fact that they differ linguistically only in the surface presence or absence of the word “like” (Aisenman, 1999). Research into metaphor and chronic pain has also treated both similes and metaphors equivalently, whilst acknowledging that similes may represent a more purposeful choice (Bullo, 2020; Bullo & Hearn, 2021). This thesis will follow CMT and use the single rubric “metaphor” to denote both metaphor and simile.

Turning to the application of metaphor and pain, Biro (2010, p. 75) writes on the difficulty of pain expression and notes that, “Pain threatens to destroy our language and conceptual abilities, leaving a void. The only way to represent that experience and fill the void is through metaphor.” The difficulty of pain expression lies in its self-reflexivity and its absence of intentionality or linkage with an external object, which translate to a lack of concreteness and render it elusive (Biro, 2010). When trying to describe their pain, people are often “lost for words”, and pain that is chronic or neuropathic presents the most difficulties (Schott, 2004). As noted above in the context of CMT, metaphor can function as a way to communicate and understand something abstract by understanding it through the lens of a more familiar, concrete source domain. Metaphor may also act as a freeing, expressive tool to overcome the isolation and confusion felt by people in persistent pain (Stewart & Ryan, 2020). This is crucial because, although people in pain can appear “cut off, turned inward, preoccupied with their inner experience”, “a sufferer needs a way of talking about pain – permission to talk about it – without feeling judged, without the implication that you lack moral fiber, or are exaggerating…” (Mantel, 2013, p. 11).

However, there is limited research in this area, with an exception being the ongoing debate on the use of metaphor in health care (Neilson, 2016; Sontag, 1978; Stewart, 2014). A recent systematic review about whether metaphors have therapeutic value for people in persistent pain identified only six studies that reported on the therapeutic value using domains such as pain, work return, mood, knowledge and understanding, and empowerment (Stewart & Ryan, 2020). The review found four themes relating to therapeutic value – expression, connection, understanding, and control. In the studies, participants used metaphor to give form to their internal experience, despite at times expressing frustration at their inability to describe their pain (Stewart & Ryan, 2020).

Using the MPQ and the 100-million-word British National Corpus (BNC; an online corpus of written and spoken English samples from a diverse range of sources) to identify the types of metaphors used by those with chronic pain, Semino (2010) found evidence for the dominance of an overarching source domain labelled “causes of physical damage” through which the target domain of chronic pain can be understood. Searching in the BNC in the span of one word to the left and one word to the right of the string “pain” and computed on the basis of log-likelihood ratio, Semino identified that eight of the top 62 collocates of this string could be subsumed under the causes of physical damage domain. These were searing, sharp, stabbing, lanced, seared, stabbed, stinging, and burning. In over 85% of instances of these expressions, their use was metaphorical in nature. Semino also found that over one-third of the 78 MPQ descriptors could be seen as examples of this proposed source domain and could be broken down further into different types of causes of physical damage. These included physical damage via:

- insertion of pointed objects (e.g. stinging, pricking, penetrating)
- application of sharp objects (e.g. sharp, stabbing, lacerating)
- pulling/tearing (e.g. pulling, wrenching, squeezing)

- application of pressure/weight (e.g. pressing, crushing, heavy)
- malevolent animate agent (e.g. punishing, torturing, killing)
- high/low temperature (e.g. burning, freezing)
- movement that may cause damage if occurring inside the body (e.g. beating, pounding, shooting)

By integrating the neuroscientific and psycholinguistic research relating to embodied simulation, Semino suggested that using metaphors relating to physical damage will facilitate a form of embodied simulation of pain experiences for the audience. This may then provide the grounds for an empathic response (Semino, 2010). Such a response may be more likely to provoke favourable responses by observers in terms of assistance, care, and treatment (Steinkopf, 2016).

Among the limited research specifically on metaphor use in populations with chronic pain is that of Hearn et al. (2016), who interviewed 16 people with neuropathic pain following spinal cord injury. Using content analysis and interpretative phenomenological analysis (IPA), they found three themes of metaphor use contained within 115 metaphors: “pain as a personal attack”, “the desire to be understood”, and “conveying distress without adequate terminology.” Participants spoke of their pain as “an embodied entity relentlessly attacking them” (Hearn et al., 2016, p. 979); one participant went so far as to liken the pain to a “devil”. The desire to be understood was shown through metaphors comparing chronic pain with painful stimuli that the listener may have previously experienced, such as pins and needles, or a toothache. Lastly, participants used metaphor to convey distress and the intensity of pain, for example metaphors of burning, while also acknowledging the difficulty in describing neuropathic pain.

Bullo also examined the metaphors women with endometriosis use (Bullo, 2020; Bullo & Hearn, 2021). In one study, she used an online questionnaire to survey 131 women to explore the communication challenges that could lead to a delay in diagnosis. Most of the pain descriptors identified used elaborate metaphorical scenarios to convey pain intensity (Bullo, 2020). Using Semino's taxonomy to provide superordinate metaphors, Bullo identified three types of metaphors for endometriosis pain: pain as "physical damage", pain as "physical properties of elements", and pain as "a transformative force." In the first, pain is described as a cause of physical damage, such as via an object, or by a malevolent agent (e.g., "A sharp stabbing pain"). The second encompasses physical properties of objects that can cause harm such as pressure, weight, volume, or high temperature (e.g., "searing hot pain"). The third describes pain as a transformative force whereby those in pain perceive themselves as moving into a different location, state, or entity using container and directional metaphors (e.g. "I feel outside of my brain").

A later study by Bullo and Hearn (2021) used CMT and interpretative phenomenological analysis to evaluate more specifically the metaphors used by women with endometriosis. Twenty-one women were interviewed, and the authors found seven conceptual metaphors across 221 metaphorical expressions. These included the categories found in Bullo's previous work as described above – pain as physical properties of elements, physical damage, and transformative force. Additional source domains described were pain via physical damage caused by an external animate agent (e.g. "like someone cutting you"), pain as an external inanimate entity (e.g. "like metal wool inside"), pain as sensory experience (e.g. "like nails against a chalkboard"), and pain as an animate agent (e.g. "my womb is angry").

Studies such as these are both novel and important, however there remains an overall paucity of literature in this area, despite the crucial link between chronic pain and metaphor use. The few existing studies are also primarily qualitative in nature, with more systematic quantitative analyses lacking in the area. There is a clear need to fill this gap in the literature, with both additional qualitative and novel quantitative studies which incorporate both linguistic and psychological theories and outcomes.

1.8 Aims of the Thesis

Chronic pain is a prevalent, costly, complex condition with multiple psychological comorbidities. Given the difficulties associated with assessing pain, both patients and healthcare providers rely primarily on language to describe and respond to pain. One specific feature of language, metaphor, has been implicated in the chronic pain experience, and metaphor may represent a powerful tool for people in pain. Research has shown evidence of metaphor use in populations with chronic pain and that it may possess therapeutic and clinical utility. Historical biomedical models, with their exclusive focus on nociception, leave no room for the incorporation of language or metaphor into the pain experience. However, this is not the case in more recent models of pain, such as the Gate Control Theory, Pain Neuromatrix, and biopsychosocial models of chronic pain, which include cognitive evaluative, motivational affective, and social factors. Metaphor may facilitate the communication of pain and thereby lead to increased understanding of and validation for patients, which can in turn decrease stress and affective distress. Because it is cognitive evaluative, metaphor may also be a mechanism to ‘open’ or ‘shut’ the gate, as per the Gate Control Theory, and thus alter a person’s pain experience. The potential advantage of the use of metaphor has been demonstrated in its application as a tool in

ACT, where it is used to decrease psychological distress and promote understanding of psychological concepts. However, despite the fundamental link between language and pain and the potential utility of metaphor, research in these areas is lacking. This thesis aimed to fill this gap in the literature by exploring the use of language and metaphor in people with chronic pain. Chronic pain was chosen over acute pain as the primary interest of the thesis due to the lack of objective measures for its assessment, entailing a higher reliance on language in order to solicit aid from others.

The overall aim of this thesis was to improve understanding of patient communication about chronic pain. Given the dynamic, explorative process involved in researching a novel area, the specific aims and focus of the thesis evolved as the findings from previous studies informed the direction of future studies. The thesis outline is as follows.

1. Explore broadly how people with chronic pain use language to describe their pain experience.
2. Analyse the types of metaphorical pain descriptors people with heterogenous chronic pain disorders use.
3. Examine the links between such pain metaphors and
    a. Diagnostic group
    b. Depression, anxiety, and stress (Depression, Anxiety, Stress Scales-21 item; DASS-21)
    c. Pain intensity (Brief Pain Inventory; BPI)
    d. Pain interference

4. Explore the clinical experiences of metaphor in healthcare professionals who work with people with chronic pain.

1.9 Overview of Thesis

Chapter 2 (Study 1)

The following chapter describes a study of how people with chronic pain use language to describe their pain experience (Thesis Aim 1). The paper analysed qualitative data from a series of focus groups conducted with outpatients attending a chronic pain management program at a hospital in Sydney, Australia. As the initial study into an under-researched area, this study was exploratory in nature.

Chapter 3 (Study 2)

Based on the finding from Study 1 that participants frequently rely on metaphorical descriptions of the pain experience, Chapter 3 provides a systematic analysis of the metaphors used by people with chronic pain (Thesis Aim 2). The study used CMT (Lakoff & Johnson, 1980) and systematic metaphor analysis (Schmitt, 2005) in a cross sectional, survey-based study of 247 people with chronic pain.

Chapter 4 (Study 3)

Chapter 4 describes study 3, which was an extension of the work undertaken in Study 2 and used the same data pool. Based on the findings of Study 2, which indicated that some metaphor source domains may point towards aspects of the pain experience such as diagnosis or pain severity, Study 3 investigated the links between specific metaphors used and their relationships with factors such as diagnostic category, mood, pain intensity, and pain interference.

Chapter 5 (Study 4)

Based on the findings of Study 3 that metaphor use may contain useful information for clinicians regarding certain chronic pain diagnostic categories and pain interference levels, the study described in Chapter 5 focused on clinicians working in the field of chronic pain. Using qualitative methodology, the study explored their experience of metaphor in chronic pain consultations and how they respond to and use it in the assessment and treatment of chronic pain.

Chapter 6

Chapter 6 summarises the main findings of the thesis and synthesises the information presented in the preceding chapters. It also discusses the strengths and limitations of the thesis as well as the clinical implications, recommendations, and future research areas stemming from the key findings.

Chapter 7

Chapter 7 comprises the final summary and conclusions of the thesis.

2. STUDY 1: THE LANGUAGE OF CHRONIC PAIN

This chapter is presented exactly as it appears in the following published article:

Munday, I., Kneebone, I., & Newton-John, T. (2021). The language of chronic pain. *Disability and Rehabilitation*, *43(3),* 354-361. https://doi.org/10.1080/09638288.2019.1624842

Principle Author

Name of Principal Author (candidate)	Imogene Munday
Contribution to the paper	Responsible for the development, ethics approval process, data collection, data analysis and write up in collaboration with thesis supervisors. Responsible for the submission, revisions, and response to peer review comments.
Overall percentage (%)	80%
Signature	Production Note: Signature removed prior to publication.

2.1 Preamble

Although multiple studies have explored the experience of chronic pain in general, there is limited research looking more specifically at the role of language in chronic pain. Given the paucity of the literature in this area, this first study was necessarily explorative and quite open. A qualitative format (focus groups) was deemed the most appropriate to investigate in depth the language used by people with chronic pain in an open and friendly environment. The results of this study grounded this thesis and helped shape the direction of the following studies, particularly those focused on the predominant use of metaphor in chronic pain communications.

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RESEARCH PAPER

The language of chronic pain

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ABSTRACT

Objective: Pain is a universal phenomenon, but is also inherently private and subjective – there's no objective test for its existence. Sufferers rely on language to describe their pain experience. The McGill Pain Questionnaire paved the way for incorporating language into pain assessment and recent research has explored aspects of pain language such as metaphors and grammatical patterns. This study investigated how chronic pain sufferers use language to describe their pain experience.
Design: Three focus groups were conducted ($N = 16$, age 22–74 years, $M = 46.6$ years) with participants attending an outpatient chronic pain management program in Sydney, Australia. Participants were asked to describe aspects of their pain experience.
Main outcome measure: The language which participants utilized to talk about their pain experience.
Results: Thematic analysis identified five superordinate themes: Isolation, Physical Sensations of Pain, Pain Personified, Pain as Overwhelming, and Coping with Pain. Across themes, participants relied on metaphorical language, which reflects the complex, multidimensional aspects of pain as well as the desire to effectively communicate it to others.
Conclusions: This study underscores research indicating the complexity of pain experience and hence pain language, and suggests that single word adjectival measures are inadequate to completely capture its complexity.

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Chronic pain; language; metaphor; personification; qualitative

➤ IMPLICATIONS FOR REHABILITATION

- Chronic pain is now considered a disease in and of itself, with patient's pain language being an important study area due to the lack of objective tests for pain.
- In both assessment and rehabilitation, patients rely on metaphorical pain language in order to facilitate understanding and garner support from others.
- Pain metaphors may provide a useful target for interventions such as Acceptance and Commitment Therapy and Cognitive Behavioural Therapy, particularly when addressing catastrophic thinking patterns.

Introduction

Pain is a universal phenomenon, which is recognized not merely as a symptom of some other disorder, but can be considered as a disease in and of itself. Chronic pain, pain persisting past three months, is a particularly problematic subgroup in this regard. It is associated with symptoms of depression and anxiety, and substance abuse [1,2]. It has been argued that the biomedical approach, with the focus solely on pathophysiology, does not adequately address the complexity of chronic pain, nor provide sufficient guidance for living with it [3]. Further understanding of chronic pain has implications for both its assessment and treatment.

The development of the McGill Pain Questionnaire [MPQ; 4], which uses verbal descriptors of pain in order to assess, measure, and diagnose pain, was seminal in introducing the role of language into pain study. It was the first tool to incorporate pain descriptors, as well as offering a multidimensional assessment of pain, including intensity, emotional impact, and significance of the pain to the patient [5]. However, although the MPQ highlights the importance of language in pain, criticisms include the fact that it is based almost entirely on one-word adjectives taken out of communicative context [6]. Criticisms have also been leveled at the SF-MPQ-2 [7]. Additionally, in an analysis of 51 studies using the MPQ, only 19 of the original 78 descriptor words were used by more than 20% of participants, suggesting the repertoire of single pain descriptors is equivocal at best [8].

One of the first comprehensive linguistic studies into the language of pain is that of Lascaratou [9]. Her work is derived from a corpus-based study of nearly 70,000 words from 131 conversations recorded between doctors and patients, involving explicitly interactive language and moving far from the single word descriptor analysis of the MPQ paradigm. She found that 60% of pain expressions involved verbals, 38.5% involved nominals, and only 1.6% were adjectival denoting a quality, a result which further questions whether the strong emphasis on adjectival descriptors in the MPQ is representative of the spectrum of pain expressions. In 57% of pain expressions, it was the suffering person, not the body part in pain, which was referenced, suggesting that overwhelmingly, it is the holistic individual who is involved in the experience and expression of pain. Further, she found that people spoke of their pain in an externalizing fashion, as "an uninvited intruder," "a torturer," placing pain outside the sufferer's

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self, with the body being a container for pain. Multiple studies into pain language support this, finding evidence of the spontaneous and frequent use of metaphor in pain description [10–12]. Metaphor may be a way of objectifying pain through language and making it tractable, able to be treated and removed from the body.

Wilson and colleagues conducted a systematic review into the role of attention on pain descriptors, as this has been shown to be a significant factor in the modulation of chronic pain. They found a lack of consistent bias towards specific pain descriptors and suggest that this may simply be because the descriptors given were not ones which participants would have used themselves [13]. Due to this, they hypothesize that personalized pain descriptors may be more appropriate to effectively communicate the pain experience. They further conclude that the language used by both individuals and health professionals may have the potential to modulate pain and may thus be a useful adjunct approach in pain management. It appears vital to build on previous work on pain language if this potential is to be harnessed. The present study aimed to further explore the ways in which chronic pain patients use language to speak about and describe their pain experience.

Methods

Design

As the research was primarily explorative and in order to reduce researcher bias, ensuring that any unforeseen aspects were not missed, qualitative research methods were deemed the most suitable. Such methods allow for a deep understanding of participant's own language, thoughts and feelings surrounding a particular topic from their own perspective. Focus groups were chosen as they have characteristics that mimic the spontaneous and informal use of language as a social phenomenon in everyday life. Additionally, the interaction between participants in a focus group has been shown to be important and beneficial for research in ways such as encouraging open conversation and facilitating the expression of experiences which may remain underexplored in an interview [14].

Ethics approval

Ethics approval was sought and obtained from the relevant local ethics committees. Participants also provided informed written consent before the focus groups, with the option of withdrawing consent at any time during or post focus group.

Site and access to sample

The pain management and research center where the study took place is situated within a large teaching hospital in Sydney, Australia. It provides multidisciplinary services for acute, subacute, chronic, and cancer pain, with approximately 40,000 episodes of out-patient care per year. The center runs an intensive three-week, outpatient multidisciplinary pain management course for those living with chronic pain [15]. As the only pre-requisite for participation in this study was having chronic pain and adequate English language ability, all those attending this program were deemed eligible for participation. Participants were approached during the program with information about the study and were invited to participate. It was emphasized that participating or not participating would have no effect on their involvement in the program and was completely voluntary. A total of 25 patients were approached. Of these, 16 signed the consent forms and participated in the focus groups. Table 1 outlines sample characteristics.

Data collection

Data was collected via focus groups. Saturation of data was reached after three focus groups, with 7 participants in group 1, 4 participants in group 2, and 5 participants in group 3. Focus groups took place at the pain management center on day two of the three week pain management course. Focus groups were held during the lunch hour and ranged in duration from 23 to 34 min. They were audiotaped and transcribed verbatim. Focus groups were conducted by the first author of this study. She was not involved in the pain management program in any capacity. The focus groups were semi-structured and commenced with a broad question for participants to describe their pain. Follow up open ended questions arising from participant's answers were used when required for elaboration and covered areas such as pain's effect on their lives and their response to this.

Analysis

The audio of the focus groups was transcribed by the first author. The transcripts were then analyzed according to the 6 step method for thematic analysis outlined by Braun and Clarke [16]. Firstly, the transcribed data was read and re-read several times in

Table 1. Participant's demographic information.

Participant	Age	Sex	Pain location	Pain duration	Education
1	55	F	Neck, lower back, groin, feet	11 months	TAFE[a]/College
2	22	M	Back and left leg	5.4 years	TAFE/College
3	22	M	Facial - right jaw	11 months	Year 9
4	51	M	Widespread	2 years	University
5	49	F	Left buttock and lower leg	6 years	TAFE/College
6	60	F	Widespread	5 years	TAFE/College
7	34	F	Lower back, buttocks, legs	1.7 years	TAFE/College
8	74	M	Widespread	15 years	High School
9	69	F	Lower back and neck	1.2 years	TAFE/College
10	72	F	Widespread	31 years	Year 10
11	65	F	Widespread	12 years	High School
12	39	F	Lower back and buttocks	6.4 years	TAFE/College
13	39	M	Head and neck	4 years	High School
14	23	F	Widespread	10 years	High School
15	23	F	Lower back, right thigh	2.2 years	High School
16	49	M	Hands and forearms	1.9 years	University

[a] TAFE is Australia's largest vocational education and training provider.

addition to re-listening to the audio in order to ensure transcription accuracy. This repeated reading results in data immersion and it is during this step that initial thoughts and ideas are noted down. Following this, initial codes were generated from aspects of the data which appeared meaningful and interesting, with the full data set given equivalent attention. Thirdly, the various codes generated in step 2 were collated into potential themes which seemed to explain larger sections of the data. These initial themes were then reviewed via a two level system. Level 1 involved checking to see whether the themes worked in relation to the coded quotes and extracts, whilst level 2 sought to determine if the themes worked in relation to the entire data set. It is at this stage that themes which were either too diverse or lacked supporting data were discarded in a process of theme review and refinement, ensuring the themes accurately reflected the data set as a whole [16]. Following this, clear definitions and names were generated for each refined theme. The final step involved choosing extracts from the transcripts which portrayed elements of the themes and illustrated them in a vivid, coherent way.

This analytic strategy was performed independently by both the first author and by a second reviewer - a postgraduate Psychology doctoral candidate with experience in qualitative research. Both reviewers then met in order to compare their results and conclusions. Agreement on the final themes and sub themes were reached via discussion until consensus was achieved. These final key themes were then examined by both parties in order to ensure that they stemmed from the data and accurately represented it.

Results

It was observed that participants spoke candidly and freely about their experience of pain and of the language that they use to talk about and describe it. As the interview was semi structured and fairly open, the focus groups covered a wide range of topics pertaining to the pain experience. Using thematic analysis, 5 superordinate themes were identified, each with their own related subthemes. The 5 key themes were Isolation, Physical Sensations of Pain, Pain Personified, Pain as Overwhelming, and Coping with Pain. These 5 themes and their subthemes are presented with example pain statements in Table 2.

Table 2. Themes, sub themes, and pain statement examples.

Theme	Sub theme	Example pain statements
Isolation	Invisibility of Pain	"It's a hidden pain." (P5); " … someone even says that you know, you look alright, but it's very painful inside." (P4)
	Difficulty of Pain Expression	"You find it's very hard for you to find a way to express yourself." (P4); "You don't know how to express it … you can't find a word to express the feeling." (P4)
	Suffering Alone	"It feels like you're carrying it alone … it's something you can't pass on to anybody." (P1); "Other people … don't want to know about your pain." (P10); "I am the only one carrying it and … people don't really understand it or want to know." (P1); " … they might feel disgust with you and they may try and keep away from that topic. They don't want to understand you … " (P4)
	Separation from Others	"I'm right in the heart of everything, a lot of people and I kind of feel like, I know I'm different." (P9); "I don't feel like I'm in it now, I'm sitting there watching as opposed to participating, it's that feeling." (P6)
	Shame	" … then there's shame, because you're not getting as well as you should be." (P1); "You wonder what the reason is for you still being here because you're not functioning or contributing." (P11)
Physical Sensations of Pain	Weight and Size	"I feel like I carry a very heavy load." (P1); "I could go from feeling not too bad to like my body weighs 500 kilograms." (P7); "It's huge … it's big to carry yeah." (P1)
	Strange Sensations	"It feels like ants in your body." (P5); "I do get a pins and needles sensation in my foot" (P2); "It's like when you wake up and you've slept on your hand and it's all pins and needles and you can't feel it." (P16)
	Temperature	"A hot throbbing bruising." (P1); "A bone deep burning sensation." (P5); "It can feel like warm, hot at times." (P3)
	Piercing	"It feels like a hot knife slicing into me." (P9); "It's like somebody's stabbing you in the back of the neck over and over … like someone is pushing a knife into the back, a big fat knife there and over the top there … " (P13)
	Aching	"It's more of a deep ache … a deep bleeding sensation." (P2); "A heavy dull ache all the time." (P9); "A real dry, deep ache … right down in the bone kind of thing, a deep ache and … nothing you can take that dulls that." (P2)
	Making Pain Relatable	"Like a period pain … that really strong cramp sort of a pain … " (P11); " … like you know when you stub your toe." (P14); "I feel like I'm having contractions in my back." (P15); "Like having a baby." (P10); "I explain it as if you've ever given birth … " (P5)
Pain Personified	As an Adversary	" … it was like a dark thing that wanted to suck me out … " (P1); "I say when I find this bloke who's stabbing me in the back of the head, he's gonna be in trouble, I'm gonna kill him … " (P13); "It feels like someone's inside twisting." (P7);
	As External to Self	" … something that is burning inside you." (P4); "I have one on the back." (P9)
Pain as Overwhelming	Unrelenting Nature of Pain	" … it's just constant 24/7 and that's the hardest." (P11); "All enveloping. It seems to take over all of my being." (P8); "I'd say overwhelming." (P1)
	Loss and Ruin	"It ruins." (P6); "It feels like somebody came and took something away." (P1); "It just robs you of living life." (P11)
Coping with Pain	Holding on and Moving Forward	" … it's that feeling of wanting to hold on." (P1); " … the pain got really bad and I just hung in there." (P8); "Swimming, keep swimming." (P1); "Small steps forward." (P1); "Push, push through and don't beat yourself up." (P6)
	Finding Positives	" … just do little things and find all the little positives … and I hold on to them and I celebrate them too." (P1); "You're a stronger person." (P15); "It's also, like, given me incredible resilience." (P14); "There's always someone worse off." (P5)

Isolation

Invisibility of pain

Participants spoke of the *invisible* nature of chronic pain with frustration and sadness. Although pain had become a dominant focus of their lives and a source of constant thought and attention for them, there were often no outward signs or manifestations of it. As one participant succinctly put it, "It's a hidden pain" (P5). On the outside, those with chronic pain may appear healthy, despite experiencing significant pain: "… someone even says that you know, you look alright, but it's very painful inside," "But everyone says 'oh you look fantastic, ok, nothing wrong with you'" (P4, P6). They also expressed frustration that because they appeared outwardly healthy, others would sometimes challenge the veracity of the pain itself, which led to feelings of hopelessness: "And when you feel very painful and the other party just don't understand and say prove it to me, challenge you … and you feel so, just knocked down and you don't know what to do" (P4).

Difficulty of pain expression

Tied to the invisibility of pain was a feeling of inexpressibility. Participants found it extremely difficult to share and communicate their pain to others. For example, one participant described it as follows: "You don't know how to express it … you can't find a word to express the feeling" (P4). One way of overcoming this difficulty was in talking and sharing with those who are suffering in the same way from pain: "I've got friends who are suffering pain and as a group we sort of get together and we talk about it to each other and say this is giving me an effing … you know, really get our feelings out about it because it helps to be able to talk to someone about it and they are feeling a little bit of what I'm feeling" (P8). Trying to express pain and communicate it to those who are not in the same position was seen as much harder.

Suffering alone

In contrast to the "getting together" mentioned above, a pervasive theme throughout the focus groups was a sense of suffering alone, in part due to the unwillingness and/or inability of those without chronic pain to understand what the participants were going through: "It feels like you're carrying it alone … It's something you can't pass on to anybody" (P1). One of the strengths of the pain management program was reported as simply knowing that they are not the only one suffering in this way: "I just think that it's great knowing that you're not alone, that there's others" (P6). However, although in this group there was a feeling of solidarity, outside of this environment was a feeling that those without chronic pain do not want and furthermore, cannot understand the pain of the participants: "Other people who haven't got pain don't want to know about your pain," "It mainly feels like I am the only one carrying it and I don't like to share that around because people don't really understand it or want to know" (P10, P1). This perceived uncaringness and inability to comprehend led to participants withdrawing socially and learning to not talk about their pain with others: "So, I just don't do it (talk about the pain)," "You sort of isolate yourself because nobody understands you and then … there's no point to mix around with them anymore because they don't understand you" (P5, P4).

Separation from others

This sense of social isolation was further fueled by a feeling of separation from others, a sense of being apart from them and the knowledge that one is somehow different and abnormal. Participants described moments where they actively compared themselves to others around them and found themselves to be different: "I live in an area where there's a lot of people around me … I'm right in the heart of everything, a lot of people and I kind of feel like, I know I'm different," "I often see people walking and I think to myself, I wonder if they haven't got what I've got happening in my body, when I see somebody walking in front of me I wonder what it's like to live normally" (P9). This resulted in a sense of being on the sidelines, or as one participant put it: "Even though I've got all my family and friends around, it's just, I don't feel like I participate anymore. I don't have that, I don't feel like I'm in it now, I'm sitting there watching as opposed to participating, it's that feeling" (P6).

Shame

Participants also reported feelings of shame associated with self and social judgment. For example, one participant highlighted the pressure to get better and heal: "Now after a year of pain, then there's shame, because you're not getting as well as you should be" (P1). There was also shame associated with succumbing to the pain and feeling weak in this regard: "… when the pain gets really severe, then I feel a feeling of shame and I know I shouldn't allow it to take over but it's just, it's so hard, cause' it gets so big" (P1). In addition to this, participants reported a sense of shame due to not being able to work and contribute meaningfully to society, saying things such as "You wonder what the reason is for you still being here because you're not functioning or contributing" (P11) and "… what sort of person does this make you?" (P8). These types of statements reflect the stigma associated with having chronic pain in society.

Physical sensations of pain

Weight and size

Participants frequently referred to their pain in terms of its perceived weight and size, with multiple referrals to pain as something huge and heavy which places a burden upon the sufferer: "I feel like I carry a very heavy load" (P1), "Mine is an anchor … like you're being dragged down by something" (P2), "I could go from feeling not too bad to like my body weighs 500 kilograms" (P7). Pain was often spoken of as a load or burden, which is "huge," "big to carry" (P1) and "heavy" (P7). Contrasted to this was the diminution of the sufferer: "It feels like the little person inside, the little girl has been hurt" (P1).

Strange sensations

Participants employed the use of evocative language and metaphor in order to try and convey strange, unnerving sensations in the body due to pain. This included examples such as "It feels like ants in your body" (P5) and "I do get a pins and needles sensation in my foot" (P2).

Temperature

A common description of pain which arose in the focus groups dealt with temperature, in particular heat. Participants described their pain as "a hot throbbing bruising" (P1) and "a bone deep burning" (P5). However, this was viewed as distinct from the feeling of having a burn. No participant described their pain as cold.

Piercing

Perhaps the most common descriptor of pain which participants spoke about was a "stabbing" pain. They described this sensation with extremely vivid language, employing phrases such as "It feels like a hot knife slicing into me" (P9), "It's like somebody's stabbing me all the time with a knife" (P10) and like "someone stabbing you in the back of the neck over and over … like someone is pushing a knife into the back, a big fat knife there and over the top there … " (P13).

Aching

Some participants described their pain less as a stab and more as an ache, something deeper and less sharp, but nonetheless painful and debilitating: "It's more of a deep ache, you know, I suppose a deep bleeding sensation at times, when you know, you cut yourself real deep and you've got that feeling of you're bleeding hard, but you're not" (P2). One participant described having both at different times, explaining how factors such as temperature can change the pain quality: "When you're out in the cold, it's more of a real dry, deep ache, the cold really does actually get to you and the stab can turn to an ache very fast and it's like right down in the bone kind of thing, a deep ache and there's nothing you can put on it, nothing you can take that dulls that" (P2). Another participant described it as "a heavy, dull ache all the time" (P9).

Making pain relatable

In contrast to "Difficulty of pain expression" participants explained how they explicitly tried to render their pain into relatable terms in order to convey it and make it understandable: " … you relate it to something so someone can go 'oh I know what that feels like'" (P15), "So you've got to relate it, so somehow they can relate to it" (P16). To this end they described their pain in terms of pains others may have experienced, such as period cramps: "Like a period pain … that really strong cramp sort of a pain … " (P11), stubbing toes: " … like you know when you stub your toe and it's that ache and that pain but it's consistent and doesn't go. You relate it to what someone might have experienced" (P14), and sports injuries: "I think, cause my son used to play a lot of sport I used to explain it to him 'you remember when you sort of get injured you know playing, that feeling and then I have that 24/7. So then he says 'oh my god', like, he can kind of relate to that because he's had a lot of sport injuries so he can kind of relate to the fact that that acute pain that I feel is actually all the time" (P11). A common description of pain among the female participants with children likened it to contractions and childbirth: "I feel like I'm having contractions in my back" (P15), "I explain it as if you've ever given birth, think of that but it never goes away, just different intensities" (P5), "Like having a baby" (P10).

Pain personified

As an adversary

Pain was often described as a dark force or power, something that wanted to destroy or hurt the participant: " … it felt like it was underneath me and that it would suck me out and I would feel that fear, that dark horrible feeling … it was like a dark thing that wanted to suck me out and that was the feeling" (P1). Participants spoke of it as an adversary they needed to defeat: "I just say to myself, this will not effing beat you, you will beat it" (P13). One participant attempted to use humor in this description, personifying her pain as "like having a mother in law you don't like constantly being here, running your life, telling you what to do and what not to do … it commands you around" (P1).

As external to self

As well as personifying their pain as an adversary, participants spoke of their pain in ways which made it clear that although it may be inside of them, it was not a part of themselves and was not endogenous to their bodies. For example, participants spoke of a "someone" who was causing the pain: "It feels like someone's inside twisting" (P7). They also separated it from their bodies through the use of language such as " … sometimes I feel the, something that is burning inside you" (P4) and "I have one on the back" (P9). In this way, the pain was linguistically separated from themselves.

Pain as overwhelming

Unrelenting nature of pain

Pain was described as something which was constant and unrelenting, an aspect of suffering which affected the participant's outlook on life and ability to cope. As one participant eloquently spoke: "I think it's because it's constant as well, it makes it harder because if you have a pain … you have a fracture and it's going to heal, it's just a certain amount of time, but it's just constant 24/7 and that's the hardest" (P11). All participants indicated that their pain levels may vary, but that the pain was ever present and inescapable: "All enveloping. It seems to take over all of my being" (P8).

Loss and ruin

Pain was further described as something which had engendered a complete and total life change and as something which led to loss and to ruin. Several participants independently described pain as, quite simply, a ruining force on their lives: "It ruined my life" (P5, P8), "It ruins" (P6). It was also described in terms of loss, of being robbed of opportunities in life, of health, of normalcy: "It feels like somebody came and took something away" (P1), "It just robs you of living life … I feel that I'm not living life, I'm just kind of enduring it" (P11). Pain meant that they were limited in life: "You can't do things that you want to do or would like to do" (P9). It also signaled the loss of being able to do things they had previously done: "I used to fence, I used to hike, I can't do any of that now" (P8). One participant described the overwhelming effect that pain had on her life as such: "It's changed my life completely. It's changed the way that I do things, it's changed the way that, you know, it changed my whole plan. Everyone has a life plan and then something like this happens and you're like 'holy shit, this isn't what I wanted'" (P15). Another participant described pain as something which caused her to "put life on hold" (P14). This devastating and total effect of chronic pain at times led participants to thoughts of suicide: "And that's when the suicidal thoughts kick in. Like go on, I'd be better off dead" (P8).

Coping with pain

Holding on and moving forward

Participants spoke of coping with their pain in two main ways. The first was simply holding on, without getting better or improving, but also without succumbing to pain or regressing: " … it's that feeling of wanting to hold on" (P1). This was often seen as a big enough challenge in its own right: " … the pain got really bad and I just hung in there" (P8). Participants evinced that sometimes this was all they could do, learning to accept this as good enough. At other times, they spoke of movement forward in a variety of ways: "Swimming, keep swimming" (P1), "Small steps forward" (P1), "Push, push through and don't beat yourself up" (P6). However, even when speaking of moving forwards despite pain, it was sometimes coupled with feelings of hopelessness as in this example: "It's just kind of putting one step in front of the other and I don't think there's any quality of life there" (P11) or with having no other option: "We just said like, that's it, you've got no other choice, you've just got to keep going" (P15).

Finding positives

Another way participants seemed to cope with their pain was to find positives where they could: "… just do little things and find all the little positives. That seems to be helping me much better … and I hold on to them and I celebrate them too" (P1). One participant chose to focus on things in her life apart from her chronic pain: "I've got such good family and friends and kids and so much to be happy about, but also so much to be angry and upset about at times, but I'm just not sad" (P7). Participants also compared themselves to others who were in situations which seemed worse to them, such as a friend who had cancer, or someone about to have heart surgery, in an attempt to minimize their own suffering and focus on what they still have: "I kind of say to myself well you're very lucky, you're still alive, you still can do this and you can still do that" (P9). Others focused on how their chronic pain had shaped them into becoming stronger people: "You're a stronger person and at the end of the day you can deal with a lot of stuff that most people wouldn't deal with" (P15), "It's also, like, given me incredible resilience" (P14).

Discussion

Language is fundamental to human experience. Recent studies have recognized and delved into the role that language plays in emotion construction and perception [17,18], but fewer have dealt with the language of pain, despite its inherent link. Although people primarily convey their pain through language, pain is notoriously difficult to express, with Scarry [19] famously asserting that "Physical pain does not simply resist language, but actively destroys it … " (p. 4). This study thus sought to clarify the specific use of language used by sufferers of chronic pain, in order to elucidate the pain experience and how it is shaped and conveyed by language.

Five key themes were identified; Isolation, Physical Sensations of Pain, Pain Personified, Pain as Overwhelming, and Coping with Pain. These themes are consistent with those found in previous qualitative studies into the experience of chronic pain [9,11,12,20]. For example, Söderberg and Norberg [12] interviewed 14 women with fibromyalgia and found that they emphasized the difficulty of pain description, the constancy of pain, and the need to find ways to cope. Participants also used heat descriptors for pain, and painted pain as a torturer, akin to the descriptions provided by participants in this study. This suggests that despite medical advances, the experience of chronic pain has remained similar in the intervening decades between these studies.

It is interesting to note that the socially isolating effects of having chronic pain was the predominant theme and the focus of a large part of each group discussion. Significantly less time was given to physical descriptions of the pain sensation. To this end, we also note that participants rarely spoke about the particular body part which was in pain. Instead, it seemed to be the whole person and their life which was involved in the suffering, in line with the findings of Lascaratou [9]. Participant's perceived isolation stemmed from the invisibility of pain, the difficulty of description, a feeling of "otherness" to the people around them, feeling like those without pain did not want to or could not understand them, and social stigma and shame. Thomas and Johnson [20] identified similar themes of pain's invisibility, separation from other people, and isolation stemming from having chronic pain. Kugelmann [11] also found that participants spoke of the invisibility of chronic pain. This emphasis on the emotional and social repercussions of chronic pain has been recently validated via a systematic review of the literature [21]. The authors found that although chronic pain seriously affects people's daily activities and quality of life, it also has a severe detrimental effect on their social and family environment. The experience of chronic pain appears to extend well past mere physical effects, with the primary focus being on the impact it has on patients' lives, particularly socially.

Sussex [6] has noted that it is doubtful whether, outside of poetry, there is another semantic domain besides pain language in which spontaneous use of metaphor would reach such levels. The results of this study accord with this view and extend the very limited research exploring the use of metaphor in pain language, highlighting its importance in understanding pain. Participants consistently displayed the use of metaphors across the themes in order to describe and qualify the pain experience. This dependence on metaphor may suggest something of the nebulous, subjective nature of pain, but also of the desire to communicate it to others and to make the invisible visible. In addition to this, participants explicitly used relatable events and comparisons in order to enable understanding in others, such as referring to their pain as akin to childbirth or sports injuries. This desire to facilitate understanding may function as a way of engendering empathy and thus gain support, in the same way that Semino [22] posits pain description metaphors may facilitate a form of embodied simulation, providing the basis for an empathic response. A clinical application of the importance of metaphors to the chronic pain experience can be found in a study conducted by Gallagher, McAuley, and Moseley [23]. For the study, they developed a book of metaphors that explained key biological concepts in order to increase knowledge of pain biology and decrease catastrophic thought processes about pain and injury, two areas that are crucial to chronic pain management. Using a blinded randomized-controlled partial cross-over trial, they found that when compared with written material presenting biopsychosocial advice for pain management, participants were significantly more likely to read the metaphors booklet (82% ± 17% vs. 47% ± 26%), their knowledge of pain biology increased significantly more and their catastrophic thoughts decreased significantly more when compared to the advice booklet. Here, they have neatly shown that by tailoring treatment to be in patient's own pain language – one of metaphors – significant clinical benefits can be achieved.

Participants in this study spoke of their pain in an externalizing fashion, placing it outside of themselves and personifying it as an adversary. This is consistent with the findings of Lascaratou [9], who found that patients spoke of their pain as "… a highly distinguishable undesirable possessed entity and as an external-to-the-self moving force capable of invading the individual as an uninvited intruder, ultimately acting as a malevolent aggressor, a torturer, and an imprisoning enemy" (p. 140). The body is seen merely as a container for pain. This externalization of pain may represent a way of objectifying pain through language, and turning it into something able to be treated and expelled from the body. Explicitly personifying it as an enemy may render it into a distinct form to fight against, to not succumb to and to create distance from a healthy, pain free self which still exists apart from pain. This pain free, valued self was also identified as important by Osborn and Smith [24] in an interpretive phenomenological analysis, who found that when in pain, the body or body part was excluded from patient's self-concept and defined as "not me." This linguistic separation from pain may on the one hand engender hope, enable coping and promote a more positive self-view. However, on the other hand it may hinder acceptance of their condition, adjustment, and potential rehabilitation [24].

This study also adds to the body of critique regarding the use of single word adjectives in the MPQ paradigm [8]. Very few words featured in the MPQ or SF-MPQ-2 were used by participants in this study (e.g. aching, heavy, stabbing, sharp), whilst common descriptors of pain in terms of its size ("big" "huge"), which was found in this study, do not appear in them at all, although "heavy" does. Participants appeared to have a limited vocabulary of sensory pain adjectives. In addition to this, participants were more likely to use metaphors and sentences to describe their pain, over singular adjectives, suggesting that pain language may be more complex than single word adjectives, which may alone be inadequate to capture pain's nuanced experience.

Sullivan [25] has praised the MPQ for calling attention to pain's multidimensionality, but argues that individual descriptors of pain should be subordinate to the place they take in the pain narrative, that is, the story being told about the pain experience. In a similar vein, a recent review into the MPQ paradigm concluded that pain assessment needs to be cast in its social context and attention paid to the function of pain expression [5]. Kugelmann [11] interviewed 14 attendees of a chronic pain management program. He posited that as they could not give evidence of their pain through empirical means such as x-rays in order to get their needs met, they sought to render it visible instead through a pain narrative, which took the form of a complaint. Hovey, Khayat, and Feig [26] have recently argued that the medical humanities can address a person's healing through a reduction in suffering and isolation by "letting pain speak" via unique pain narratives, poetry and stories. It seems important for participants to be able to talk about their pain by situating it in a narrative context of personal meaning, rather than being boxed into a single-word adjectival paradigm. This was seen in this study in the way that the physical, sensory aspects of pain were subsumed by narratives of social isolation and whole person and life suffering, exemplified in the themes of Isolation and Loss and Ruin.

Study limitations

Several limitations to this study need to be acknowledged. Firstly, this was a small, exploratory study and as such, its ability to draw generalizable conclusions is necessarily limited. Although saturation appeared to be reached by the third focus group, with minimal new information being added, it may be that further groups or one on one interviews would have provided more in depth and detailed data. However, recent research indicates that more than 80% of themes are discoverable within two to three focus groups, with three focus groups being adequate to identify all the most prevalent themes within a set of data [27]. Importantly, caution should be applied when generalizing the results of this study. This study is based on the data of only 16 English-speaking participants, with varying types of chronic pain, interpreted by two reviewers reaching a consensus on the themes. As some studies have found that patients with different pain diagnoses use different pain language [28,29], the language used by these participants may not be generally representative of all chronic pain patients. As languages differ significantly from one another, these results will likely only be applicable to English-speakers. In addition to this, only 64% of those approached elected to participate in the study and there was no chance to review the results and themes with the participants themselves. Owing to all of the above, it must be stated that the themes derived from this study may not be reflective of other pain groups experiences and may indeed be specific to this sample of patients and to the specific sorts of pain diagnoses and problems represented by them. Lastly, participant's involvement in a pain management program and its potential effect on their pain language should not be ignored. In order to counter this, focus groups were conducted on day two of the three-week program, before any significant changes would be likely to occur. Although participants were a range of ages, gender, and education levels, a larger sample with even more varied demographics may have resulted in more diverse views and language.

Future directions

Future research may aim to confirm the findings of this study by widening the participant pool to larger pain populations and extend it by utilizing a mixed methods design which incorporates some quantitative measurement (e.g. pain intensity scales) along with the analysis of pain language. Exploration of the pain language used by different pain groups may be useful in accordance with previous research. As this study was necessarily quite broad, future research may aim to delve more deeply into the specific aspects of pain language identified here; for example an exploration in a larger sample of the metaphors employed by those with chronic pain, in order to identify those frequently used. Another interesting avenue of exploration would be in exploring how "healthy" populations, those who have only had episodes of acute pain, use pain language and talk about their pain. Ultimately, this research may inform clinical applications by complementing existing measures of pain and aiding in innovative treatment options, which utilize patient's own pain language. For example, Gallagher et al. [23] have already shown that utilizing language (here, metaphors) in treatment can have significant positive effects. Another potential application of this research may be in the modification of maladaptive or unhelpful pain language, with the aim to alter or decrease it in the same way that many pain management programs currently aim to reduce catastrophic thinking, using approaches such as cognitive behavioral therapy [30]. One such way might be in adapting the use of the thought record, commonly used in CBT in order to identify negative automatic thoughts and make the patient more aware of these, before ultimately incorporating and working on developing alternative or more helpful thoughts. This record may be used to identify a patient's personal pain language (e.g., their specific pain metaphors) and later in treatment, to alter these metaphors into more adaptive and less catastrophic language.

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No potential conflict of interest was reported by the authors.

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3. STUDY 2: 'BARBED WIRE WRAPPED AROUND MY FEET': METAPHOR USE IN CHRONIC PAIN

This chapter is presented exactly as it appears in the following published article:

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3.1 Preamble

The paper presented in the previous chapter highlighted the language used by those with chronic pain. It explored aspects of the chronic pain experience such as isolation, the overwhelming nature of pain, and coping with pain. However, apparent from the paper was the ubiquitous use of metaphor in pain description, particularly as seen in the themes of *Physical Sensations of Pain* and *Pain Personified.* Given pain's subjective and personal nature, this preponderance of metaphor was not too surprising but nonetheless warranted further attention.

The study presented in this chapter aimed to investigate more specifically metaphor use by people with chronic pain. Quantitative methodology was used to explore and catalogue the most common types of metaphors used by people with chronic pain.

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‘Barbed wire wrapped around my feet’: Metaphor use in chronic pain

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Objectives. As there is no objective test for pain, sufferers rely on language to communicate their pain experience. Pain description frequently takes the form of metaphor; however, there has been limited research in this area. This study thus sought to extend previous findings on metaphor use in specific pain subgroups to a larger, heterogeneous chronic pain sample, utilizing a systematic method of metaphor analysis.

Design. Conceptual metaphor theory was utilized to explore the metaphors used by those with chronic pain via qualitative methodology.

Methods. An anonymous online survey was conducted which asked for the descriptions and metaphors people use to describe their pain. Systematic metaphor analysis was used to classify and analyse the metaphors used into specific metaphor source domains.

Results. Participants who reported chronic pain completed the survey ($N = 247$, age 19–78, $M = 43.69$). Seven overarching metaphor source domains were found. These were coded as *Causes of Physical Damage*, *Common Pain Experiences*, *Electricity*, *Insects*, *Rigidity*, *Bodily Misperception*, and *Death and Mortality*.

Conclusions. Participants utilized a wide variety of metaphors to describe their pain. The most common descriptions couched chronic pain in terms of physical damage. A better understanding of pain metaphors may have implications for improved health care communication and provide targets for clinical interventions.

Statement of contribution

What is already known on this subject?

- There is no objective test for the existence or nature of pain.
- Chronic pain sufferers regularly use metaphor to describe their pain.
- Metaphor use in chronic pain has not been comprehensively examined.

What does this study add?

- A systematic analysis of pain metaphors in a heterogeneous chronic pain sample.
- A taxonomy of pain metaphors, which has the potential to enhance communication in health settings.

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Chronic pain, defined as pain persisting longer than 3 months, is associated with a range of psychological comorbidities including depression, anxiety, and substance abuse (Gormsen, Rosenberg, Bach, & Jensen, 2010; Manchikanti *et al.*, 2006). However, there are no objective assessment measures for pain, meaning that people must rely on language or non-verbal pain behaviours to communicate their suffering to others. These non-verbal pain behaviours such as facial expressions or guarding are often involuntary and there is evidence to suggest that they are inaccurately decoded by others (Prkachin, Berzins, & Mercer, 1994). Consequently, there is a necessary reliance on verbal reporting of pain, which can be problematic due to difficulty in pain description (Munday, Kneebone, & Newton-John, 2019).

One common use of language to communicate pain experience is metaphor (Aldrich & Eccleston, 2000; Kugelmann, 1999; Munday *et al.*, 2019; Söderberg & Norberg, 1995). For example, ‘my pain is like barbed wire wrapped around my feet’. Metaphor elicitation is a way of accessing individual sense-making around a particular experienced phenomenon, and metaphor analysis can facilitate the exploration of this individual sense-making (Cassell & Bishop, 2019). It follows that metaphor may provide a powerful tool for chronic pain sufferers who lack objective means to verify and communicate their pain to family and health professionals.

Lakoff and Johnson (1980) provide a comprehensive definition of metaphor in their work on conceptual metaphor theory (CMT). They posit metaphors are not simply literary ‘decoration’, but rather a conceptual tool for thinking, organizing, and shaping reality. According to CMT, a conceptual metaphor consists of understanding one domain of experience (target domain) in terms of another (source domain). The target domain is typically more abstract and the source domain is typically more concrete. An example of a conceptual metaphor is ‘love is a journey’, where love is the target domain and journey the source domain. This conceptual metaphor can easily be seen in linguistic phrases such as ‘We’re at a crossroads’ or ‘They went their separate ways’. When seen in terms of journeys, we understand love as a path people move along, complete with obstacles. Other examples of conceptual metaphors are ‘anger is fire’ (e.g., ‘He was burning with rage’) and ‘argument is war’ (e.g., ‘He attacked my weak points’).

With the exception of the well-known McGill Pain Questionnaire (Melzack, 1975), there has been a dearth of research in the area of pain language. The MPQ, whilst providing an important perspective on the communication and assessment of pain, relies on single word adjectival descriptors and has been subject to numerous criticisms on this account (Bouhassira & Attal, 2009; Wilkie, Savedra, Holzemer, Tesler, & Paul, 1990). Some researchers have gone beyond single words to look at the use of metaphor in pain description. Semino (2010) posited neuropathic or chronic pain, given its abstractness and difficulty to explain in literal language, can be seen as a target domain. In contrast to this, nociceptive pain caused by physical damage, by virtue of being universal and familiar to people, is considered more concrete and easily understood, potentially making it a source domain through which chronic pain might be understood. Epidemiological studies have found that prevalence rates for chronic pain range from 19% to 30.7% in the Western world, meaning that a significant minority of the population will have an experience of chronic pain (Blyth *et al.*, 2001; Breivik, Collett, Ventafridda, Cohen, & Gallacher, 2006; Johannes, Le, Zhou, Johnston, & Dworkin, 2010). However, it is worthy of note that everyone will have an episode of acute pain at some point in their lives. Semino (2010), looking at the 78 one-word pain descriptors from the MPQ, as well as a sample of collocates of ‘pain’ in the British National Corpus of English, found that more than a third of these could be coded under the source domain 'causes of physical damage'. Semino further broke this down into sub-classes of damage causes, including by *insertion of pointed objects* (e.g., stinging), *application of sharp objects* (e.g., stabbing), *pulling/tearing* (e.g., wrenching), *pressure/weight* (e.g., crushing), *a malevolent animate agent* (e.g., torturing), *high/low temperature* (e.g., burning), and *movement* (e.g., shooting). Semino (2010) maintains the result of metaphorically describing chronic pain in terms of these more concrete causes of physical damage is the facilitation of an internal embodied simulation of pain experiences for the listener, which may provide the basis for an empathic response.

Hearn, Finlay, and Fine (2016) looked at metaphor use in a sample of 16 individuals with spinal cord injury and specific chronic neuropathic pain via semi-structured qualitative interviews. Utilizing content analysis and interpretative phenomenological analysis, they found that metaphor use fell under three themes: pain as a personal attack, the desire to be understood (i.e., comparing pain to painful events which may have been experienced by the listener previously such as toothaches), and conveying distress without adequate terminology. Further to this, the study found that being female, younger, and being an outpatient were associated with increased metaphor use.

Bullo (2019) surveyed 131 women with endometriosis via online questionnaire, exploring how they conceptualized and articulated their pain. She found that in addition to feeling they did not have appropriate tools for pain description, the women tended to use elaborate metaphorical scenarios to convey their pain intensity. Using an adapted version of Semino's taxonomy, Bullo (2019) found that the metaphorical expressions could be grouped under three categories: pain as physical damage, pain as physical properties of elements, and pain as a transformative force, whereby sufferers perceive themselves as moving into a different location, state, or entity due to their pain. Bullo goes further to explore difficulties that arise when health professionals are faced with these metaphorical descriptions of pain, stating that a mismatch in assumptions or lack of a shared understanding can lead to miscommunication and thus potentially a delay in diagnosis. For example, metaphorical descriptions may undermine expected models of illness accounting and lead to minimization or dismissal or may lead to the pain being considered psychological in nature (Hodgkiss, 2000; Overend, 2014). Both these outcomes were reflected in Bullo's (2019) qualitative data. Here, metaphor as a tool to communicate may entail the risk of health professionals failing in their goal of providing the best medical care to patients in pain. It seems vital therefore to, as Bullo suggests, catalogue and understand the metaphors used by sufferers, in order to promote a shared code and understanding. This study sought to progress such an undertaking, by extending the previous limited diagnosis specific findings to a larger, heterogeneous chronic pain sample, utilizing a systematic method of metaphor analysis.

Methods

Ethics approval

Ethics approval was obtained from the relevant local ethics committee – University of Technology Sydney HREC REF: ETH18-2192. Participants provided informed consent during the first part of the online survey, with the option of withdrawing from the study at any time during completion of the survey. If participants did not provide consent, they could not continue to the survey.

Protocol

Advertisements for the study were placed on websites and social media platforms of several Australian chronic pain organizations (e.g., Chronic Pain Australia) in order to recruit participants. These organizations were chosen through consulting with a pain clinician and because they are the peak consumer advocacy bodies for chronic pain sufferers in Australia. Pre-requisites for participation were self-reported diagnosis of chronic pain (defined as pain lasting longer than 12 weeks), being over 18 years of age, and English reading and writing ability. As an incentive, participants were eligible to enter a draw for one of five AUD$100 Gift Cards at completion of the survey. The information provided to the participants indicated the survey was voluntary and anonymous. The information section also detailed who the researchers were as well as the motivations for conducting this study. The survey was offered on the Qualtrics online platform and comprised of two parts: (1) basic demographics (sex, age, pain duration, education in years, self-reported diagnosis, ethnicity, marital status, employment; see Tables 1 and 2), measures of pain outcomes such as intensity and interference via the Brief Pain Inventory (BPI; Cleeland & Ryan, 1994), and measures of mood via the Depression, Anxiety and Stress Scales (DASS-21; Lovibond & Lovibond, 1995). (2) A request, facilitated by a simple free text response box, for the descriptions and metaphors they use to talk about and describe their pain. The word metaphor was defined, several common examples were given, and participants were provided with basic prompts to use if they desired. Participants were encouraged to write as many different metaphors they have used in the time they have had chronic pain. The exact prompt is available in the Appendix. It is principally part two of the survey we report on here.

Participants

A total of 323 participants began and partially completed the survey, with 279 (86%) completing all parts. The exclusion criteria included those who selected ‘no’ to the question: ‘Have you been diagnosed with chronic pain by a health professional?’ (11 participants) and those with Pain Intensity scores below three on the Brief Pain Inventory (21 participants). After applying exclusion criteria, 247 participants remained. Tables 1 and 2 outline sample characteristics. The most common diagnoses are listed.

Analysis

Systematic metaphor analysis was utilized (Schmitt, 2005). This method involves the following steps. Firstly, a topic of analysis was chosen (chronic pain) and the authors (a PhD candidate and two experienced doctoral level clinicians/researchers) acquainted themselves with and assembled a ‘broad-based collection of background metaphors’ relating to the target topic (p. 370). This was done via reading existing literature on common metaphor source domains, in particular those relating to pain, as well as research regarding chronic pain description (e.g., Bullo, 2019; Lakoff & Johnson, 1980). With the

Table 1. Sample demographics: age, pain duration, education (all in years)

Variable	Minimum	Maximum	Mean	Standard deviation
Age	19	78	43.69	11.71
Pain duration	0.38	50	14.30	10.18
Education	9	25	14.71	3.11

Table 2. Sample demographics: sex, diagnosis, ethnicity, marital status, employment status

Variable	Number	%
Sex		
Female	221	89.5
Male	26	10.5
Diagnosis		
Endometriosis	18	7.3
Migraine	20	8.1
CRPS	25	10.1
Fibromyalgia	71	28.7
Ehlers–Danlos	7	2.8
Neuropathy	27	10.9
Arthritis	69	27.9
Ethnicity		
White	230	93.1
Asian	3	1.2
Aboriginal/Torres Strait Islander	1	0.4
Other	5	2
Mixed	8	3.2
Marital Status		
Married	118	47.8
Widowed	2	0.8
Divorced	22	8.9
Separated	10	4
Single	44	17.8
Long-term relationship	51	20.6
Employment		
Full Time	37	15
Part Time	44	17.8
Unemployed	16	6.5
Homemaker	13	5.3
Retired	9	3.6
Student	12	4.9
Not working due to pain	95	38.5
Other	21	8.5

Note. CRPS = Complex regional pain syndrome.

aid of this collection of potential source domains, the next stage was inductive and involved identifying and coding the metaphors used in the data set. QSR International's NVivo (version 12, Melbourne, Australia) was utilized in order to code the metaphors into different source domains. The use of qualitative analysis software such as NVivo has been shown to be highly useful for systematic metaphor analysis (Kimmel, 2012). The target domain was not coded separately as it remained constant – participants' chronic pain. Broad source domain coding was performed initially by the first author, resulting in 60 categories. Meetings were then held with all authors present in order to identify further source domains, refine and collate existing source domains, and reconstruct overarching metaphorical concepts from these. Agreement on final metaphor source domains and subdomains was reached through discussion until consensus was achieved. The final categories were then re-examined by all parties in order to ensure they originated from and accurately represented the data. The categories of metaphors obtained were compared among themselves and previous research, in order to explore the differences and similarities. Finally, the coding of the first author (IM) was compared to that of an independent assessor, a Masters qualified registered psychologist and reliability calculated via Cohen's κ. Due to the large amount of data, a random sample of 10% of the data was utilized for this.

Results

Participants' answers for the free text metaphor question ranged in length from three to 376 words. The number of distinct metaphor source domains used by each participant varied from zero to 13 ($M = 5$, $SD = 3$). Eleven per cent of the sample did not record any metaphors, instead, for example, writing about their experience of chronic pain more generally or about feelings of depression.

An independent-samples *t* test was conducted to compare the number of metaphor source domains used for females and males. There was a significant difference in the number of source domains used in favour of females ($M = 5.2$, $SD = 3$) compared to males ($M = 3.9$, $SD = 2.9$); $t(245) = 2.06$, $p = .041$.

Outliers were defined as values three standard deviations above or below the mean. On this basis, four outliers were identified on the Education variable and these were consequently removed from the data set. Years of education was not significantly correlated with number of source domains used, $r(239) = -.123$, $p = .056$. Age was also not significantly correlated with number of source domains used, $r(245) = -.036$, $p = .574$.

Using systematic metaphor analysis (Schmitt, 2005), seven overarching metaphorical concepts regarding chronic pain as the target domain were found. These and their subdomains are presented in Table 3. The percentage of the sample who used each source domain is presented in Figure 1. The overarching source domains were *Causes of Physical Damage*, *Common Pain Experiences*, *Electricity*, *Insects*, *Rigidity*, *Bodily Misperception*, and *Death and Mortality*.

There was good agreement between the two independent coders, $\kappa = .831$ (95% CI, 0.76–0.90), $p < .0005$.

Mixed metaphors

It is important to note that participants often utilized several metaphor source domains in a single phrase. For example, the phrase 'the pain feels like a scorching hot fire poker is being shoved up my feet every second' (P14) contains both the *Temperature–Heat* source domain, as well as the *Causes of Physical Damage via Sharp Objects* one. In this study, metaphor source domains were not treated as discrete or exclusive categories and thus in such instances both source domains were coded.

Causes of physical damage

This was the largest category and accounted for the majority of metaphor source domains used by participants. However, within this broad category were distinct subcategories, outlined below, with each highlighting different methods of causing physical damage to the pain sufferer. Several of these source domains are consistent with Semino's (2010) classification, such as physical damage via movement, or via temperature.

Table 3. Source domains for the target domain: chronic pain

Source domains and subdomains	Example Metaphors
Causes of Physical Damage	
Motor Vehicle Accident	". . . like I've been crushed by a car. . ." (P37); "Hit by a bus." (P41)
Movement	"A jack hammer in my head." (P158); "I can feel a heartbeat in my spine. . ." (P230)
Object – Sharp	"Barbed wire wrapped around my feet." (P13); "A million hot needles all over my body." (P30)
Object – Blunt	". . .like I'm being hit with a sledge hammer every minute of the day." (P263)
Physical Attack	
Embodied Other	"Somebody driving a knife into my bones and muscles and twisting it." (P47)
Non-embodied Other	"Like I have been punched in my face." (P127)
Pressure/Weight	". . . like a mix of substance like mercury and sticky molasses have been injected into parts of my body and set like concrete." (P27)
Pulling/tearing/rubbing	"It feels like my muscles are getting tied up in knots and being pulled tight from each end." (P125)
Temperature	
Hot	"It feels like I'm burning but I can't put the fire out. It feels like embers are smouldering inside." (P107)
Cold	"Ice running through body." (P81); "Headache like a freezing head." (P216)
Hot-Cold	"A deep frozen burning inside." (P62); "The pain feels like burning and cold to the point of torture." (P113)
Common Pain Experiences	
Bruise-fracture-dislocation	"Constantly having a sprained ankle throughout my whole body." (P202)
Childbirth & Pregnancy	"Baby kicking me in the ribs/belly." (P20)
Common Illness	"Like a giant toothache all over." (P88); "The pain feels like a constant migraine throughout my body. . ." (P263)
Excessive Physical Exertion	"It feels like I have run 15 km at the gym." (P196); ". . .like I have ran a long distance but haven't." (P206)
Electricity	"The pain feels like I am holding a live wire and electricity is burning through my body." (P24)
Insects	"It feels like a horse kicks me in the butt every morning and left millions of ants running inside my leg." (P169)
Rigidity	"My joints make my legs feel like stiff tree trunks." (P103)
Bodily Misperception	"My foot does not belong to me." (P113); ". . .(worst days) feels as if my leg is not part of me." (P156)
Death and Mortality	"Feels like rigamortus [sic] first thing every morning" (P147); "My whole body aches like hell in all my bones." (P43)

Causes of physical damage via motor vehicle accident. Participants frequently compared their pain to having been 'hit' by either a bus, truck, or car. One participant went further, saying that their pain felt like having 'been crushed by a car', whilst another described it as 'like I've been run over, reversed over and run over again' (P37, P241).

Causes of physical damage via movement. This source domain contains words and descriptions to do with movement, which would cause damage if it occurred within the

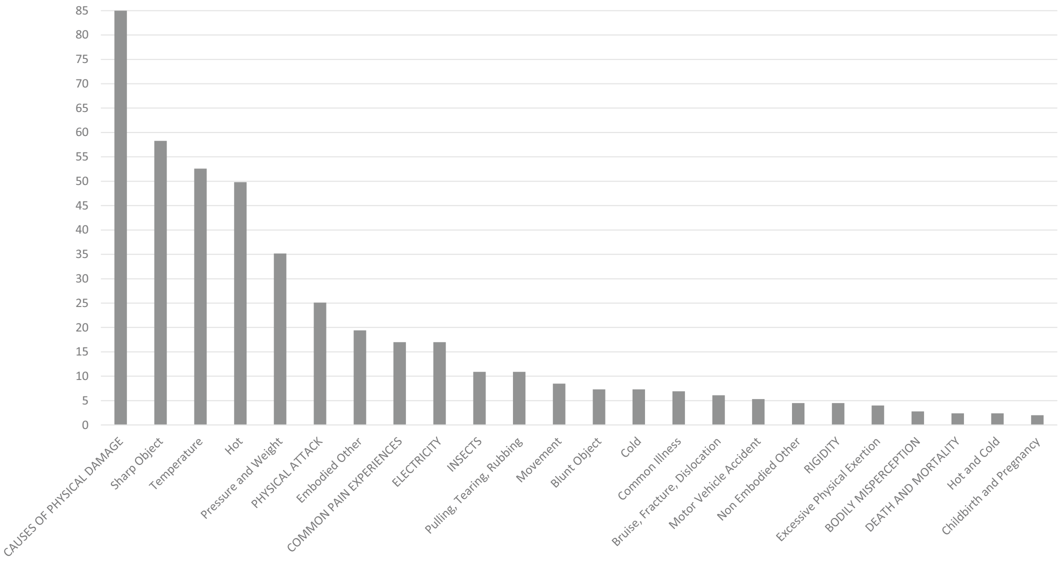

Figure 1. Percentage of sample who used each source domain. The overarching source domains are displayed in capital letters.

body (Semino, 2010). This includes descriptions of pain as 'shooting' or 'throbbing' as well as a 'heaving pain in my legs' (P99). Participants also described their pain as a 'heartbeat', which 'pulses kinda' (P279).

Causes of physical damage via object (sharp/blunt). Substantial numbers of participants described their pain in terms of damage via an object, with more participants referencing a sharp, rather than blunt object. A large variety of sharp instruments were used in pain descriptions, including knives machetes, screwdrivers, pokers, knitting needles, cheese graters, hand drills, metal spikes, razors, pins, and shards of glass. At one end of this source domain, participants simply described their pain as 'stabbing', whilst the other end featured elaborate metaphors such as their pain feeling 'like I have two large stakes being plunged through both my temples and through the bottom of my skull' or 'like broken glass rubbing across your stomach' (P168, P42).

In terms of blunt objects, instruments such as bricks, sledgehammers, cricket bats, hammers, and rulers were referenced. For example, pain was described as being 'just hit repeatedly in the temple with a large rubber mallet' or 'like I've been smacked in the back with a baseball bat. . .' (P3, P154).

Causes of physical damage via physical attack (embodied and non-embodied malevolent other). Many participants described their pain in terms of a physical attack. Of the descriptions without an explicit embodied attacker, pain was described as akin to being in a physical fight, to having been 'punched' or 'kicked'. However, the vast majority of these descriptions featured an embodied attacker, a malevolent agent that harmed them. This source domain was often mixed with others, as the embodied attacker utilized a wide variety of methods to harm the participant. Examples include descriptions of their pain feeling like 'something with claws is grasping and twisting my leg as tight as it can' or like 'someone poured gas on me and lit me on fire' (P5, P74). At times, the attacker was more defined than a 'something' or 'someone', instead becoming a 'giant crushing my bones', a 'large snake', or a 'monster in my head' (P76, P37, P139).

Causes of physical damage via pressure and weight. Physical damage as a result of pressure or weight was also a common source domain. Single word metaphorical descriptors included pain that was 'pinching', 'pressing', 'crushing' 'tight', or 'heavy'. Multiple participants described their pain as feeling like their body part in pain was in a 'vice', with pressure being exerted on it. More elaborate and unusual pressure metaphors included comparing the feeling to like 'being constricted by a large snake, my breath being squeezed out of me' (P37). In terms of weight, participants described their pain as something heavy, likening it to 'an anchor on my chest' or 'like wearing the lead vests they put on you for an X-ray. . .' (P18, P3). Others compared their limbs to 'cement blocks' or like an elephant sitting on their body (P116, P241).

Causes of physical damage via pulling/tearing/rubbing. Metaphors utilizing this source domain featured single word descriptors such as 'tearing', 'pulling', 'wrenching', 'drawing', and 'squeezing' pain. Pain was described as a 'violent tearing sensation at various intervals' or 'like there are excessively taut ropes between my neck and my toes, running down my spine, through my buttocks and the back of my legs' (P190, P256). Others experienced a 'grinding' pain or felt as if 'sandpaper is being rubbed over my skin' (P62).

Causes of physical damage via temperature (hot, cold, hot–cold). The source domain of temperature was harnessed by over half of the sample, with metaphors of heat being most prevalent, followed by cold, as well as a small subsample of participants who described their pain as both hot and cold in the same phrase.

Metaphorical descriptions of their pain as 'burning' or of a body part 'on fire' were common. More elaborate metaphors included pain as a 'hot curling iron sitting on my skin' or 'like my joints are constantly being injected with boiling hot glue' (P172, P263). One participant painted a vivid picture of 'a heavy burning weight of lava inside my shoulder, sitting on the scapula dripping down and wrapping around my ribcage, precariously balanced such that any excess activity upsets the balance and sends it pouring down my arm and leg and exploding up into my skull' (P226). Use of both the heat and sharp objects source domain was also common, with descriptors of a 'red hot dagger', 'stabbed with a hot poker' and 'hot knife' (P100, P93, P254).

Participants also used the other end of the temperature spectrum, describing their pain as 'having my foot constantly in a bucket of ice' or feeling 'as though my bones are blocks of ice' (P156, P4). Pain was described as 'freezing' and like 'being stabbed with an icepick' (P173).

In addition to the above, a small number of participants described their pain as both cold and hot, simultaneously. For example, one participant wrote 'pain feels icy cold and burning all at once', whilst another described it as a 'deep frozen burning' (P189, P62).

Common pain experiences

Participants drew from common experiences of pain in ordinary life in order to explain their chronic pain. They used examples such as injuries, illnesses, pregnancy, and physical exertion. However, they often either extended the extent of these pain experiences or utilized them in non-literal or novel ways.

Bruise–fracture–dislocation. Chronic pain was described as feeling like 'one big bruise' or having 'put joints out of place' (P143, P87). Participants used metaphors of broken bones to illustrate the pain they were in, despite not having these injuries literally. For example, one participant described their feet aching 'like someone has broken my toes', whilst another wrote their pain felt like 'walking with broken bones in my feet' (P279, P103).

Childbirth/pregnancy. A few participants compared pain to aspects of pregnancy and childbirth, comparing the pain they felt as 'similar to those I experience during labour' (P133). Others compared their pain to 'full blown labour with no pain relief', 'contractions' or like a 'baby kicking me in the ribs/belly' (P188, P84, P20).

Common illness. Participants drew upon common illnesses such as the flu or a headache; however, they extended these illnesses to perpetuity: for example 'having the flu 24/7 for years' or 'a mongrel headache that never goes away' (P274, P28). They also utilized common pain experiences such as toothaches, but in novel ways, positioning this toothache where they felt their pain. For example, one participant described a 'toothache in my hip' whilst another had a 'toothache in my right knee' and yet another implored the reader to 'imagine a toothache in your shoulder' (P71, P252, P230).

Excessive physical exertion. Another common pain experience which participants drew upon was that of excessive physical exertion, such as 'working 24/7' or feeling like 'I've done an intensive workout at the gym, but I actually haven't' (P20, P173). Their pain was also compared to having 'been in a marathon' (P197). Their pain felt as if they had expended tremendous energy and work, when in fact they had not.

Electricity

This source domain covered multiple types of electricity such as lower grade electricity (e.g., buzzing, humming, tingling) right through to an electric paroxysm (lightning bolts, electric shocks, electrocution). References to lightning were common, for example 'feels like lightning is shooting across my ribs or through my limb' and a 'lightning strike pain' (P103, P145). Participants also spoke of their pain as 'electricity running through my veins' and as a '. . .buzzing/humming under my skin that makes me flinch and twitch' (P121, P24).

Insects

Participants compared their pain to a feeling of insects on top of their skin: 'I can feel bugs crawling all over me' and '. . .I am being walked over by insects 24/7 × 365 like caterpillars, biting ants, horseflies, spiders, cockroaches, stung by scorpions and mosquitoes and sandflies and midgies' (P103, P4). At times, the particular insect was defined, for example ants or bees, and at other times simply referred to as 'bugs' or 'something'. Participants also wrote of feeling like there were insects *under* their skin, for example 'ants crawling under the skin' or 'a million bee's in my shoulders' (P52, P248).

Rigidity

Participants compared their pain to ideas of stiffness and immobility, with their pain rendering them 'as stiff as the tin man' or 'like my muscles have turned into painful rocks' (P176, P30). One participant felt as if they had 'a tight piece of string going from my head down to my hand' (P63). Parts of their body 'locked up' or 'jammed stuck' and were unable to function fluidly as normal.

Bodily misperception

This was another small, but distinct source domain. Participants described feeling like their limb or place of pain was not a part of them, for example remarking 'my foot does not belong to me' or 'like the original place of pain is not a part of me, sometimes my hand that is all deformed now is slimy' (P113, P84). The latter part of this quote displays a marked type of revulsion as well as a changed perception of their limb, also echoed in another participant feeling like their hand '. . .is swollen 10 times than actually it [is]' (P248). Lastly, a lack of control over their own body in pain is displayed here: 'the pain feels like my brain does not control my body' (P25).

Death and mortality

Although small, this source domain nonetheless emerged as distinct and unable to be subsumed under another category. Included among it are references to the process of dying, such as 'I often feel like my insides are being cut off from blood circulation and I can feel pieces of myself die' (P187). A premonition or longing for death due to pain is also present: 'The pain in my head makes me feel like I am going to die, or that I want to die' (P198). More covert allusions to death exist in references to rigour mortis, hell, and rotting.

Discussion

This study begins the work of establishing a taxonomy of the types of metaphors sufferers of chronic pain use. Drawing on CMT, we found that participants in our sample utilized a wide variety of metaphor source domains to elucidate the target domain of chronic pain. However, seven source domains in particular were found: *Causes of Physical Damage, Common Pain Experiences, Electricity, Insects, Rigidity, Bodily Misperception,* and *Death and Mortality*.

The study found that women generated significantly more metaphors than men, thus using a larger number of source domains. This is in line with previous research, such as Strong *et al.* (2009) who found that when asked to write about a past pain event, women used more words overall, more MPQ descriptors, and more graphic language than men. Hearn *et al.* (2016) also found a significant gender difference, with women using more metaphors than men. However, contrary to Hearn *et al.* (2016)'s findings, age was not a significant predictor of metaphor use.

The most common overarching source domain utilized was *Causes of Physical Damage*. This study found evidence that people, when asked for their pain metaphors, do in fact utilize all the subcategories which Semino (2010) proposed in her taxonomy and which Bullo (2019) also found reflected in her data, for example *Physical Damage via Sharp Object, Pressure/Weight, Temperature, Pulling/Tearing,* and *Movement*. However, in our study, further subcategories emerged from the data, which included the addition of *Physical Damage via Blunt Instrument* (as opposed to only sharp), as well as by *Motor Vehicle Accident*, and the extension of some of the categories. From this study, it appears that people use a wider variety of metaphorical language than that contained in the MPQ to describe their pain in terms of physical damage.

Included among the categories of physical damage is one source domain which stands out, in part because it is not an exclusive or distinct category, but rather overlaps with many of the other physical damage source domains. This is the *Physical Attack* category, most commonly perpetuated by a malevolent embodied agent, whom inflicts damage via sharp or blunt instruments, temperature, or force. This is consistent with previous research into pain metaphors (Bullo, 2019; Munday *et al.*, 2019). It is also consistent with the findings of Lascaratou (2007), who in a corpus-based study of nearly 70,000 words from 131 conversations recorded between doctors and patients found that participants spoke of their pain as '. . .a highly distinguishable undesirable possessed entity and as an external to the self moving force capable of invading the individual as an uninvited intruder, ultimately acting as a malevolent aggressor, a torturer, and an imprisoning enemy' (p. 140). By personifying their pain as an enemy, sufferers may create a target to fight against, as well as create a separation from a healthy pain-free self. This linguistic separation from pain may provide hope and promote a more positive self-view; however, it may also negatively impact acceptance and adjustment to pain as well as potential rehabilitation (Osborn & Smith, 2006).

The category of *Bodily Misperception* adds more depth to this tendency of separating themselves from the pain. Here, participants explicitly describe feeling as if their painful body part is not a part of them or being unable to control their own body. However, another way this category can be viewed is as a primary feature of complex regional pain syndrome (CRPS). Research shows that CRPS patients, in addition to having distorted body representation, often report feeling as if their affected limb does not belong to them, seeing it as strange and viewing it with hostility (Halicka, Vittersø, Proulx, & Bultitude, 2020; Lewis, Kersten, McCabe, McPherson, & Blake, 2007). This is exemplified by one participant who described it as 'like the original place of pain is not a part of me, sometimes my hand that is all deformed now is slimy' (P84). Research has shown that although chronic limb pain of other origin patients also use these types of descriptions, it is significantly more common in CRPS populations (Frettlöh, Hüppe, & Maier, 2006). Here, we see that the metaphors people use may provide diagnostic clues.

Participants used a much wider variety of pain metaphors than those of physical damage however. For example, another way of enhancing understanding may be through comparing chronic pain to a painful event that the listener may have already experienced. This is epitomized in the source domain *Common Pain Experiences*. In these metaphors, participants used concrete painful events such as toothaches and broken bones to describe their more abstract chronic pain. Often, participants took a pain experience such as a toothache and transferred it to their body part in pain, describing for example a toothache in their back or knee. This reflects previous research which has shown that people in pain reliably refer to common pain experiences in order to facilitate understanding in their listener (Hearn *et al.*, 2016; Munday *et al.*, 2019). The desire to be understood was evident throughout the data.

Also evident from the data is the prevalence of certain metaphors, which may be indicative of linguistic conventionalization. Language-based tools such as the MPQ, whilst initially generated from patient language, may nonetheless have a shaping effect on pain vocabulary. For example, the use of 'stabbing' to describe pain was extremely frequent, with 92 instances of the word 'stab' (including stabbing, stabbed, stabs) found in the data set. Other examples included descriptions of 'electric shocks' or like being in a 'vice'. Such descriptions may be examples of dead metaphors – metaphorical expressions that, through common usage, have lost metaphoric force. This loss of force/effectiveness, is explored in depth by Semino (2010). She suggests that different types of metaphorical pain descriptions may vary in terms of their potential to elicit an embodied simulation response. Through looking at linguistic data and research, a metaphor's level of detail, degree of creativity, and textual complexity may affect the listener's response – its nature and intensity (Semino, 2010). That is, not all metaphors will have the same effect.

In CMT, source domains are typically concrete, in order to facilitate understanding of the more abstract target domain. It is noteworthy therefore, that of the source domains found above, there was one which could be considered more abstract in nature – *Death and Mortality*. Whilst death is a certainty, it is not something knowable. Kövecses (2016) remarks that the use of an abstract source domain may occur, but that when it does, there is 'always some special poetic, stylistic, aesthetic, and so on, purpose or effect involved' (p. 16). However, as our participants were not writing for literary or art making purposes, there may be another answer, outside of stylistic reasons, as to why they sought to communicate their pain via the abstract. It may be that their pain intensity was so great; they could only attempt to communicate it through death itself.

Interestingly, a small proportion of the sample (11%) did not write any metaphors at all, despite metaphor having been defined, asked for explicitly, and with exemplar prompts. Some appeared to have misunderstood the question, writing more generally on their experience of pain, such as being disbelieved by health professionals. However, it seems likely that, following on from the literature which states that people find it difficult to communicate pain (Bullo, 2019), some people may simply lack this particular tool of communication and find it too difficult to describe their pain in such a way. Metaphor may be a valuable resource, but perhaps not everybody has it available, leaving some to rely on other means of communication.

Implications

Metaphor is both an inescapable and important aspect of language and thought, which can be an important tool for understanding and dealing with pain (Bullo, 2019; Demjén & Semino, 2016; Loftus, 2011). A deeper understanding of the metaphors that people living with chronic pain utilize is thus an important area of research. This study utilized systematic metaphor analysis to uncover the most commonly used chronic pain metaphors. It is unique in that it is, to our knowledge, the largest sample studied, as well as being diagnostically heterogenous, in order to access the full diversity of metaphors as the language of chronic pain. Previous research has used relatively small samples and focused only on specific subgroups of chronic pain. As a consequence, this study has gathered the broadest range of pain metaphors to date, exceeding the breadth of both previous studies and existing instruments such as the MPQ. This illustrates that if you rely on small qualitative studies or restrict diagnosis type, results may be narrow and not fully representative.

A better understanding of the language used by those in pain may have implications for communication in health care settings. Health professionals may be less prone to dismiss, minimize, or misunderstand a patient's pain when expressed through metaphor, if they are more aware and knowledgeable about it. Further, understanding pain metaphors may have useful clinical applications. Metaphor, more broadly, has long been harnessed in psychological therapies such as Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 2011) in order to facilitate patient understanding and effect change. However, health care research is now also starting to utilize metaphor as a tool. For example, Gallagher, McAuley, and Moseley (2013) developed a book of metaphors explaining key biological concepts for chronic pain. Participants given this book were significantly more likely to read it, increased their knowledge of pain biology significantly more and decreased their catastrophic thoughts significantly more, than participants given a standard advice booklet. Semino (2014) has also developed a 'metaphor menu' for cancer patients to support pain communication in that population. The current research may support the development of assessment tools which go beyond the single word adjectival paradigm of the MPQ and instead provide a richer base of metaphors from which chronic pain patients can select. In addition to this, identifying and targeting patient's specific metaphors may ultimately create a new focus as well as a tool, for work in therapy. For example, identifying and modifying maladaptive or unhelpful pain metaphors with the aim to either transform them or decrease their use, similarly to how pain management programs currently try to reduce catastrophic thinking (Wideman & Sullivan, 2011).

Limitations

As participants were recruited online they necessarily self-selected as having chronic pain, rather than being drawn from, for example a cohort hospital sample. This leaves the possibility of bias sampling and may therefore impact the generalizability of our findings to the full population of chronic pain sufferers.

Other cautions to generalization apply. Although our participants were of a wide variety of ages, with pain stemming from a variety of diagnoses, the sample was 89.5% female, well educated, and 93.1% white. This necessarily means that their results may not be representative of a more varied sample in these regards. Additionally, as languages differ significantly from each other, these results will likely only be applicable to English speakers.

Lastly, we acknowledge the potential biasing factor of the prompts and example metaphors chosen to elicit participant metaphors. Participants may have been more likely to generate metaphors which held some relation to these prompts.

Future directions

This study looked at what source domains those with chronic pain in general used. Future research may aim to delve more deeply into this by looking at whether people with different pain diagnoses use the same or different metaphors to each other. If there are significant differences, or specific metaphor profiles of diagnostic groups, this may potentially inform assessment. In addition to this, future research may look at how aspects of the pain experience such as pain intensity, pain related disability, and mood affect the types of metaphors used. Another interesting area to explore would be the creativeness of more elaborate metaphors and what purpose that serves. Lastly, future research might look into healthy populations who have only had acute pain, in order to see what pain metaphors, if any, they use and thus determine whether those used by chronic pain sufferers are intrinsic to pain in general or are shaped by chronicity.

Author contributions

Imogene Munday (Conceptualization; Data curation; Formal analysis; Investigation; Methodology; Project administration; Resources; Writing – original draft; Writing – review & editing); Toby Newton-John (Conceptualization; Formal analysis; Supervision; Validation; Writing – review & editing); Ian Kneebone (Conceptualization; Formal analysis; Supervision; Validation; Writing – review & editing).

Conflicts of interest

All authors declare no conflict of interest.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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Appendix: Prompt given to elicit metaphors

Many people use metaphors in order to describe their pain. Metaphors are figures of speech that describe something in a way that isn't literally true, but helps explain an idea or make a comparison.

These can be statements such as;

"It feels like ants in my body."

"It feels like a knife slicing into me."

"It feels like something that is burning inside you."

"It feels like I carry a very heavy load."

How would you describe your pain and what it feels like? What metaphors or descriptions do you use to talk about your pain?

Please feel free to write as many different metaphors or descriptions as you have used over the time you have had chronic pain. You may use the prompts below if you like to help you get started.

Living with pain is like…

The pain feels like…

4. STUDY 3: THE LANGUAGE OF PAIN: IS THERE A RELATIONSHIP BETWEEN METAPHOR USE AND ADJUSTMENT TO CHRONIC PAIN?

This chapter is presented exactly as it appears in the following published article:

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Contribution to the paper	Responsible for the development, ethics approval process, data collection, data analysis and write up in collaboration with thesis supervisors. Responsible for the submission, revisions, and response to peer review comments.
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4.1 Preamble

The previous study used CMT to explore in detail the types of metaphors that people with chronic pain use. The findings were consistent with those of previous research by showing that people predominantly use metaphors associated with physical damage (Semino, 2010), including personifying their pain as an attacker (Hearn et al., 2016; Lascaratou, 2007). Additional categories of metaphor were found, including descriptors of pain as electricity, rigidity, insects, or common pain experiences.

Some categories of metaphor seemed to point towards other aspects of the pain experience. For example, the category of *Bodily Misperception* echoed the neglect-like syndrome associated with CRPS, and the *Death and Mortality* category seemed to indicate the severity of the pain experience.

The study described in this next chapter aimed to explore whether there are associations between metaphor type and aspects such as those listed above. Using the same data pool as the study described in Chapter 3, statistical analyses were used to identify significant links between metaphor type and the following variables.

1. diagnostic category
2. pain intensity (BPI)
3. pain interference (BPI)
4. depression, anxiety, and stress (DASS-21)

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The Language of Pain: Is There a Relationship Between Metaphor Use and Adjustment to Chronic Pain?

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Abstract

Objective. Metaphor, frequently used in chronic pain, can function as a communicative tool, facilitating understanding and empathy from others. Previous research has demonstrated that specific linguistic markers exist for areas such as pain catastrophizing, mood, as well as diagnostic categories. The current study sought to examine potential associations between the types of pain metaphors used and diagnostic category, disability, and mood. **Design**. Online cross-sectional survey in Sydney, Australia. **Subjects**. People with chronic pain (n = 247, age 19–78 years, *M* = 43.69). **Methods**. The data collected included demographics, pain metaphors, the Brief Pain Inventory (BPI) and the Depression, Anxiety, and Stress Scales (DASS-21). Associations between metaphor source domains, obtained via Systematic Metaphor Analysis, and scores on the BPI, DASS-21, as well as diagnostic group were considered using binary logistic analysis. **Results**. Use of different pain metaphors was not associated with pain intensity, however the extent to which pain interfered with daily life did have a relationship with use of metaphorical language. Preliminary support was found for an association between the use of certain pain metaphors and self-reported diagnostic categories, notably Endometriosis, Complex Regional Pain Syndrome, and Neuropathic pain. **Conclusions**. There may be specific linguistic metaphorical markers to indicate pain interference and for particular diagnoses. Appreciation of pain metaphors has potential to facilitate communication and enhance understanding in interactions between clinicians and people with chronic pain.

Key Words: Chronic Pain; Conceptual Metaphor Theory; Language; Assessment

Introduction

Pain persisting longer than 3 months is defined as chronic and is associated with numerous psychological comorbidities such as depression, anxiety, and substance abuse [1, 2]. In the absence of objective assessment measures for pain, those affected rely on language, as well as nonverbal pain behaviors such as facial expressions, to communicate their subjective experiences.

Although pain is quintessentially private and elusive, metaphor provides people experiencing pain with the means to turn a private experience into a public one [3]. Metaphor is a well-documented linguistic tool for pain communication [4–6]. Eliciting metaphors is a way of accessing individual sensemaking around particular experienced phenomena. Metaphor analysis facilitates the exploration of this individual sensemaking [7]. A recent systematic review concluded that metaphors may provide people with pain with therapeutic value, but that additional research is needed to see how they can be best applied in practice settings [8]. Loftus [9] meanwhile asserts that dialogical study of healthcare metaphors, including those used in pain, will deepen the understanding of healthcare itself and how to conduct it more compassionately.

Conceptual metaphor theory (CMT) [10] posits that metaphor is a conceptual tool for thinking, organizing, and shaping reality. In CMT, a conceptual metaphor is the understanding of one domain of experience (the target domain) in terms of another (the source domain). For instance, "*Life* is a *Journey*," which can be seen linguistically through statements such as "I'm at a crossroads in my life" or "She'll go places in life." Thus, taking what we know of "journeys," we apply it to the target domain of "life" and understand it as a path people move along. Another example of a conceptual metaphor is "*Argument* is *War*." Some researchers have further argued that metaphorical thought and language are grounded in embodied experience—for example, "*Desire* is *Hunger*" [11].

Research on metaphor use in chronic pain has focused on people with spinal cord injury and specific neuropathic pain, as well as people with endometriosis [12, 13]. In terms of the utility of metaphor use, Semino [14] posits that describing chronic pain in terms of acute or nociceptive pain may result in a form of internal embodied simulation of pain experiences for the listener, which may in turn engender a greater empathic response. That is, although chronic pain is unknowable unless personally experienced, the use of more familiar acute pain metaphors may facilitate a listener's understanding. Metaphor may also help to explain disability, aiding understanding of why someone may not be able to do certain activities, over and above a simple "because it hurts."

In addition to this, the pain metaphors that someone uses may reveal certain other information about that individual. For instance, there are linguistic indicators that can contain information linking to psychological factors such as depression. Research has shown that depression is linked to elevated use of personal pronouns and negative emotion words [15]. Al-Mosaiwi and Johnstone [16] found, via text analysis of internet forums, that those focusing on anxiety, depression, and suicidal ideation contained significantly more absolutist words (e.g., always, totally) than control forums.

Linguistic indicators of pain catastrophizing were explored in a study of people with chronic musculoskeletal pain [17]. Seventy-one participants completed the Pain Catastrophizing Scale and were asked to write about their deepest thoughts and feelings about their life with chronic pain. Using quantitative word count analysis, the authors found that catastrophizing was associated with increased use of first person singular pronouns, pronouns referencing other people, as well as greater use of sadness and anger words. When the authors controlled for task engagement, age, gender, pain intensity, and neuroticism, these linguistic indicators together uniquely explained 13.6% of the variance in catastrophizing. This study demonstrates there may be a linguistic profile associated with higher rates of pain catastrophizing.

Language may also convey information useful for diagnosis. With the advent of the McGill Pain Questionnaire (MPQ) [18], a number of studies have sought to determine whether it could have a diagnostic function. Using multiple group discriminant analysis, Dubuisson and Melzack [19] found a high degree of specificity for pain language amongst a variety of diagnostic categories, correctly classifying 77% of people into the correct category using pain descriptors alone. Boreau, Doubrere, and Luu [20] were able to classify 77% of people with neuropathic pain and 81% of people with non-neuropathic pain using pain descriptors from a French adjective list similar to the MPQ. More recently, pain descriptors have been found to aid screening to identify neuropathic pain [21]. The Leeds Assessment of Neuropathic Symptoms and Signs (LANSS) [22] consists of a bedside examination of sensory dysfunction, in conjunction with an analysis of neuropathic pain sensory descriptors, featuring terms such as "pins and needles," "electric shocks," and "burning." It should be noted, however, that not all research has supported the use of pain language analysis. For example, one study found few and only marginally significant relationships between single word semantic pain descriptors and other pain-related disability and psychological measures, concluding that the presentation of chronic pain is too complex to be reliably discriminated via a simple word set [23].

However, on balance it seems that language, particularly pain descriptors, can convey valuable information, including the possibility of depression and anxiety, as well as information useful for diagnosis. So far, the limited research in this area has relied on single word pain descriptors, such as those in the MPQ. However, both the original MPQ as well as the more recent short forms have been criticized [21, 24], with studies showing that participants may instead speak in more complex metaphorical language [5, 13]. The power of metaphor to communicate complex abstract phenomena, facilitate understanding, and engender empathy, suggests that it can be a useful tool for people with chronic pain to communicate their pain experience to others, including health professionals and family, over and above literal language or single word adjectives. The current study seeks to further explore the link between pain metaphors, mood, and disability in chronic pain. Specifically, we sought to determine whether pain and mood related information can be gleaned from the specific metaphors people use to describe their pain. We were also interested to ascertain whether individuals with different pain disorders used different pain metaphors to describe their pain.

Methods

Ethics Approval

Ethics approval was sought and obtained from the relevant local ethics committee—*University of Technology Sydney HREC REF: ETH18-2192*. Informed consent was provided during the first part of the online survey. Participants were unable to continue to the survey if they did not provide consent. Participants had the option to withdraw from the study at any time.

Protocol

The study was part of a broad investigation of metaphor use in chronic pain [25]. To recruit participants, advertisements for the study were promoted through several Australian chronic pain organizations. Inclusion criteria for participation were being over 18 years old, a self-reported diagnosis of chronic pain (defined as pain lasting longer than 12 weeks), pain intensity of $\geq$ 3/10, and competent English reading and writing ability. Participants who completed the survey were eligible to enter a draw for one of five AUD$100 gift cards. It was made clear to participants that the survey was anonymous and voluntary. The survey was hosted on the Qualtrics survey platform (www.qualtrics.com) and was made up of two parts:

1. Basic demographics, measures of pain outcomes such as intensity and interference using the Brief Pain Inventory (BPI; [26]) and measures of mood as assessed by the Depression, Anxiety, and Stress Scales (DASS-21; [27]).
2. A request for participants to list the metaphors they commonly use to talk about and describe their pain. The word metaphor was defined and examples and basic prompts were given, which participants could use if they wished to. This explicit definition and request for metaphors was provided so as to collect and investigate pain metaphors directly, in order to analyze them in relation to diagnosis, mood, and disability. The metaphor definition, common examples, and response prompt are available in AppendixA.

Measures

Brief Pain Inventory (BPI). The BPI [26] is a self-administered questionnaire commonly used for chronic pain conditions. It comprises nine items, including pain drawing diagrams, four items regarding pain intensity (worst, least, average, and current pain), two items regarding pain relief treatments and medications, and one item regarding pain interference, which has seven subitems (general activity, mood, walking ability, normal work, interpersonal relations, sleep, life enjoyment). It uses Likert scales of 0–10 to give two main scores, a pain intensity and a pain interference score. The BPI has sound validity and reliability [26, 28].

Depression, Anxiety, and Stress Scale Short Form (DASS-21). The DASS-21 [27] is a 21 item self-report questionnaire used to measure emotional states of depression, anxiety and stress, with three subscales comprising seven items each. It uses a Likert scale of 0 to 3 with participants rating the extent to which the given statements applied to them over the past week. Acceptable reliability and validity levels have been reported by numerous researchers for both the 42-item long form and shorter 21 item form of the DASS [29, 30]. In terms of factor validity, it appears that the DASS-21 subscales can validly distinguish between depression, anxiety and stress, whilst each of these subscales also taps into a more general dimension of psychological distress [31].

Participants

In total, 323 participants began the survey. Of these, 279 (86%) completed all parts. Exclusion criteria included participants who selected “No” to the question “Have you been diagnosed with chronic pain by a health professional?” and those with Pain Intensity scores < 3 on the BPI. Eleven participants were excluded due to not having a chronic pain diagnosis, and 21 were excluded with Pain Intensity scores < 3, leaving a total of 247 participants. Table. 1 outlines sample characteristics. In the sample, 89.5% were female, 93.1% were white, and 38.5% were no longer working due to pain. The category of hypermobility included Ehlers-Danlos Syndrome, Hypermobility type, while neuropathy included a variety of neuropathic pain conditions. A specific chronic pain diagnosis was not provided by 13.8% of the sample, 53.4% gave one chronic pain diagnosis, 23.1% gave two diagnoses, and 9.7% gave three or more chronic pain diagnoses.

Analysis

Metaphor Analysis

Systematic Metaphor Analysis [32] was utilized in order to identify and collate the metaphor source domains used by participants, in line with CMT [10]. First, the topic of analysis was chosen (chronic pain) and the authors familiarized themselves with the existing literature on metaphor and pain description, assembling a broad collection of background metaphors which related to the target topic via an NVivo mind map. Following this, inductive identification and coding of the metaphors into source domains was performed also via NVivo (version 12). Qualitative analysis software such as this has been previously demonstrated to be a valuable tool for systematic metaphor analysis [33]. The target domain was constant (chronic pain) and as such it was not coded separately. Broad metaphor source domain coding was done initially by the first author. Metaphors were identified when the word or phrase could “be understood beyond the literal meaning in context of what is being said” (Schmitt [32], 384).This literal meaning generally stems from an area of physical or cultural experience (source domain), but in the metaphorical context is transferred to a second area (target domain—here, chronic pain). For example, the expression “stabbing pain,” in the context of chronic pain description can be understood beyond its literal meaning, which is “to wound or pierce by the thrust of a pointed object or weapon” [34]. Similes are defined by

Table 1. Sample demographics

					Brief Pain Inventory		Depression Anxiety Stress Scale		
Diagnosis	*n*	Age	Pain Duration	Education (years)	Pain Intensity	Pain Interference	Depression	Anxiety	Stress
Endometriosis	18	33.2 (5.6)	13.6 (7.8)	14.9 (3.7)	5.6 (1.5)	7.1 (2.0)	23.7 (11.9)	16.8 (7.8)	22.3 (10.1)
CRPS	24	42.8 (10.8)	11.5 (7.1)	15.5 (3.2)	5.8 (1.3)	6.8 (2.1)	19.1 (11.7)	14.4 (9.3)	21.8 (11.1)
Neuropathy	42	47.3 (12.7)	11.6 (8.5)	15.0 (2.8)	6.0 (1.6)	7.3 (1.6)	18.0 (11.6)	13.2 (8.8)	18.9 (8.3)
Arthritis	75	49.9 (10.8)	17.6 (11.2)	14.6 (3.9)	5.8 (1.4)	7.1 (1.7)	19.4 (10.8)	14.2 (9.5)	19.3 (9.5)
Hypermobility	18	34.9 (9.3)	19.5 (10.8)	14.8 (2.7)	5.8 (1.2)	7.0 (1.8)	16.2 (11.6)	13.3 (9.2)	18.9 (9.3)
Fibromyalgia	71	42.0 (10.1)	15.2 (9.7)	14.5 (2.9)	5.8 (1.2)	7.4 (1.5)	18.1 (11.6)	15.1 (9.2)	21.3 (9.9)
Migraine	21	44.4 (10.4)	17.8 (10.9)	14.8 (2.7)	6.0 (1.5)	7.3 (2.0)	17.1 (10.7)	15.0 (9.3)	20.4 (9.4)
Musculoskeletal	48	44.8 (12.5)	16.0 (9.4)	15.2 (2.8)	5.8 (1.3)	6.8 (2.0)	18.8 (11.6)	13.0 (8.7)	19.2 (9.6)
Other	6	43.0 (9.1)	13.1 (15.9)	11.2 (1.6)	6.4 (0.7)	7.1 (2.1)	18.3 (8.3)	16.7 (7.2)	18.3 (6.4)
TOTAL (n)	247	43.7 (11.7)	14.3 (10.2)	14.7 (3.1)	5.8 (1.3)	6.7 (1.8)	18.8 (11.1)	13.9 (8.8)	20.3 (9.3)

Note: There are no determined cutoff points for the BPI; however, both the pain intensity and pain interference scores are from 0 to 10. DASS-21 scoring is as follows: Depression (0–9 normal, 10–12 mild, 13–20 moderate, 21–27 severe, 28+ extremely severe), Anxiety (0–6 normal, 7–9 mild, 10–14 moderate, 15–19 severe, 20+ extremely severe), Stress (0–10 normal, 11–18 mild, 19–26 moderate, 27–34 severe, 35+ extremely severe).

Semino [35] as "an explicit statement of comparison between two different things, conveyed through the use of expressions such as 'like', 'as', 'as if' and so on" (16). Metaphors directly state a comparison without the use of these expressions, however similes are nonetheless metaphors in the sense that they compare one concept in terms of another [13]. Research has also shown that the strength of individual metaphors and similes is equivalent in most cases [36]. As such we have coded both similes and metaphors into conceptual metaphor source domains.

Initial metaphor source domain coding resulted in 60 categories. Meetings were then held with all authors in order to refine and collate these categories, identify any further source domains, and construct overarching metaphorical concepts from these. Agreement on the final metaphor source domains was reached via discussion until consensus was achieved. These final categories were then re-examined to ensure they accurately represented the data. As a final step, the coding system was checked against that of an independent assessor (a Master's qualified registered psychologist) and Cohen's κ was calculated to estimate reliability. Owing to the large amount of data, a random sample of 10% of the data was utilized for this purpose. There were high levels of agreement between the two independent coders, $\kappa = 0.831$ (95% confidence interval [CI], .76 to .90), $P < .0005$.

Statistical Analysis

Use of metaphor source domains was coded as a binary variable, with the source domain being either "Used" or "Not Used" by the participant.

Binary logistic regression was used to estimate odds ratios for the association between diagnostic groups and the use of each metaphor source domain. As some combinations of condition and metaphor use had data that were below the minimum recommended number of events per condition group (<5 events), we estimated these with shrinkage (Firth Correction) [37] to overcome issues of sparse data. A similar analysis was used to ascertain whether scores on either the BPI or DASS-21 were associated with use of particular metaphor source domains.

Results

Seven overarching metaphor source domains were generated from the data: *Causes of Physical Damage*, *Common Pain Experiences*, *Electricity*, *Insects*, *Rigidity*, *Bodily Misperception*, and *Death and Mortality*. Source domains and their associated subdomains are presented in Table2. These source domains have been reported on in more detail in a previous paper [25]. Participants on average used 5 (SD = 3) distinct metaphor source domains in their pain description.

Odds ratios calculations for use of metaphor source domains by diagnosis are reported in Table3, illustrating the odds of the specific diagnostic group's use of each metaphor source domain. Migraine, fibromyalgia, or musculoskeletal reported pain diagnoses did not show any important level of association with any source domains and as such were excluded from Table 3 (and can be found in Table 4 in AppendixB).

A reported diagnosis of endometriosis was associated with increased odds of use of the following source domains: *Childbirth and Pregnancy* (odds ratio [OR], 9.81; 95% CI, 1.74–55.22; e.g., "…in full blown labor with no pain relief," P188), *Physical Damage via Sharp Object* (OR, 3.44; 95% CI, 1.01–11.64; e.g., "…like knives twisting and stabbing through my pelvis," P37), *via Pulling/rubbing/tearing* (OR, 8.74; 95% CI, 3.09–24.70; e.g., "…like something pulling at me from the inside," P138), and *via Bruise/fracture/dislocation* (OR, 3.93l; 95% CI, 1.05–14.73; e.g., "…like I'm about to walk on glass with a broken ankle," P188).

A reported diagnosis of complex regional pain syndrome (CRPS) was associated with increased odds of use of the following source domains: *Bodily Misperception*

Table 2. Metaphor for chronic pain: source domain descriptions and examples of participant responses

Source Domains	Description of Source Domain and Example Metaphors
Causes of physical damage	Physical damage caused by a range of stimuli.
Motor vehicle accident	Physical damage caused by motor vehicle accidents, e.g. “like I’ve been run over,” “hit by a truck.”
Movement	Movement which would cause damage if it occurred within the body, e.g., “throbbing pain,” “heaving pain.”
Object—Sharp	Physical damage inflicted by a sharp object (knives, razors, glass, etc.), e.g., “a million hot needles all over my body.”
Object—Blunt	As above, but with a blunt object (mallet, hammer, cricket bat etc.), e.g., “hit repeatedly… with a large rubber mallet.”
Physical attack	Damage from a physical attack. When this attack had no referenced subject (nonembodied other), they described it simply as having been “punched” or “kicked.” However, the majority featured a malevolent agent that harmed them (embodied other), e.g., “someone wringing my legs out like a towel” or “a giant is crushing my bones.”
Embodied other	
Nonembodied other	
Pressure/weight	Physical damage caused by pressure, e.g., “like my head is in a vice,” or weight, e.g., “an anchor on my chest.”
Pulling/tearing/rubbing	Physical damage caused by pulling, tearing, or rubbing sensations, e.g., “a wrench like pain,” “pulling pain.”
Temperature	Physical damage arising from extreme temperatures, either via hot, cold, or hot and cold temperatures simultaneously.
Hot	e.g., burning,” “having my arm in a furnace,” “lava flowing through my feet.”
Cold	e.g., “ice running through my body,” “as though my bones are blocks of ice.”
Hot-cold	e.g., “pain feels icy cold and burning all at once”
Common pain experiences	Acute pain experiences which others may have experienced.
Bruise-fracture-dislocation	Common injuries such as bruises and broken bones, e.g., “like walking with broken bones in my feet.”
Childbirth and pregnancy	Aspects of childbirth such as “contractions,” or pain being “similar to those… during labor.”
Common illness	Common illnesses such as colds, headaches, or toothaches, e.g., “a toothache in my right knee.”
Excessive physical exertion	Exercise related pain, e.g., “similar to a runner’s cramp but MUCH more intense.”
Electricity	Aspects of electricity such as “electric shock,” “lightning strike,” and “buzzing/humming” to describe pain.
Insects	e.g., “ants crawling under the skin,” “a million bee’s in my shoulders”
Rigidity	Stiffness or immobility, e.g., “like my muscles have turned into painful rocks.”
Bodily misperception	A distorted perception of the painful body part, feeling as if it were not part of them, or was larger than it actually was, e.g. “like the original place of pain is not a part of me, sometimes my hand that is all deformed now is slimy.”
Death and mortality	Death and the process of dying, e.g., “feels like rigamortus [sic] first thing every morning.”

(OR, 7.00; 95% CI, 1.28–38.41; e.g., “my foot does not belong to me,” P113), *Temperature* (OR, 6.43; 95% CI, 1.97–20.98), including all its subdomains: *Cold* (OR, 4.40; 95% CI, 1.45–13.37; e.g., “…as though my bones are blocks of ice,” P4), *Hot* (OR, 7.29; 95% CI, 2.23–23.78; e.g., “…someone poured gas on me and lit me on fire,” P74, “like a blow torch on my skin,” P214), *Hot-Cold* (OR, 5.42; 95% CI, 1.06–27.63; e.g., “The pain feels like burning and cold to the point of torture,” P113), and *Childbirth and Pregnancy* (OR, 7.00; 95% CI, 1.28–38.41; e.g., “contractions” P84).

A reported diagnosis of Neuropathic pain was associated with increased odds of use of the following source domains: *Physical Damage via Sharp Object* (OR, 2.57; 95% CI, 1.21–5.48; e.g., “A sharp hot or cold knife going straight up my neck into my brain,” P61, “shards of glass buried deep in my feet when I walk on them,” P121), *Temperature* (OR, 2.56; 95% CI, 1.25–5.26), including all its subdomains: *Cold* (OR, 3.57; 95% CI, 1.32–9.67; e.g., “ice inside my bones” P117), *Hot* (OR, 2.58; 95% CI, 1.27–5.23; e.g., “like my skin is being burnt constantly,” P227), *Hot-Cold* (OR, 9.51; 95% CI, 1.93–46.82; e.g., “… freezing but burning hot feet,” P 248), and *Physical Attack* (OR, 2.14; 95% CI, 1.06–4.31), notably via an *Embodied Other* (OR, 2.20; 95% CI, 1.04–4.63; e.g., “someone using a hand drill to drill a hole in my head,” P70).

A reported diagnosis of Arthritis was associated with increased odds of use of the *Insects* source domain (OR, 3.29; 95% CI, 1.47–7.36; e.g., “ants under my skin,” P151). Of relevance here, 26.2% of those with arthritis also experienced neuropathic pain and rates of use of this source domain were similar in arthritis and neuropathic pain (20% vs 19%).

A reported diagnosis of Hypermobility was associated with increased odds of use of the *Physical Damage via Blunt Object* source domain (OR, 6.53; 95% CI, 2.05–20.80; e.g., “It feels like my body is being hit with a hammer repeatedly,” P80).

BPI Intensity scores were not significantly associated with the use of any of the metaphor source domains. However, BPI Interference scores were associated with increased odds of using the *Death and Mortality* metaphor source domain (OR, 2.42; 95% CI, 1.16–5.04; e.g., “…like my insides are being cut off from blood circulation and I can feel pieces of myself die,” P187) and with increased odds of using the *Physical Damage via Sharp Object* source domain (OR, 1.25; 95% CI, 1.08–1.45; e.g., “like a knife stuck in between my ribs,” P30). BPI

Table 3. Odds ratios for use of metaphor source domains by diagnosis

	Endometriosis		CRPS		Neuropathy		Arthritis		Hypermobility	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Causes of physical damage										
Motor vehicle accident	1.49	0.25, 9.08	0.32	0.02, 5.85	1.04	0.25, 4.33	0.75	0.21, 2.60	1.49	0.25, 9.08
Movement	1.64	0.39, 6.93	0.19	0.01, 3.47	0.59	0.15, 2.33	0.74	0.27, 2.03	0.88	0.15, 5.15
Sharp object	**3.44***	1.01, 11.64	0.83	0.35, 1.92	**2.57***	1.21, 5.48	1.02	0.59, 1.77	1.41	0.52, 3.88
Blunt object	1.04	0.18, 6.18	0.75	0.13, 4.35	2.09	0.72, 6.04	0.92	0.33, 2.60	**6.53***	2.05, 20.80
Physical attack	1.60	0.58, 4.43	0.82	0.30, 2.25	**2.14***	1.06, 4.31	1.13	0.61, 2.10	0.91	0.29, 2.81
Embodied other	1.75	0.60, 5.10	1.17	0.42, 3.25	**2.20***	1.04, 4.63	1.20	0.61, 2.34	1.29	0.42, 4.03
Nonembodied other	1.79	0.29, 11.08	0.38	0.02, 6.99	0.20	0.01, 3.56	0.93	0.26, 3.37	1.79	0.29, 11.08
Pressure and weight	0.95	0.34, 2.60	0.76	0.31, 1.91	1.32	0.67, 2.60	1.05	0.60, 1.86	0.95	0.34, 2.60
Pulling, tearing, rubbing	**8.74***	3.09, 24.70	1.33	0.39, 4.52	0.44	0.11, 1.70	1.69	0.75, 3.81	0.66	0.11, 3.83
Temperature	1.81	0.66, 4.95	**6.43***	1.97, 20.98	**2.56***	1.25, 5.26	1.21	0.70, 2.09	0.71	0.27, 1.86
Cold	1.95	0.46, 8.41	**4.40***	1.45, 13.37	**3.57***	1.32, 9.67	0.92	0.33, 2.60	0.31	0.02, 5.76
Hot	1.27	0.48, 3.33	**7.29***	2.23, 23.78	**2.58***	1.27, 5.23	1.05	0.61, 1.81	0.80	0.31, 2.11
Hot and cold	0.93	0.05, 18.48	**5.42***	1.06, 27.63	**9.51***	1.93, 46.82	0.61	0.10, 3.85	0.93	0.05, 18.48
Common pain experiences										
Bruise, fracture, dislocation	**3.93***	1.05, 14.73	0.92	0.16, 5.40	0.88	0.22, 3.59	0.40	0.10, 1.61	2.43	0.56, 10.61
Childbirth and pregnancy	**9.81***	1.74, 55.22	**7.00***	1.28, 38.41	0.43	0.02, 8.16	0.75	0.12, 4.93	1.10	0.05, 22.34
Common illness	4.50	0.96, 21.16	0.46	0.02, 8.64	0.84	0.14, 5.01	0.75	0.17, 3.25	2.23	0.35, 14.14
Excessive physical exertion	1.99	0.32, 12.44	0.41	0.02, 7.73	0.75	0.13, 4.40	1.61	0.47, 5.57	1.99	0.32, 12.44
Electricity	1.54	0.49, 4.83	1.40	0.50, 3.92	1.72	0.78, 3.83	1.05	0.51, 2.14	1.54	0.49, 4.83
Insects	1.22	0.29, 5.07	1.33	0.39, 4.52	2.36	0.97, 5.75	**3.29***	1.47, 7.36	1.22	0.29, 5.07
Rigidity	1.79	0.29, 11.08	2.51	0.57, 11.07	1.28	0.30, 5.43	1.39	0.42, 4.65	1.79	0.29, 11.08
Bodily misperception	1.10	0.05, 22.34	**7.00***	1.28, 38.41	1.62	0.24, 10.77	3.29	0.63, 17.20	1.10	0.05, 22.34
Death and mortality	3.50	0.52, 23.66	0.68	0.04, 13.21	1.32	0.21, 8.41	1.27	0.26, 6.17	0.93	0.05, 18.48

Note: * $P < .05$.

Interference scores were not significantly associated with any of the other metaphor source domains.

Higher scores on both the Depression and Stress indices of the DASS-21 were associated with decreased odds of use of the *Pressure and Weight* metaphor source domain (OR, 0.98; 95% CI, 0.95–1.0; OR, 0.97; 95% CI, 0.94–1.0, respectively; e.g., "like I am wearing a lead suit," P228). Scores on the Anxiety index of the DASS-21 were not associated with any metaphor source domains.

Discussion

This study found the use of different pain metaphors was not associated with the pain intensity levels reported by individuals with chronic pain, however the extent to which pain interferes with daily life did have a relationship with the use of metaphorical language. Furthermore, the study provided preliminary support for an association between the use of certain pain metaphors by individuals with chronic pain and their diagnostic category, in particular for those reporting endometriosis, CRPS, and neuropathic pain diagnoses.

Diagnostic Group

Individuals with self-reported diagnoses of either migraine, musculoskeletal pain, or fibromyalgia did not report significantly increased or decreased odds of using any particular metaphor source domains. That is, from these results, there does not appear to be particular metaphoric indicators for these diagnoses. Instead, participants in these categories employed a wide range of metaphor types to communicate their pain, without relying on particular source domains. In the case of musculoskeletal pain, this may be due to the fact that this is a broad category, comprising many different subtypes and pain locations, whilst fibromyalgia pain is also often variable and widespread. Further research into the language of these subgroups is warranted to explore their specific metaphor use in greater detail.

A diagnosis of endometriosis was associated with significantly increased odds of use of the following source domains: *Childbirth and Pregnancy, Physical Damage via Sharp Object Physical Damage via Pulling/rubbing/,* and *Physical Damage via Bruise/fracture/dislocation.* Endometriosis is a gynecological disorder which is often difficult to identify, such that delays of between 7 and 11 years have been reported before a definitive diagnosis is made [38]. More recently, Bullo [13] found a diagnosis delay of 8.6 years for this disorder. Multiple reasons have been hypothesized for this delay, including difficulty describing endometriosis pain, dismissal, and normalization of pain as part of the female condition, and the perceived stigma of talking about menstruation [13, 39, 40]. Bullo [13] found that a majority of pain expressions by people with endometriosis used the metaphor of describing pain as physical damage. Our data reflect this but go further by identifying which physical damage metaphors those with endometriosis are significantly more likely to use, in contrast to those used by participants with chronic pain conditions of other origins. Understanding the types of metaphors used provides clues as to the quality of the pain, for example characterizing the pain as feeling like being stabbed, as being bruised, or as a wrench-like, tearing pain. These results can also potentially improve diagnostic information by providing clues as to the language that health practitioners should look out for in early consultations. For example, for people with endometriosis the odds of using a *Physical Damage via pulling/rubbing/ tearing* metaphor were 8.74 times greater than for those with other chronic pain syndromes, whilst the odds of using a *Sharp Object* metaphor were 3.44 times greater in this population. Although not exclusive to this population, our finding of increased odds of use of the *Sharp Object* source domain may indicate a need to convey the intensity of pain, in the face of disbelief from medical practitioners.

Complex regional pain syndrome remains a poorly understood chronic pain condition. It involves sensory, motor, autonomic, and neuropsychological changes [41] and is notoriously difficult to treat [42]. In our data, a diagnosis of CRPS was associated with significantly increased odds of use of the source domains of all temperature related categories, including *Hot Temperature, Cold Temperature,* as well as the *Hot-Cold Temperature* subdomain. It is interesting to note that although a majority of the overall sample utilized at least one temperature-based metaphor, the CRPS and neuropathy subsets were the only distinct groups to have significantly increased odds of use of these source domains. Those with a CRPS diagnosis had odds of using a temperature metaphor 6.43 times greater than non-CRPS pain conditions. This is reflective of the specific symptoms of CRPS, which often involve changes in skin temperature [43]. The *Bodily Misperception* source domain in our sample was small but distinct, comprising participants who described feeling as if their limb did not belong to them, was deformed, differing in size, or as a lack of control over the body part in pain. Such metaphorical descriptions are in accord with both quantitative and qualitative CRPS research findings [44]. Frettlöh, Hüppe, and Maier [45] found that participants with CRPS reported significantly more “neglect-like” symptoms (whereby the affected limb is seen as strange, disordered, and not belonging to the person’s body) on a survey than a control group, with survey scores providing good specificity for a CRPS diagnosis. In our sample, those with a CRPS diagnosis had odds 7 times greater than those without for use of this *Bodily Misperception* metaphor source domain, suggesting that spontaneous use of these metaphors in pain description can provide helpful clues to a CRPS diagnosis. Finally, the fact that respondents with CRPS also had significantly increased odds of using a childbirth and pregnancy type metaphor is difficult to interpret but may be indicative of how severe CRPS pain can be. Our sample was primarily female and likely to draw on familiar pain experiences to describe their pain. They may have used childbirth as a reference point for extreme pain, seeking to convey their pain intensity through metaphor.

Neuropathic pain is caused by a lesion or disease of the somatosensory system and symptoms typically include burning and electrical-like sensations, as well as allodynia [46]. Having some form of chronic neuropathic pain was, like CRPS, associated with increased odds of use of all of the temperature related source domains. This utilization of temperature based metaphors is most likely reflective of the symptomology of neuropathic pain, which can include “burning” or “freezing pain.” Multiple well-validated assessment tools for neuropathic pain feature questions regarding temperature, for example, “hot or burning sensations” in the LANSS [22] or “burning pain” and “freezing pain” in the Neuropathic Pain Questionnaire [47]. In addition to this, having neuropathic pain was associated with increased odds of use of the *Sharp Object* subdomain. This included multiple descriptions of pain which was “stabbing” or which felt like “pins and needles,” which are also descriptors found in multiple neuropathic pain assessment measures [46]. Moving away from the more straightforward symptom related pain metaphors, those with neuropathic pain were also found to have odds 2.2 times greater for use of the *Physical Attack via Embodied Other* source domain. This domain was composed of metaphors depicting an external malevolent agent which did harm to the participant, a “something” or “someone” inflicting pain upon them. The tendency to externalize pain generally as an intruder or malevolent agent has been previously documented, notably via in depth explorations of Greek pain lexicalizations [5, 6, 48]. Looking specifically at neuropathic pain however, one of the three metaphorical themes found by Hearn, Finlay, and Fine [12] in a sample of individuals with chronic neuropathic pain was “pain as a personal attack,” in which participants likened their pain to an attacking embodied entity. People with neuropathic pain experience complex symptoms, impaired quality of life, and difficult treatment decisions [49]. Through this type of personifying metaphor they may thus seek to externalize their pain in a way that renders it tractable, creating something to fight against. As an example, one participant described their pain as "someone using a hand drill to drill a hole in my head" (P70). Here pain is externalized and placed outside of the self—pain is being inflicted onto them by an embodied other. Externalizing, where a problem is considered to be outside of the self, is a coping strategy which makes the problem more controllable. It also works to separate the embodied unpleasantness of chronic pain from a preferred pain-free self [50]. This can promote coping, but hinder long term acceptance.

A diagnosis of hypermobility was associated with increased odds of use of the *Physical Damage via Blunt Object* source domain. This domain included descriptions of pain such as being hit with a large rubber mallet, or hammer, and seems to indicate a duller, more diffuse kind of pain, in contrast to the sharper pain associated with neuropathic pain.

Finally, it was somewhat unexpected to see a correlation between the arthritis-related pain diagnosis and increased odds of use of the *Insects* source domain. However, 26.2% of those with arthritis also experienced neuropathic pain, which may explain the result. Dysaesthesias are a common feature of neuropathic pain, which would include formication and the rates of use were equivalent between the groups.

Pain Intensity and Interference

An interesting finding from this study was that pain intensity scores were not significantly associated with increased (or decreased) use of any particular metaphor source domains. However, this may be explained by several factors. Schlaeger et al. [51] had 248 participants assign a pain intensity value, using a 0–100-mm visual analogue scale, to 26 pain intensity descriptors. They found large across-person variability, with the descriptor "distressing," for example, having a mean of 55.3 mm but standard deviation of 24 mm. In the same way that there was a large amount of variation in how participants rank single word pain intensity descriptors, the same may well apply to longer, metaphorical pain descriptions. That is, different types of pain metaphors are likely to indicate different levels of intensity to each participant.

In addition to this, it may be that pain intensity is defined more by affective-evaluative than sensory descriptors. In an early study, Bailey and Davidson [52] had a total of 183 participants, across two studies, rate 39 adjectives on a 130 mm scale of pain intensity. Using factor analysis, they found that 10 of these adjectives loaded onto an "intensity" factor. However, utilizing research into pain descriptors by Melzack and Torgerson [53], they found that only two were "sensory" descriptors, with the remaining eight occurring in either the "affective" or "evaluative" domains. The sensory domain describes pain in terms of temporal, spatial, pressure, thermal, and other properties (e.g., sharp, burning), while the affective domain is in terms of tension, fear, and autonomic properties comprising the pain experience (e.g., nauseating, torturing), and the evaluative domain describes the subjective overall intensity of the total pain experience (e.g., annoying, unbearable). The systematic metaphor analysis employed in our study focused exclusively on sensory descriptions of pain, without looking at the affective or evaluative components of pain description. Sensory metaphorical descriptions alone may not be useful in identifying pain intensity levels.

Pain interference scores provide a measure of how much pain has interfered with various domains of the individual's daily life (e.g., activity, sleep, work, enjoyment of life, etc.). In this study, greater pain interference scores were associated with an increased likelihood of using a *Death and Mortality* metaphor. Although this source domain was not often used in this sample, its association with pain interference was significant. It may be that metaphorically referencing death in pain description might be a form of pain catastrophizing, defined as "an exaggerated negative 'mental set' brought to bear during actual or anticipated painful experience" ([54], p. 53). Participants whose pain greatly impacted their ability to engage in normal daily activities were perhaps indicating "my life is over." Pain catastrophizing has been shown to be a predictor of many pain related outcomes, including pain-related activity interference and mood [55]. Further research exploring the use of metaphorical language in the context of pain catastrophizing is warranted.

Those with higher pain interference scores were also more likely to use the overarching *Causes of Physical Damage* source domain, with a focus on the subdomain of damage via *Sharp Object*, which included descriptors of "stabbing" pains, and physical damage inflicted by a wide variety of sharp instruments such as knives, machetes, metal spikes, and razors. For example, one participant described their pain as feeling like there was "a knife stuck in between my ribs" (P30). It appears that although pain intensity may be better predicted by affective-evaluative descriptors, these strong sensory metaphors can convey how disrupted daily life is.

Depression, Anxiety, and Stress

There were significant associations for scores on the Depression and Stress indexes of the DASS-21, with higher scores corresponding to decreased odds of use of the *Pressure and Weight* source domain. However, we note that that odds ratios are very close to 1, which would suggest no association between these factors (OR of 0.98 and 0.97, respectively) and as such this finding is unlikely to be of clinical significance.

The lack of association between DASS-21 scores and particular metaphor source domains was somewhat surprising but could reflect a similar phenomenon to the lack of correlation between pain intensity scores and source domains. That is, it appears that affective, rather than sensory descriptors provide a better predictor of psychological disturbance. For example, Kremer, Atkinson, and Kremer [56] found that, using the MPQ [18], affective descriptors were more sensitive to psychological variables such as depression and anxiety, and that sensory descriptors did not add significant predictive strength. Sist et al. [57] found that pain clinic participants with depression chose significantly more affective pain descriptors and scored significantly higher on the affective pain intensity dimension of the MPQ than participants without depression. In contrast to this, no differences in sensory pain descriptors were found based on depression.

Implications

Our research has begun the work of exploring and cataloging the metaphors that people with chronic pain routinely use, as well as exploring whether these metaphors shed light on quantifiable pain-related factors such as diagnosis or mood. It is unique in that it is one of the few quantitative explorations of metaphor use in a chronic pain population and is, to our knowledge, the only quantitative exploration across a broad spectrum of conditions. It is also the only study to use inferential statistics to explore how metaphor source domains are associated with diagnostic categories, mood, and disability. A better understanding of pain language may engender a shared understanding between people with chronic pain and health professionals and aid communication. This study suggests there are specific linguistic markers (in the form of metaphor type) for certain diagnoses and pain related outcomes, such as pain interference. The metaphors that people choose to describe their pain has potential to inform health professionals in their communications with them. In time-poor consultations, considering metaphorical language to build upon data provided by standardized questionnaires can be of value. That is, careful listening to the metaphors that people use could provide valuable insights to aid in diagnosis and associated healthcare planning.

In addition to this, increased understanding of pain metaphors has useful clinical applications. The current research may support the development of novel assessment tools focusing on the metaphors that people with chronic pain use, while identifying and targeting a person's specific metaphors may provide a new focus point for work in psychological therapy.

Study Limitations

Due to the online recruitment process, participants necessarily self-selected as having chronic pain, as well as self-reported their individual diagnoses. As our sample was predominantly female, well educated, white Australians, sample to population (statistical) generalizability may be limited [58]. However, as the metaphors generated by participants are consistent with previous research, it may instead have naturalistic generalizability [59]. An additional limitation is the potential for bias due to the pain metaphor examples provided. Although we felt it was necessary to have a clear explanation, participants may have been more likely to produce metaphors related to these prompts. Finally, there is evidence that languages and cultures differ significantly from one another in terms of pain experience [60–62]. Population groups differing on these grounds may have varying results.

Future Directions

Future research should aim to expand on the sample presented here in order to evaluate if results continue to be supported in other more varied settings. Future research may also focus on exploring pain metaphors from the clinician's point of view. For example, we have shown that participants readily use a wide variety of metaphors and that these are associated with factors such as diagnosis and disability. It has also been found that metaphor may have therapeutic benefit to people in pain [8]. However, there is less research focusing on the clinician use and understanding. Given the frequency of use and the potential utility of metaphor, the next step may be to investigate the attitudes and interpretations of health professionals toward these pain metaphors. It may be that a gap exists between what people with chronic pain find helpful in the use of metaphor for communication of pain and what health professionals find helpful.

Conclusions

This study has shown evidence of specific linguistic, metaphorical markers for both pain interference levels, as well as certain diagnoses, notably Endometriosis, Complex Regional Pain Syndrome, and Neuropathic pain. Increased awareness of and attention towards pain metaphors may provide valuable information, enhance understanding, and facilitate communication between people with chronic pain and health providers.

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AppendixA

Prompt given to elicit metaphors

Many people use metaphors in order to describe their pain. Metaphors are figures of speech that describe something in a way that isn't literally true, but helps explain an idea or make a comparison.

These can be statements such as:

"It feels like ants in my body."

"It feels like a knife slicing into me."

"It feels like something that is burning inside you."

"It feels like I carry a very heavy load."

How would you describe your pain and what it feels like? What metaphors or descriptions do you use to talk about your pain?

Please feel free to write as many different metaphors or descriptions as you have used over the time you have had chronic pain. You may use the prompts below if you like to help you get started.

Living with pain is like…

The pain feels like…

AppendixB

Table 4. Odds ratios for use of metaphor source domains by diagnosis

	Migraine		Fibromyalgia		MSK	
	OR	95% CI	OR	95% CI	OR	95% CI
Causes of physical damage						
Motor vehicle accident	0.37	0.02, 6.84	1.64	0.54, 5.00	0.88	0.21, 3.64
Movement	0.74	0.13, 4.27	1.62	0.65, 4.03	1.41	0.50, 3.93
Sharp object	1.80	0.68, 4.76	0.82	0.47, 1.44	0.90	0.48, 1.70
Blunt object	0.88	0.15, 5.12	1.00	0.35, 2.83	0.60	0.15, 2.38
Physical attack	0.98	0.35, 2.76	0.93	0.49, 1.76	1.01	0.49, 2.09
Embodied other	1.41	0.50, 3.99	1.18	0.60, 2.32	0.83	0.36, 1.88
Nonembodied other	0.44	0.02, 8.17	1.51	0.45, 5.05	1.08	0.25, 4.56
Pressure and weight	1.44	0.58, 3.56	0.85	0.47, 1.51	0.91	0.47, 1.77
Pulling, tearing, rubbing	0.55	0.10, 3.17	0.72	0.28, 1.82	1.58	0.64, 3.93
Temperature	0.66	0.27, 1.63	1.14	0.65, 1.97	0.72	0.38, 1.35
Cold	0.26	0.01, 4.81	0.53	0.16, 1.77	0.33	0.06, 1.83
Hot	0.75	0.30, 1.84	1.05	0.61, 1.82	0.82	0.44, 1.55
Hot and cold	0.79	0.04, 15.45	0.18	0.01, 3.36	0.31	0.02, 5.70
Common pain experiences						
Bruise, fracture, dislocation	0.32	0.02, 5.86	1.75	0.62, 4.97	0.74	0.18, 3.01
Childbirth and pregnancy	0.94	0.05, 18.67	0.82	0.12, 5.34	1.37	0.21, 9.09
Common illness	0.53	0.03, 10.10	3.17	0.88, 11.44	0.21	0.01, 3.72
Excessive physical exertion	0.48	0.03, 9.04	1.75	0.51, 6.05	0.19	0.01. 3.32
Electricity	0.10	0.01, 1.82	0.65	0.30, 1.43	1.20	0.53, 2.68
Insects	0.17	0.01, 3.06	1.85	0.82, 4.17	0.37	0.10, 1.42
Rigidity	2.94	0.66, 13.11	2.17	0.67, 7.03	1.08	0.25, 4.56
Bodily misperception	0.94	0.05, 18.67	0.22	0.01, 4.07	0.36	0.02, 6.90
Death and mortality	2.95	0.44, 19.64	2.53	0.56, 11.53	4.32	0.94, 19.87

Note: * $P < .05$.

5. STUDY 4: CLINICIAN EXPERIENCE OF METAPHOR IN CHRONIC PAIN COMMUNICATION

This chapter is presented exactly as it appears in the following submitted manuscript.

Munday, I., Newton-John, T., & Kneebone, I. (2021). *Clinician experience of metaphor in chronic pain communication.* [Manuscript submitted for publication]. Graduate School of Health, University of Technology Sydney.

Additional Files: Qualtrics Survey (Appendix A), Interview Schedule (Appendix B), COREQ reporting guidelines checklist (Appendix C)

Principle Author

Name of Principal Author (candidate)	Imogene Munday
Contribution to the paper	Responsible for the development, ethics approval process, data collection, data analysis and write up in collaboration with thesis supervisors. Responsible for the submission of the paper.
Overall percentage (%)	80%
Signature	Production Note: Signature removed prior to publication.

5.1 Preamble

Chapter 4 established that there are metaphor-based linguistic markers for some chronic pain diagnostic categories, as well as pain interference levels as measured by the BPI. Given this important information contained in the metaphors people use to describe their pain, the study described in this chapter examined whether this information can be used by health professionals working in this area. It also sought to examine how clinicians perceive and experience metaphor in chronic pain consultations, given that previous research has suggested that there may be a communication gap between people with chronic pain and health professionals and that metaphorical descriptions of pain may lead to miscommunication or even dismissal (Bullo, 2020; Overend, 2014). However, few studies have looked directly at the clinician's experience of metaphor use because most have focused on the patient's experience. This study sought to fill this gap and investigated the experience with the use of metaphor of clinicians working in the context of chronic pain. In this study, clinicians were asked how they perceive, respond to, use, and interpret pain metaphors.

Title: Clinician experience of metaphor in chronic pain communication

5.2 Abstract

Objective: Investigate the experience of clinicians regarding patient use of metaphors in chronic pain communication.

Design: Individual interviews with Australian clinicians working with chronic pain patients for minimum one year, whose current clinical load consisted of at least 50% chronic pain patients. Eighteen clinicians participated, age range 26 to 64 years (*M* = 46.6), 50% female, experience working in chronic pain ranging from 2 to 27 years (*M* = 11.16). Sixteen participants identified as Caucasian, one as Asian, and one as multiracial. Thematic Analysis was applied to transcribed interviews.

Results: Four key themes with subthemes were identified; Metaphor as communicative tool, Metaphor as clue, Metaphor as obstacle, and Metaphor use in treatment. Clinicians identified metaphor as an important tool for patients to communicate their pain experience, whilst acknowledging that in certain instances it could be unhelpful to patients. In general, metaphor was seen to contain useful information for clinicians and possess utility in assessment and treatment.

Conclusion: Metaphors play a significant role in chronic pain consultations, with clinicians utilising them to gain insight into pain type, psychopathology, and patient pain understanding. Metaphor in treatment phases may be underutilised. Clinicians should encourage patient metaphor use in chronic pain communication.

Keywords: chronic pain, communication, metaphor

5.3 Introduction

Chronic pain, defined as pain persisting longer than 3 months, has a prevalence rate of 19% to 30% in the western world (Blyth et al., 2001; Breivik et al., 2006; Johannes et al., 2010). It is a common presentation at primary care clinics, with one study finding 37.5% of adult appointments in a typical week were for chronic pain (Upshur et al., 2006). For effective pain management, the clinician-patient consultation and how pain is conveyed in order to make a diagnosis and come to a treatment decision is critical. For both parties, descriptions of pain underpin much of this communication (Moir, 2021).

Despite its importance, difficulties in clinician-patient pain communications are well established. For example, a comprehensive review identified that for 78% of the 80 studies examined, professionals underestimated pain compared to patients, with this number increasing to 91% of high quality studies (Seers et al., 2018). Worryingly, underestimation was seen to increase with pain severity. A study focussing on back pain found that few medical terms used by clinicians were understood and accepted by lay participants in the way that the clinicians discussed and intended them to be (Barker et al., 2009). Misunderstandings, resulting in negative emotional responses were also common. Additionally, patients with chronic pain have described feeling disbelieved and misunderstood by primary care providers (Upshur et al., 2010).

Communicating pain experience is inherently complex. Given its subjective nature, pain is difficult for patients to describe, and this may be more so for long-term pain conditions (Craig, 2009). Research has found that one method of conveying pain to others consistently used by chronic pain patients is metaphor (Bullo, 2020; Bullo & Hearn, 2021; Lascaratou, 2007; Moseley & Moseley, 2007; Munday et al., 2020). Metaphor is defined as when a word or phrase can be understood beyond its literal meaning in the context of what is being said, for example a “stabbing” pain (Schmitt, 2005). Although additional research is needed to see how this may best translate into practice, a recent systematic review found that using metaphors can be therapeutically valuable to people in pain (Stewart & Ryan, 2020). Pain metaphors may also be of use to clinicians; that certain disease groups use demonstrably different metaphors when communicating about their pain may support diagnosis (Munday, Kneebone, Rogers, et al., 2021). Munday, Kneebone, Rogers, et al. (2021) found evidence of associations between diagnostic groups, in particular endometriosis, complex regional pain syndrome, and neuropathic pain, and the use of certain pain metaphors. For example, they found that people with complex regional pain syndrome were significantly more likely to use metaphors relating to temperature or bodily misperception than any other diagnostic group.

However, difficulties can arise when clinicians are confronted with these metaphorical descriptions of pain. Such descriptions may contravene expected biomedical descriptors of pain, potentially leading to minimisation or dismissal by the clinician (Overend, 2014). There may be a mismatch in assumptions and lack of a shared understanding, leading to miscommunication in the interaction (Bullo, 2020). That is, there may be an incompatibility in how patients and clinicians communicate chronic pain. While research has established the frequency and potential utility of metaphor use for both patients with chronic pain and clinicians, to the best of our knowledge, none has explored the clinician experience of pain metaphors. This study thus aims to investigate the experience of clinicians regarding patient use of metaphors in chronic pain consultations.

5.4 Methods

Ethics Approval

Ethics approval was obtained from the relevant local ethics committee. Participants provided informed consent at the outset of an online survey, with the option to leave the survey at any time.

Protocol

Recruitment was purposive (Cresswell & Plano Clark, 2011) and carried out through multiple online channels including Twitter and chronic pain organisations. Inclusion criteria were Australian clinicians who had worked in chronic pain for minimum one year, whose clinical load consisted of at least 50% patients with chronic pain. The study comprised of:

1. An online survey hosted on Qualtrics.
2. A semi structured individual interview conducted over Zoom (Zoom Version 5.4.9, 59931.0110).

The study method was consistent with COREQ recommendations (Tong et al., 2007).

Participants

Eighteen participants took part. Table 1 outlines sample demographics. All were currently employed and working with chronic pain patients, except for one (R10) who had recently paused clinical work to pursue a PhD. Fifty percent were male, age range 26 to 64 years (*M* = 46.6), experience working with chronic pain ranging from 2 to 27 years (*M* = 11.6). Sixteen participants identified as Caucasian, one Asian, and one multiracial (Caucasian/Melanesian).

Table 1
Sample Demographics

Response ID	Age	Sex	Discipline	Years Qualified	Years Worked in Chronic Pain
1	48	M	Psychology	15	10
2	55	F	Nursing	31	23
3	47	F	Nursing	26	7
4	26	F	Psychology	1	3.5
5	33	F	Physiotherapy	11	6
6	64	M	Medical Doctor	35	2
7	50	M	Physiotherapy	25	20
8	34	M	Physiotherapy	8	6
9	36	F	Physiotherapy	13	8
10	29	F	Physiotherapy	5	3.5
11	51	M	Physiotherapy	29	27
12	61	M	Psychology	5	5
13	41	F	Physiotherapy	20	12
14	50	M	Psychology	16	12
15	48	F	Physiotherapist	27	10
16	62	F	Nursing	37	16
17	42	M	Physiotherapist	18	18
18	62	M	Psychiatry	31	20

Data Collection

Survey

The survey screened for the inclusion criteria and gathered basic demographic and occupational data (Appendix A).

Interviews

The private interviews were semi structured, commencing with a broad question on participants' experiences of patients using pain metaphors. Follow up open ended questions were used as required for elaboration and covered areas such as how clinicians use metaphors during consultations (Appendix B). Interviews were audio recorded and ranged from 14 to 38 minutes (M = 22). They were conducted by the first author, a female registered psychologist and PhD candidate actively researching metaphor and pain, with no prior relationship with the participants.

Analysis

Interviews were transcribed and analysed via thematic analysis in six phases (Braun & Clarke, 2006). Firstly, transcribed data was read over several times to facilitate data immersion. Secondly, initial codes (N = 38) were generated by the first author using qualitative analysis program NVivo. Thirdly, initial codes were collated and refined into potential themes which could explain larger sections of the data. These potential themes were reviewed by all authors in step four via a two-level system, consisting of checking the themes against coded quotes, as well as checking themes against the entire data set. Also in this step themes which were deemed to lack supportive data or to be too diverse were discarded. Clear names and definitions were then generated for each final theme before quotes were selected which exemplified each theme. Data saturation was considered to have been achieved by interview 15 and this was confirmed by subsequent interviews.

5.5 Results

Participants were observed to speak freely and several remarked upon the interesting and thought-provoking nature of the interview topic. Four key themes with attending subthemes were identified, which are summarised in Table 2 and described in detail below.

Metaphor as communicative tool

Ubiquity of use

All participants described the ubiquity of metaphor use in chronic pain consultations, reporting that most, if not all, of their patients utilised metaphor to describe their pain. The difficulty of communication without metaphor was reported, as well as the unfeasibility of using a "checklist" of pain descriptors, instead of open-ended questions through which metaphors arise (R6).

Understanding and empathy

Metaphors were described as a way to get an understanding and sense of the person's individual chronic pain experience. They made it more relatable and let clinicians feel "like I know them better if they use this language" (R12). This "richer view" (R1) and understanding paved the way for sympathy and empathy.

Belief

Numerous participants reported they felt that metaphor use may be a way for patients to "concretise the pain" (R18) and communicate their suffering in the face of potential disbelief. Strong or multiple metaphors was seen as a way for patients to ensure the clinician believed their experience was valid and real.

Table 2

Themes, sub themes, and example participant quotations

Theme	Sub theme	Example participant quotations
Metaphor as communicative tool	Ubiquity of use	“I think that pretty much every single patient uses metaphors to describe their pain… it’s you know, such an individual experience and I think that it’s really hard to put in non-metaphorical terms.” (R10) “Oh I’ll say first of all, patients always, you said *if* your patient uses a metaphor. All patients use metaphors.” (R6)
	Understanding and empathy	“Some of it can make it more relatable, umm, as a human being…” (R2) “I mean I think that the countertransference would be empathy whichever descriptions they use…you get a bit of a sense of what’s going on for someone…” (R1)
	Belief	“…people using a lot of metaphors repeatedly might give me an indication of whether they feel that they’ve been believed, I guess, in terms of their pain in the past…trying to I guess be as accurate as they possibly can, about what it is they’re experiencing so that, me as a practitioner, understands or gets it, that they’re not making it up or it’s not an experience that’s not valid or real.” (R1) “They’ve learnt… that they’ve got to use this strong language to get the message across.” (R13)
Metaphor as clue	Always helpful to clinician	“No I think it's always like it's their experience of their pain so they describe or whatever metaphors or language they use I think that says something to me. I don't think it's ever unhelpful.” (R4) “Yeah, so I reckon metaphors are never unhelpful to the clinician but often unhelpful to the patient.” (R12)”
	Pain type	“It gives me an indication of whether or not we're talking about visceral pain or neuropathic pain…and therefore what sort of treatment we should be aiming at.” (R3) “Their metaphors are very helpful, but that quality is a bit of a point towards neuropathic syndrome and severe neuropathic pain like CRPS [complex regional pain syndrome] where people will talk about the hot and cold and…they’ll talk about a dead limb or you know, things that are actually quite evocative and that is helpful in terms of making a diagnosis.” (R18)
	Pain intensity	“I think it's not about intensity, but it's about distress…” (R3) “…pain intensity is only useful for people to share in a way that’s meaningful for them” (R7), “metaphors in my experience are more about the quality of the pain rather than the intensity” (R12) “Sometimes if the metaphor is particularly vivid or elaborate” (R14)
	Psychopathology	“Others use metaphors on the consequences of the pain to them and that's where you're getting clues into their self-efficacy...their catastrophizing.” (R6) “If they're using… metaphors to indicate helplessness then it really highlights either potentially depression or certain parts of catastrophizing” (R9)
	Reflects pain understanding	“It also gives you an idea of their understanding or lack of understanding about the underlying pathophysiological processes… you get a bit of a picture of where they’re at through the use of metaphor.” (R18), “…it could correlate with their beliefs and their understanding about their pain, what’s happening in their body…” (R13)
Metaphor as obstacle	Barriers to metaphor use	“I'm sure people differ in their capacity, in their tendency or capacity to use metaphors.” (R18) “…if it's just a constant barrage of huge metaphors perhaps I might get a little frustrated if I'm trying to reassure them…” (R9) “…but just the ones who are always constantly ringing up with these use of metaphors, you know flowery sort of language, you sometimes get a bit sort of ‘oh here we go again,’ but I know we shouldn't…” (R16)
	Unhelpful metaphors	“…if they're using ones that are scary and that are inaccurate then I think they’re very unhelpful and they can really ramp up their, you know, fear of movement, fear of doing anything and I think also latching onto a health professional’s metaphor

		that the health professional may have just said on a whim, but they've held on." (R9) "It can lend itself towards a more catastrophic interpretation of what's happening." (R13)
	Fixation	"…it's such a deeply entrenched idea and you're not able to engage it in a positive way and they keep coming back to it repetitively instead of being able to view the metaphor as an opportunity rather than this is set in stone as the metaphor and not able to shift it. I think when a metaphor is kind of fluid, then that's a wonderful opportunity. Where it's fixed and engrained and it's hard to shift then that's where the challenge arises." (R8)
Metaphor use in treatment	Clinician metaphors	"I talk about the nervous system being like an amplifier and how again the volumes turned up and I say it often and I talk about the pain superhighway to the brain as I said. I talk about a stormy sea and needing to settle using medication, settle the waves down so that we can make some progress because they're tossed about in this stormy sea of pain and distress." (R18)
	Informing pain education	"…if it does inform the sort of pain the person is experiencing and umm it will direct a bit in terms of the education or how I would structure the education perhaps that I would give them regarding what's going on in terms of pain…" (R1) "…it would prompt me I think to ask more directly about those things and therefore hopefully provide some direct treatment to either you know make those more accurate…" (R13)
	Rapport Building	"It just tells me that there is some kind of therapeutic relationship developing and that the patient trusts you to share those metaphors which sometimes can be quite personal." (R8) "It can be very validating so that often I think if we, in a very clinical setting metaphors can be a bit, they can be ignored and I think that in a way might be an invalidating experience for the client, so I think being able to hear the metaphor and have them elaborate on the metaphor, I think validates in some ways their experience which is always helpful for counselling." (R14)
	Utilising patient's own metaphors	"Yeah I think you can use it as an outcome measure first of all in terms of instead of going what's your pain like, you can ask them how the riverbed's flowing." (R8) "…so I suppose it would be best to resort to explaining it in the metaphor that they've used…" (R2)
	Metaphor as target	"One thing that I sometimes do with clients is I'll talk to them about the idea that you know, it's okay to imagine pain as a certain metaphor. For example the one that I use is the idea of, if they talk to me about like it feels to me like a saw or a cutting sensation I'll say to them 'well okay lets imagine the pain to be slightly different to that; rather than a saw made out of metal with hard teeth, let's imagine the saw to be made out of say rubber or plastic' and slowly by degrees change the way of thinking, rather than substitute the metaphor completely with something they can't relate to at all. So I'm always cautious as to not invalidating or changing their metaphor completely so it doesn't make sense, but using it and maybe thinking about how you can slightly tweak it so it's more helpful." (R14)

Metaphor as clue

Always helpful to clinician

Participants felt that metaphor use was always helpful, whether this was due to increased understanding, rapport, or the various insights they may give into aspects such as patient functioning and pain type. Even if a metaphor was judged unhelpful to the patient, it still presented valuable information for the clinician.

Pain Type

Although not diagnostic in and of themselves, metaphors were described as containing clues which may point towards various pain conditions. This was most evident for assessing neuropathic pain, where participants felt that descriptors such as heat, electricity, shooting, or dysesthesia could indicate its presence. Other pain types included whether pain was inflammatory or pointed towards complex regional pain syndrome (CRPS) with evocative metaphors of distance, temperature, or a "dead limb" (R18).

Pain intensity

The majority of participants reported that metaphors were not helpful for assessing pain intensity, due to the highly personal nature of metaphors, with similar metaphors indicating significantly different intensities to individuals. However, a few participants noted that particularly strong or unusual metaphors may indicate greater pain intensity.

Psychopathology

Contrary to pain intensity, metaphors were viewed by most as a window into how patients were coping with the pain, with only one participant reporting they did not use metaphors as an indicator of psychosocial factors, utilising questionnaires instead. Others saw certain metaphors as indicators of distress, helplessness, “emotional attachment to pain” (R8), depression, anxiety, and low self-efficacy.

Reflects pain understanding

Several participants spoke of patient’s metaphorical descriptions potentially reflecting their understanding of and beliefs about their pain, their “cognitive interpretations of what’s going on in their body” (R13). Metaphors may reflect fear of movement and help explain why people behave in certain ways, potentially due to “lack of understanding about the underlying pathophysiological processes” (R18).

Metaphor as obstacle

Barriers to metaphor use

Participants spoke of several barriers which may hinder patient’s use of metaphor to communicate or render it disadvantageous to them. This included times when clinicians were unable to fully understand the metaphor’s meaning or when patients were less articulate. Culturally and linguistically diverse patients may have difficulty using metaphors in English or use them in ways that are less interpretable to the clinician. Lastly, although most participants reported that patient metaphor use did not affect their perception of the patient, a few participants indicated that metaphor use may lead to feelings of irritation or frustration and generate “a sort of negativity towards them” (R16).

Unhelpful metaphors

The majority of participants described how certain metaphors may be unhelpful to the patient, reflecting poor pain understanding or contributing to catastrophic thinking about pain. At times these unhelpful metaphors were initially provided by a prior health professional. Examples of unhelpful metaphors included “crumbling spine” (R3), “wobbly bones” (R9), or being like a “broken vase” (R14) and these would often negatively impact patient’s behaviour.

Fixation

Several participants described the potential for patients to be fixated by certain pain metaphors, becoming fused with the metaphor so strongly it “became part of their identity” (R3). These metaphors may reflect poor pain understanding and may be so fixed that they hinder progress in treatment.

Metaphor use in treatment

Clinician metaphors

Participants spoke of the metaphors they themselves used to communicate pain concepts to patients. This was seen as more efficacious than using medical terminology. Examples included metaphors for hypersensitivity, procedures, and the nervous system.

Informing pain education

Just as patient metaphor use may reflect their understanding of pain, it can also inform the type and structure of pain education given by clinicians. Participants described using the patient’s metaphors as a springboard to lead into relevant pain education or to correct the false beliefs about pain held in the metaphor.

Rapport building

Participants frequently spoke of metaphor use as a way to build rapport with the patient. The initial sharing of metaphors may reflect trust of the clinician, whilst acknowledgement, validation, and engagement with the metaphor may build rapport, with the patient feeling as though they have been heard.

Utilising patients own metaphors

Participants often used patient metaphors in treatment as it “makes sense to them and allows the conversation to be more relevant” (R14). The most common way to use them was as their own personal outcome measure, for example if a patient described their pain making their body feel like a “dried riverbed” (R8), the clinician could assess progress via how much water was running through it.

Metaphor as target

In a few cases, a patient’s metaphor was described as a potential treatment target itself, which could be manipulated and adapted to be more helpful. As one participant put it, “changing the metaphor itself is powerful because of the intrinsic power of the metaphor for them. It underpins their, not just this, but as an example their confidence to move or behave in a certain way. So if you shift that metaphor…it can also contribute to their attitudes and beliefs and therefore also contribute to their behaviour and their movement as well” (R8).

5.6 Discussion

This study explored health professional's experience of metaphor in chronic pain consultations. Metaphor was found to be an important component of these consultations and four key themes were identified: Metaphor as communicative tool, Metaphor as clue, Metaphor as obstacle, and Metaphor use in treatment.

Although metaphor was seen by clinicians as an important communicative tool for patients, it is notable its use was described as having both positive and negative effects. Metaphor use engendered understanding and empathy from clinicians, through giving them a sense of the lived experience of the person with chronic pain, as well as building rapport. This may reflect the process described by Semino (2010) who theorised that certain metaphorical descriptions of chronic pain may provide the basis for an empathic response through an internal embodied simulation of pain experiences. Metaphor also functioned to bridge the gap between private, unmeasurable by objective standards sensations and the outer world in order to illustrate the validity and reality of pain. This need to be believed by individuals with pain is consistent with the literature, which has often found that patients feel disbelieved and dismissed (Upshur et al., 2010).

On the other hand, metaphor use was occasionally perceived to be disadvantageous for patients, leading to negative reactions, reflecting a catastrophic cognitive style and hindering treatment progress. Although not a commonly reported experience, a minority of the clinician sample spoke of irritation, frustration or general feelings of negativity towards patients using them (although this was accompanied by recognition that this was unempathetic). Most participants were of the opinion that patient metaphor use was simply data to use, and that they had in a way become desensitised to it. This result may be because our sample were individuals who had chosen to work in the chronic pain field, often for a long time – clinicians outside of this field (such as primary care providers) may have different reactions when interpreting a metaphor. In fact, one participant reported that “I think a lot of medical professionals would tend to ignore the metaphor” (R14). Worryingly, several participants spoke of patients who had been given an unhelpful metaphor by a previous clinician, for example being told they had a “crumbling spine,” a powerful image they had held onto and which then negatively influenced their beliefs and behaviour. Just as Sontag (1978) criticised the broad militarisation of metaphors of illness, individual metaphors supplied by clinicians can also be harmful to patients. Unhelpful metaphors, particularly those framed through viewing the body as machine, can lend themselves to misinterpretation and fail those with chronic pain, who may continue to search for a fix for something ‘broken’(Loftus, 2011; Stewart, 2014). Fixation on these unhelpful metaphors may also contribute to catastrophising and stall treatment progress.

Patient-clinician communication is vital, as it has been found that patient history reports lead to diagnosis 78.58% of the time, compared to physical examination (8.17%) and investigations (13.27%) (Roshan & Rao, 2000). In a similar way, this study found that participants utilised the rich information contained in metaphors to inform their judgments on pain type, psychopathology and the patients understanding of pain. The fact that pain metaphors may reflect diagnostic group has been demonstrated previously, although this effect was not found for mood

(Munday, Kneebone, Rogers, et al., 2021). This was most clearly evident for neuropathic pain, with many participants speaking of metaphorical descriptions similar to those found in the Leeds Assessment of Neuropathic Symptoms and Signs (LANSS; Bennett, 2001). Participants appeared to clearly view metaphorical descriptions of burning, electricity, and pins and needles as indicative of neuropathic pain. Conditions such as CRPS were also described as having distinctive metaphorical descriptors, in line with previous research (Frettlöh et al., 2006; Munday, Kneebone, Rogers, et al., 2021). Further, participants reported that patient metaphors gave them insights into how that person was coping with pain, in terms of distress, anxiety, or depression levels.

Due to its individuality and personal nature, participants did not view metaphor as a useful gauge of pain intensity. This view is echoed in previous research on pain descriptors, which found large amounts of variation in how people ranked them on a 0-100mm visual analogue scale, as well as research which found no significant associations between pain metaphors and pain intensity (Munday, Kneebone, Rogers, et al., 2021; Schlaeger et al., 2020). Although metaphor could not reliably inform pain intensity, it could be used as a personal outcome scale to assess treatment progress, often in quite personally relevant and creative ways. It could also be used to gauge a patient's understanding of their pain and thus tailor pain education to address incorrect or unhelpful pain beliefs. This utilisation of metaphor in treatment was found to be common, as was clinicians using their own metaphors to explain pain concepts. However, few participants went further in terms of treating the metaphor itself as a target of intervention. If, as Lakoff and Johnson (1980) assert, metaphors are powerful conceptual tools capable of shaping reality, it follows that targeting and changing maladaptive pain metaphors themselves may be of use. Indeed, participants spoke of metaphors reflecting and underpinning patient’s erroneous beliefs about pain, undermining their confidence to move and progress, and possessing significant power. The potential underutilisation of metaphor in the treatment, rather than assessment phase, may highlight a lack of knowledge, or as one participant remarked “…I don’t know how much in, across all the health professionals that we are, medicine, nursing, allied health – how much education we get in harnessing the use of metaphor to better understand, but also I think more importantly, how we can use those as tools” (R6).

Study Limitations and Future Directions

The sample were predominantly White, with the discipline of physiotherapy being represented more than other clinician groups. Whether or not these results would reflect the experiences of non-white medically trained individuals remains to be seen. The effect of culture and training in the Australian health care system also limits generalisability, as other cultures may have different views of pain (Peacock & Patel, 2008). Lastly, the follow up prompts used in the interview may have influenced results, however they were considered necessary to facilitate discussion of this novel topic.

Education as to “how we can harness use of metaphor bilaterally to get the best outcomes for patients” is important (R6). Future research is needed to identify the most effective ways to harness metaphors for benefit in clinical settings, for instance targeting metaphors as part of intervention.

Conclusions

The results of this study demonstrate that clinicians both expect patients to utilise metaphor and are able to use them to provide insight into pain type, psychopathology, and pain understanding. They also use metaphor themselves to assess progress in treatment and tailor pain education. These results suggest that clinicians should routinely encourage patients to utilise metaphor in describing their pain experience, through questions such as “Describe to me what your pain feels like.” This can not only yield useful clinical information, but may also function to address the invalidation and feelings of disbelief many patients with chronic pain report (Munday, Kneebone, & Newton-John, 2021; Upshur et al., 2010) The role of metaphor in treatment may also be underutilised, with clinicians unsure of how best to translate metaphor into clinical utility.

6. DISCUSSION AND IMPLICATIONS

This thesis consisted of an exploration into how people with chronic pain use language to describe their pain experiences, a systematic analysis of the conceptual metaphor source domains most frequently used by patients, statistical analysis of the associations between metaphor source domains and pain diagnosis, mood, and functioning, and lastly, an examination of clinician experience of metaphor in chronic pain consultations. Chronic pain is highly prevalent and potentially devastating to quality of life, but despite advances in diagnostic imaging and tools, diagnosis and treatment rely heavily on a patient's ability to describe their experience. However, patient use of pain language has been little studied.

This chapter synthesises the results of the empirical studies presented in Chapters 2–5 and discuss the implications for clinical practice and research. The strengths and limitations of the thesis are also discussed.

6.1 Metaphors for Chronic Pain: Frequency, Diversity, and Complexity

Frequency of Metaphor

The high frequency rate of metaphor use has been demonstrated throughout this thesis, which found that the metaphorical description of the chronic pain experience underpins communication about pain. This ubiquity was noted in Study 4 by clinicians working in the field of chronic pain; all the clinicians interviewed referred in some way to the idea that "all patients use metaphors" (R6). In Study 1 of this thesis, all focus group participants used metaphor in some form to describe and convey the experience of their chronic pain. In the online survey-based study (Studies 2 and 3), 89% of the respondents reported using metaphor to describe their pain. It should be noted that this number did not account for people who may have used metaphor to describe aspects of the pain experience outside of pain description such as social isolation. This frequency of use is consistent with that reported in previous research on pain description, such as the study by Hearn et al. (2016), who found that 15 of 16 participants interviewed used metaphor to describe their pain, even though metaphor was not explicitly mentioned or asked about.

Participants also used multiple distinct source domains when describing their pain, and their scores ranged from 0 to 13, with an average of 5, in the online survey conducted as part of Studies 2 and 3. Female participants wrote longer responses and used more source domains than male participants. These results echoed previous research that found that women wrote more words and used more metaphors than men (Hearn et al., 2016; Strong et al., 2009).

Stemming from its frequency of use, metaphor thus appears to be an important tool for people living with persistent pain and is a tool they use consistently in daily communication. Participants in Study 1 spoke about the difficulty in describing chronic pain, and metaphor may be one way of overcoming this difficulty. This is at odds with the findings of Scarry (1987), who asserted that “Physical pain does not simply resist language but actively destroys it” (p. 4). The results of this thesis suggest that, when given the opportunity, patients can and will speak actively and openly about their pain. This echoes the view of Sullivan (1995) that "Pain generally drives us to language*"* (p. 10).

Diversity and Complexity of Metaphor

This thesis adds to the body of work suggesting that language use in chronic pain is diverse, complex, and multidimensional. The findings move away from the single-word paradigm of the MPQ towards a more complex metaphorical description and narrative. Moving from a small sample of 16 in Study 1 to the larger survey sample of 247 in Studies 2 and 3 uncovered a wider variety of metaphor source domains. For example, although no participants used a metaphor pertaining to cold temperature in Study 1, 7.3% of participants in the larger sample used this source domain. On the other hand, source domains that were small in the larger sample, for example, *Childbirth and Pregnancy* (2%) were also mentioned in the focus groups. These results suggest that metaphors are highly personal and illustrate the need for larger sample sizes to identify a fuller spectrum of source domains. The sample size of 247 uncovered 22 distinct source domains, and it is possible that an even larger sample would uncover a wider variety of metaphors.

Of the 247 participants in the online survey study, 11 participants (4.5%) responded with single-word descriptors in lieu of more complex metaphors. These single-word descriptors included adjectives found in the MPQ, such as shooting, throbbing, stabbing, aching, tiring, itchy, exhausting, and cramping. However, only a minority of participants relied on these types of descriptors. Throughout this thesis research, the overwhelming majority of participants provided rich and detailed metaphorical descriptions of their pain. Such vivid descriptions support the criticism of the MPQ that it reduces these to single words that may not necessarily be sufficient to capture the chronic pain experience.

6.2 The Causes of Physical Damage Source Domain

By far the most prevalent source domain found in this thesis was the overarching *Causes of Physical Damage*. Eighty-five per cent of the survey sample in Studies 2 and 3 used at least one metaphor from this source domain. The next most prevalent source domains in the survey were *Common Pain Experiences* and *Electricity,* (each used by 17% of the sample). Thematic analysis in Study 1 revealed several themes and subthemes that could also appropriately be incorporated into this source domain. These include weight and size, temperature, piercing, and pain personified as an adversary. In addition, 14 of the 16 (88%) focus group participants used a metaphor relating to physical damage; this rate was similar to that found in the larger sample. Although the type or cause of damage widened with a larger sample size, the overarching domain use remained similar.

Other studies looking at metaphor use in chronic pain populations have also found evidence of use of the *Causes of Physical Damage* source domain in English for describing neuropathic pain and endometriosis (Bullo, 2020; Bullo & Hearn, 2021; Hearn et al., 2016) and in Farsi for describing chronic musculoskeletal pain (Raiisi, 2021). The latter study found that patients most commonly spoke of their pain using the source domains of object (e.g. *ostokhanam ra khanjar mizanand*; pain is an object that seems to stab me in the bone), causation (e.g. *anghoshtam yakh zade*;

pain causes my fingers to feel as if they are frozen), and human, where pain is referenced as a human who kills and destroys. These three source domains accounted for two-thirds of the metaphors provided and could theoretically come under the *Causes of Physical Damage* source domain.

These results provide strong support for the argument of Semino (2010) that chronic pain description is predominantly via metaphors that refer to acute damage to the body. The reason for such dominance may be partly the ability of these metaphors to facilitate an embodied simulation of pain for the listener. Research has demonstrated that parts of the neural network responsible for the representation of painful experiences can become active when a person experiences pain and when they observe another person in a painful situation or even in response to pain-evoking onomatopoeic words (Osaka et al., 2004; Singer et al., 2004). The parts of the neural network activated in these studies were those linked with the affective qualities of pain (the bilateral anterior insula and the rostral anterior cingulate cortex). Other research has found mirroring effects in the sensorimotor areas responsible for signifying the intensity and localisation of painful experiences (Avenanti et al., 2005). Research also shows that the amount of neural activation correlates with empathic tendencies and ratings of pain intensity for the observed other in pain (Avenanti et al., 2005; Jackson et al., 2005; Roche & Harmon, 2017; Singer et al., 2004). Therefore, such activation when faced with the pain of others or with linguistic descriptors of pain that evoke physical damage (e.g. ‘kiri-kiri’ a stabbing type pain word used by Osaka et al. 2004) may lead to a sort of internal simulation, which may act as the base for an empathic response to another person’s pain (Semino, 2010). Although this process does not account for all aspects of the reaction one might have to another's pain, which can depend on a complex interplay of multiple factors, it is nonetheless an important phenomenon (Semino, 2010).

6.3 Metaphor: More Help than Harm?

According to CMT, metaphor is a powerful conceptual tool and is pervasive and inherent in everyday thought and language. This thesis research has demonstrated the ubiquity of its use in populations with heterogeneous chronic pain, as well as its potential utility both for patients and in communication about chronic pain. However, the potential for harm arising from the patient's use of metaphor should be considered carefully.

Metaphor Utility for Patients

Although the participants in this thesis research often remarked on the difficulty in describing pain, the vast majority were able to use metaphor to express their pain experience. Being able to express pain through metaphor may lead to a sense of emotional relief for people with chronic pain (Stewart & Ryan, 2020). In a study of the use of metaphors in accounts of addiction experience, Shinebourne and Smith (2010) described metaphor as a "safe bridge" that can enable people to communicate indirectly emotions that may be too painful or distressing to express directly.

Certain metaphors can also function to externalise pain, particularly in the case of the *Pain Personified* (as an adversary, as external to self) theme in Study 1 and the 'Causes of Physical Damage via Embodied Other' source domain of Studies 2 and 3.

Throughout this thesis research, patients often described their pain as either something external to the self or as an entity capable of harming the individual. This externalisation of pain as an attacker is consistent with findings of previous research on pain description described earlier (Bullo, 2018; Hearn et al., 2016; Lascaratou, 2007) and addiction metaphors, in which alcohol and drugs are described as "poison", "demons", and "wild animals" (Shinebourne & Smith, 2010). Externalisation of pain via metaphor may represent a coping strategy that functions to make a problem more controllable by locating it outside the self. The personification of pain may also function as a way of linguistically separating pain from a healthy, preferred self (Osborn & Smith, 2006). Osborn and Smith (2006) suggest that persistent pain facilitates a large disruption to the everyday experience of the body and, in effect, changes the relationship between the individual and their body by bringing painful parts into awareness. Describing pain in a way that implies it is something separate to a person's self-concept may preserve a valued self. However, it may also obstruct the processes of rehabilitation or adjustment because of the identification of a painful body with alienation and exclusion from their self-concept, rather than integration and acceptance. In this way, pain may also come to be linked to these negative aspects of the self (Osborn & Smith, 2006).

Lastly, metaphor may elicit understanding in others. For example, the clinicians included in this research felt they could relate to and understand the experience of the person in pain when they use metaphor, as exemplified in the theme *Metaphor as Communicative Tool – Understanding and Empathy* in Study 4. This may be accomplished via the process described above for *Causes of Physical Damage* metaphors. Another way metaphor can facilitate understanding and empathy is through the comparison of chronic pain with acute pain experiences the listener could have experienced previously, such as common injuries and illnesses. This tendency is demonstrated in the theme *Making Pain Relatable* in Study 1 and the source domain *Common Pain Experiences* in Studies 2 and 3. Communicating pain in such a way may be evolutionarily advantageous because of the potential responses by observers that pain communication provokes, namely assistance, care, and treatment (Steinkopf, 2016). Engendering empathy in health practitioners may also lead to placebo responses, where empathic communication can decrease anxiety and negative mood, and improve patient satisfaction (van Osch et al., 2017).

One obvious caveat to the helpful effects of metaphor for pain communication is that the metaphor must be used effectively (Schott, 2004). Children may be able to process metaphor only after age 7 years (Bieri et al., 1990), whereas those with cognitive difficulties, aphasia, or intellectual impairment may not be able to use metaphor effectively. Cultural considerations also play a role; for example, in one study of how older adults describe chronic pain, the authors found that Chinese participants who had English as their second language were more prone to use a 0–10 pain-rating score than were Caucasian participants who evinced a general preference to describe pain verbally (Clarke et al., 2012).

Clinical Utility of Metaphor

Study 3 highlights the wealth of information contained within the metaphors people use to describe their pain. This information may be of clinical utility; for example, the clinicians who participated in Study 4 spoke of the ways metaphor informed their assessment and treatment of people with chronic pain.

Linguistic indicators have been found for pain catastrophising (Junghaenel et al., 2017), differentiating healthcare super-utilisers (defined as > 6 emergency visits per year) (Guntuku et al., 2021), and depression (Al-Mosaiwi & Johnstone, 2018). Natural language-processing tools can successfully classify patients with Alzheimer's disease and predicting psychosis (Clarke et al., 2020; Corcoran et al., 2018). A recent study of the language profiles of patients with chronic back pain found that, using only language features, placebo responders could be distinguished from non-responders with 79% accuracy (Berger et al., 2021). That study also found that several language subsets (semantic distances to concepts of stigma and identity, and number of achievement-related words) explained 46% of the variance in placebo analgesia and that this type of analysis may provide a way to measure the analgesic potential of a placebo. The authors concluded that language features may deliver greater explanatory power to self-report scores and may also identify added information lost using standardised tests. In a similar fashion, the results of this thesis suggest that the metaphors people use to describe their pain may provide additional information that may complement and enhance that given by standardised pain assessment measures.

This thesis found evidence of significantly increased odds of use of specific metaphor source domains for certain diagnostic groups and pain interference levels. This evidence suggests that the metaphorical language a person uses may indicate both their diagnostic group and the extent to which pain affects their life. The diagnostic groups with significant metaphoric linguistic indicators were patients with endometriosis, CRPS, neuropathic pain, or hypermobility. Self-reported diagnosis of endometriosis was associated with increased odds of use of the following source domains: *Childbirth and Pregnancy, Physical Damage via Sharp Object*, *via Pulling/rubbing/tearing* and *via Bruise/fracture/dislocation.* A reported diagnosis of CRPS was associated with increased odds of use of the following source domains: *Bodily Misperception, Physical Damage via Temperature* (including all of its subdomains: Cold, Hot, and Hot–Cold), and *Childbirth and Pregnancy.* A reported diagnosis of neuropathic pain was associated with increased odds of use of the following source domains: *Physical Damage via Sharp Object, Temperature* (including all of its subdomains: Cold, Hot, and Hot–Cold), and *Physical Attack,* notably via an *Embodied Other.* Lastly, self-report of hypermobility was associated with increased odds of use of the *Physical Damage via Blunt Object* source domain. These results may be indicative of the symptoms of these conditions, for example the skin temperature changes or the neglect-like syndrome found in CRPS (Bruehl et al., 2016; Halicka et al., 2020). They may also describe the quality of the pain felt or reflect underlying psychological coping strategies such as the externalisation of pain.

Awareness of the metaphors used by specific diagnostic groups may provide valuable information for clinicians and may aid in the diagnosis of particular conditions. BPI Interference scores were associated with increased odds of using the *Death and Mortality* metaphor source domain and the *Physical Damage via Sharp Object* source domain. Use of these metaphors may give insight into how people are coping with their pain in terms of interference with daily activities. However, the BPI Pain Intensity and DASS-21 scores were not significantly associated with increased odds of use of any metaphor source domains, which suggests that metaphor source domains are unlikely to be a useful indicator of pain intensity or mood.

The results from Study 4 indicate that clinicians informally use the information contained in metaphor. For example, clinicians reported that patient metaphors were "always helpful to them", even when they didn't consider them helpful to the person in pain. This was because these metaphors can provide clues into the pain type, in particular neuropathic pain or CRPS, as well as offer insight into the patient's understanding of pain and the potential psychopathology. In line with our findings from Study 3, clinicians primarily agreed that pain metaphors are not a useful gauge of pain intensity. In terms of treatment applicability, clinicians were able to use patient metaphors as personalised treatment progress scales, tailor pain education according to them, and at times target the metaphors themselves.

Metaphor's Potential for Harm

There is a long history of criticism of metaphor in healthcare settings (Sontag, 1978; Stewart, 2014). Sontag's seminal book *Illness as Metaphor* argued that metaphors may not be helpful to patients but harmful in so far as they place the blame for illness on patients themselves, in effect shaming and silencing them. Her solution was to remove metaphor from the discourse on disease completely (Sontag, 1978). However, although acknowledging the significance of this work in raising awareness of the importance of language in the illness experience, Clow (2001) highlights the lack of systematic research involved in it, as well as the fact that metaphor does not necessarily render people with pain helpless and may, in fact, help patients and their families to cope with disease. The military or fighting style of metaphor, for example where cancer is presented as a battle to fight against, has been criticised because of the implied meaning of treatment at all costs as well as the possibility that patients suppress their emotional distress to evince a positive fighting spirit (Byrne et al., 2002).

In terms of pain, it has been argued that metaphors may be prone to oversimplification and hence misinterpretation (Stewart, 2014). Research has also considered that patients in pain and health professionals may speak different metaphoric languages. Using concordance-based language analysis of 373 consultations of 40 UK general practitioners, Skelton et al. (2002) found that doctors and patients use different metaphors. Doctors use mechanical metaphors for disease such as “the body is a machine”, whereas patients used a range of evocative metaphors but fewer machine and problem/solution metaphors. This was reflected in the thesis findings, which provided little evidence of mechanistic metaphors being used by patients in favour of evocative metaphors such as describing pain as physical damage.

The issue of credibility is critical in chronic pain consultations, given the aforementioned difficulties in objective pain assessment. Lacking contextual cues, such as an open wound that lends credibility to pain, people with chronic pain are faced with the difficulty of rendering their pain legitimate (Tait et al., 2009). Often, they experience feelings of invalidation, which may affect pain-related impairment (Wernicke et al., 2017). Patient presentation has a significant effect on outcomes.

For example, a study of “histrionic” vs “business-like” patients complaining of chest pain found that only 13% of physicians suspected a cardiac cause when viewing the histrionic patient compared with 50% for the business-like patient. Physicians were also much less likely to pursue a cardiac workup for histrionic patients, despite making similar risk appraisals after reviewing the laboratory data (Birdwell et al., 1993).

A study of chronic pain found that the implicit dialogue between doctors and patients with chronic pain appears to challenge each party’s credibility and cause distress to both patients and doctors (Kenny, 2004). Patients felt invested in a biogenic stance, as their “credibility as legitimate patients rested on the need to find a physical cause for their pain” (Kenny, 2004, p. 300), and physicians felt the need to shift patients to a psychogenic position by highlighting the importance of psychosocial factors in the development and maintenance of chronic pain when no further medical tests or treatments were available.

The issue of credibility is particularly pertinent for women, who face additional challenges when communicating pain to healthcare providers (Frantsve & Kerns, 2007). An in-depth qualitative study of 10 women with chronic pain found that women invested a lot of work, time, and energy both before and during medical encounters to be perceived as a credible patient (Werner & Malterud, 2003). These women used strategies such as appropriate assertiveness, surrendering, and appearance as they attempted to “fit in with normative, biomedical expectations of what was ‘just right’” (Werner & Malterud, 2003, p. 1412) and metaphorically described their medical encounters as akin to a legal court case, viewing them as "credibility tests." Most of the sample in Studies 2 and 3 were women, which makes these issues particularly relevant to this thesis.

This thesis demonstrates that patients use a wide range of metaphors in pain description and that these metaphors are often evocative and complex. Skelton et al. (2002) posits that rendering problems more graphically may spring from a desire to legitimise and give credibility to the presence of the patient in the doctor's surgery, as well as being an attempt to articulate difficult sensations. However, these evocative metaphors may, in some cases, contribute to catastrophising and work to undermine patients' credibility in the eyes of healthcare professionals, who may think the patients are exaggerating and would therefore be more prone to dismiss the patients' concerns. As Craig (2009) notes, patients who dramatise their pain through language risk being characterised as faking or malingering. The patients who participated in this thesis research frequently spoke of feeling disbelieved by health professionals, and the clinicians interviewed in Study 4 also referred to their patients' feelings of not being believed by previous health professionals. Research supports this idea by showing frequent underestimation of pain by healthcare professionals and patients' qualitative experiences of being doubted (Munday, Kneebone, & Newton-John, 2021; Upshur et al., 2010). One participant in the online survey (Studies 2–3) expounded that, "You will never know frustration like someone with chronic pain seeing a doctor who thinks all chronic pain patients are addicts and drug seekers." The impact this belief can have on patients is significant and includes the perpetuation of stigma, experience of isolation, and increased emotional distress such as guilt, anger, or depression (Newton et al., 2013).

In addition to potentially impacting credibility, the specific metaphors patients use to describe their pain may be harmful and maladaptive. That their metaphors may, at times, have been given to them by a health professional was a concern raised by several clinicians in Study 4. This is important because research shows that healthcare professionals have the strongest influence on patient attitudes and beliefs, and that information and advice continue to influence patient beliefs for many years and even single, off-hand statements can heavily influence recovery expectations (Darlow et al., 2013). Skelton et al. (2002) showed that healthcare practitioners primarily used metaphors of the body as a machine. This can present a problem in the context of chronic pain; that is, if patients believe their bodies are machine like, they may think that their pain should be able to be repaired, as well as reinforcing maladaptive beliefs about doing damage to the machine/body, which can cause more pain (Loftus, 2011). Thus, certain types of metaphors, either generated by the patient or given to them by a health professional, can have the potential for harm.

6.4 Pain's Impact on Life

In addition to the above findings, which focused specifically on the use metaphor by patients with chronic pain, the results of this thesis highlight the significant psychosocial impact that pain has on daily functioning. This was particularly evident in Study 1 where, in the open environment of focus groups, participants spoke predominantly of the psychosocial aspects of having chronic pain, such as becoming socially isolated and feelings of loss, more than describing their physical and sensory pain. In Study 2, despite having been asked about the explicit metaphors and descriptors used to describe their pain, many respondents nonetheless incorporated psychosocial aspects, such as social isolation, lowered self-esteem, and a loss of independence. Lastly, clinicians in Study 4 spoke of patients feeling disbelieved, helpless, and distressed.

Social Isolation

Social isolation was the principal topic of the focus groups conducted in Study 1. Participants spoke of the invisibility of pain, difficulties in expressing and describing pain, feelings of suffering alone and separation from others, and the sense of shame that exacerbated their isolation. These themes were echoed in responses to the online survey, in which participants wrote of feeling “invisible and misunderstood”, that “people judge you as pain is invisible”, that “you can’t explain it if you don’t have something like it”, and of “hibernation” in their home. The fact that these descriptions were provided despite the study explicitly asking for metaphorical pain descriptors only highlight how pervasive and personally important the socially isolating effects of pain can be.

Themes of social isolation have been reported consistently in the chronic pain literature (Breivik et al., 2006; Kugelmann, 1999; Thomas & Johnson, 2000). In a review of 68 studies, Dueñas et al. (2016) determined that chronic pain has significant consequences on patients’ social environments and can lead to deterioration in their quality of life. These consequences include restricted social contacts, reduced leisure activities, reduced family contact, and deterioration of existing interpersonal relationships because of negative emotions, irritability, and anger, as well as the additional burdens placed upon caregivers. Social isolation is also important because research has shown that people with high levels of social isolation have higher levels of pain interference and lower levels of physical function than those with low levels of social isolation (Karayannis et al., 2019). Additionally, low levels of social support predicted both pain and functional disability at the 3and 5-year follow-ups of patients with early rheumatoid arthritis (Evers et al., 2003).

Psychological Impact

Evident throughout this thesis was the psychological impact of pain. The theme *Pain as Overwhelming* in Study 1 describes the unrelenting nature of pain and the feelings of loss and ruin that accompany it. Participants spoke freely of the detrimental effects of pain on their mood, with some having experienced suicidal ideation. In addition to providing sensory pain metaphors, the responses to the online survey spoke of the pain being overwhelming, ruining, and unbearable, and described the participants' feelings of worthlessness, depression, and fear.

The effects of pain on mood are also reflected in the scores on the DASS-21 collected in the online survey. This tool measures levels of depression, anxiety, and stress. Good validity has been demonstrated in a chronic pain sample (Janotta et al., 2007) and Rasch analysis supports its use to measure mood in research into chronic low back pain (Parkitny et al., 2012). Participants in the online survey study had severity scores in the moderate range for depression, anxiety, and stress. These results are consistent with normative data for clinic populations with chronic pain, as derived from aggregating data from 12,343 heterogeneous patients from 36 specialist adult pain services, 35 in Australia and one in New Zealand (Nicholas et al., 2019).

Numerous pathways have been suggested to explain the high co-occurrence of depression and anxiety in chronic pain populations. A diathesis–stress model has been proposed, wherein diathesis represent pre-existing, semi-dormant characteristics of an individual preceding the chronic pain onset, which are later activated by the stressors associated with chronic pain, and ultimately lead to diagnosable psychopathology (Banks & Kerns, 1996; Dersh et al., 2002; Turk, 2002). Indirect, long-term nociceptive activation of the HPA axis may result in HPA dysfunction, which can be manifest as depressive symptoms (Blackburn-Munro & Blackburn-Munro, 2001). It has also been hypothesised that chronic pain may provoke anxiogenic effects via altering opioidergic functions in the amygdala that are considered critical for the regulation of anxiety (Narita et al., 2006). Further, it has been proposed that presynaptic long-term potentiation in the anterior cingulate cortex may trigger chronic anxiety in the context of chronic pain (Zhuo, 2016).

Metaphor and Pain's Impact on Life

It was interesting to note that, although the use of certain metaphor source domains was not significantly associated with scores on the DASS-21 or the Pain Intensity subscale of the BPI in Study 3, this was not the case for BPI Pain Interference scores. This subscale features seven items and asks the patient to circle the number that describes how pain in the past 24 hours has interfered with their general activity, mood, walking ability, normal work (both outside the home and housework), relations with other people, sleep, and enjoyment of life. This subscale is scored using a Likert scale of 0–10, with 0 indicating "does not interfere" and 10 "completely interferes." It thus provides a measure of how much pain interferes with and impacts various domains of daily life and functioning.

Higher BPI Interference scores were associated with increased odds of using the two source domains *Death and Mortality* and *Physical Damage via Sharp Object.* The evocative, sensory metaphors within these source domains may be capable of conveying the extent of pain's impact on life. In particular, use of an abstract domain (*Death and Mortality*) is highly unusual in CMT, which uses typically concrete source domains to facilitate understanding of the target domain (Kövecses, 2016). Before analysing any of the data, I posited in Study 2 that "It may be that their pain intensity was so great, they could only attempt to communicate it through death itself" (Munday et al., 2020, p. 826). This hypothesis was supported somewhat, only instead of being associated with pain intensity scores, the metaphors were associated with pain interference scores. It appears that metaphorically referencing death may be more indicative of the extent to which pain interferes and impacts upon people's lives.

Use of these source domains may also represent a form of linguistic catastrophising through vivid descriptors of pain such as "the pain in my head makes me feel like I am going to die, or that I want to die", "like someone is slashing my spinal cord with a razor", or "it feels like someone is stabbing my vagina from the inside and shooting bullets upwards into my cervix." These are arguably more evocative and intense than more straightforward descriptors of pain such as "aching" or "throbbing." Pain catastrophising has been researched extensively and is a predictor of pain-related outcomes including interference with activity and mood (Quartana et al., 2009). However, as described further in Section 6.6 (thesis limitations), this study did not include a measure of catastrophising.

6.5 Strengths

Uniqueness

A major strength of this thesis lies in its novelty. To my knowledge, this thesis research is the only quantitative exploration of a population with heterogenous chronic pain in terms of systematically analysing metaphor use. It is also the first to use inferential statistics to investigate how metaphor source domains or types are associated with factors such as diagnostic category, mood, and disability. This thesis comprises studies that draw on CMT, which is more commonly seen in cognitive linguistics studies, and applied it to an area of psychology and health.

Qualitative and Quantitative Methodologies

The mixed-methods approach of qualitative research methods integrated with rigorous quantitative methodology lends strength to the work as a whole. Studies 1 and 4 included qualitative focus groups and interviews, which produced a large amount of rich data and depth of content. However, by analysing data on metaphor source domains and potential associations quantitatively, the thesis was able to identify statistically significant results of potential clinical relevance and utility.

Sample Size

The results reported in Studies 2 and 3 were also drawn from a larger sample size compared with other studies of metaphor use in populations with specific chronic pain conditions. After applying the exclusion criteria, the sample size included 247 participants with chronic pain, which is higher than that included in other studies of metaphor use in endometriosis populations (N = 131, Bullo, 2020), (N = 21, Bullo & Hearn, 2021) and neuropathic pain populations (N = 16, Hearn et al., 2016).

6.6 Limitations

Sample Generalisability

Limits to generalisability apply to this thesis as a whole for several reasons. In the case of Studies 1 and 4, these arise naturally given the small sample sizes (N = 16, N = 18). However, even for Studies 2 and 3, which included a much larger sample, the results should also be interpreted cautiously. Across studies, most participants were White, well educated, predominantly female, and all participants were living in Australia. Caution should be exercised when generalising these findings to other populations, particularly as research has demonstrated the importance of language and culture in this area (Huh, 2015; Narayan, 2010; Peacock & Patel, 2008). Other studies have also found gender differences in pain description, that is, females use more metaphorical descriptors, MPQ descriptors, and graphical language than males

(Hearn et al., 2016; Strong et al., 2009). Lastly, as participants self-selected to complete the studies, an element of self-selection bias may have been introduced.

Chronic Pain and Diagnostic Group Status in Relation to Self-report

In contrast with Study 1, in which participants were drawn from an outpatient chronic pain management program at an established hospital, participants in Studies 2 and 3 self-reported their diagnosis of chronic pain in the online survey. They also self-reported their diagnostic category, such as endometriosis, CRPS, and other chronic pain conditions. I attempted to control for diagnosis accuracy by incorporating the question “Have you been diagnosed with chronic pain by a health professional?”, which removed 11 respondents from the analysis. However, information provided about the diagnosis could not be verified via objective means such as medical records or physical assessments.

Self-report Measures of Pain-related Disability and Mood

The reliance on self-report to obtain data about pain intensity and interference levels, and depression, anxiety, and stress is another limitation. This thesis research did not use objective measures of functioning or pain interference in daily activities, such as analgesic medication consumption, general practitioner visits for pain, or any physical function measures. Issues with self-report measures include the potential for bias in the form of socially desirable responding, acquiescent responding, and extreme responding, as well as the potential desire to respond to a questionnaire in a way that reinforces one’s self-view, rather than being necessarily being accurate

(Paulhus & Vazire, 2007). However, the measures used in this thesis (BPI, DASS-21) have been demonstrated to be valid and reliable, and have been used extensively in previous research. Additionally, self-report measures for pain and mood have typically been the accepted method in research, given the lack of objective measures in these areas. Significant associations between pain behaviour and self-report measures of pain intensity, pain disability, and self-efficacy have also been found, and these link self-report to explicit behaviour (McCahon et al., 2005).

Potential for Bias because of the Prompts Used

Prompts were included in all studies and may have biased the data and shaped the types of responses collected. For example, in Study 2 the word “metaphor” was defined and specific examples given (e.g. “It feels like a knife slicing into me”). However, given the novel topic of research, these prompts were deemed necessary to elicit responses and to avoid confusion. During the interviews and focus groups, prompts were primarily open ended to facilitate unbiased dialogue, and the example metaphors given in the survey were common ones, with which participants were likely familiar.

Lack of Inclusion of Pain Catastrophising

This thesis research did not include a measure of pain catastrophising, such as the Pain Catastrophizing Scale. As such, an opportunity to assess the relationship between metaphorical descriptions of pain and levels of pain catastrophising was missed. Pain catastrophising is linguistic based and has been demonstrated to be a core component of the chronic pain experience. Therefore, including it in this thesis may have yielded greater understanding of the role of this phenomenon in pain metaphor. Levels of catastrophising have been linked to pain intensity, disability, and mood (Severeijns et al., 2001). However, given that no significant associations were found between pain intensity or mood with certain metaphorical descriptors in this thesis, the incorporation of such a measure may not have yielded significant results.

6.7 Clinical Implications and Recommendations

A Holistic Approach – Interdisciplinary Treatment

Seen primarily in Study 1 and displayed in Studies 2–4 is clear evidence that, for people with chronic pain, the physical sensation of pain is only one part of their overall pain experience. Participants in Study 1 spoke primarily of the emotional and social effects of chronic pain and expounded on their sense of isolation, pain's invisibility, and the overwhelming emotional toll it took to live with. Although not included in the data analysis, a proportion of people in Studies 3 and 4, in addition to providing metaphors describing their pain, or instead of, spoke about the emotional and social effects of chronic pain, such as being disbelieved by health professionals and their negative affect. Lastly, in Study 4, clinicians saw certain metaphors as indicative of distress, depression, and anxiety among other factors. Taken together, these findings support the use of a holistic approach to treatment that includes input not just from pain specialists and physiotherapists, but also mental health specialists such as psychologists. In addition to medical issues, treatment should focus on the significant influence of psychological and social factors. Consistent with this, research states a biopsychosocial approach is crucial when trying to treat chronic pain (Hylands-White et al., 2017). Additionally, it has been argued that interdisciplinary rather than multidisciplinary treatment approaches provide the best path forward. Although the terms are often mistakenly used interchangeably, the interdisciplinary treatment approach, which “analyzes, synthesizes and harmonizes links between disciplines into a coordinated and coherent whole” differs from the multidisciplinary approach, which “draws on knowledge from different disciplines but stays within their boundaries” (Choi & Pak, 2006, p. 359). Interdisciplinary treatment can include tailoring programs to the patients, co-led sessions, team meetings, a coordinate assessment, and importantly, constant communication between the treatment team members (Gatchel et al., 2014; Giusti et al., 2017). Although multidisciplinary and interdisciplinary treatments can be considered as ends of a continuum, Giusti et al. (2017) posit that it is possible that “the more the perspectives of the various professionals are integrated, the more the patients are able to comprehend the complexity of their syndrome and can be conscious about how the different biological, psychological, and social factors affect its course” (p. 16). Given the complex biopsychosocial nature of chronic pain, interdisciplinary approaches are essential and likely to be more effective than serial multidisciplinary treatments or disparate care approaches, and may be more cost effective (Clark, 2000).

Education to Enhance Communication

Throughout this thesis, it is evident that people with chronic pain frequently use metaphor to describe their pain experience. Study 3 demonstrates that certain metaphorical descriptions of pain are linked to the diagnostic category and pain interference levels. Two clinical recommendations can be made about the education of health professionals, in particular clinicians who do not specialise in chronic pain, such as primary care providers. The first recommendation is to educate healthcare professionals about the potential of aspects such as the ubiquity of use and types of metaphorical descriptions used by people with chronic pain to reduce the risk of minimisation or dismissal. Awareness that metaphor is the primary way in which people with chronic pain communicate may reduce the instances of labelling patients using language such as exaggerating or histrionic. The second recommendation is to educate clinicians about how the valuable information contained in metaphors may improve communication and understanding, as well as aid in assessment, when used in conjunction with standardised measures and physical assessment. For example, this thesis has shown that the diagnostic categories of endometriosis, CRPS, and neuropathic pain have metaphorical linguistic markers associated with them. Being attuned to such markers may aid in the diagnosis of pain type, as shown by the several chronic pain specific clinicians articulated in Study 4. Metaphorical descriptors may also promote insight into psychopathology and pain understanding, as well as provide an opportunity to build rapport or provide a focus for discussion.

Use of Patient Metaphors in Treatment

Although more research into how best to apply metaphor for clinical utility in treatment settings is needed, this thesis points towards incorporating metaphor more broadly in this area. Psychological therapies such as ACT depend heavily on metaphors to explain concepts and to effect change, and studies such as the book of metaphors developed by Gallagher et al. (2013) have proven metaphor can be of clinical utility. However, this research is heavily weighted on use of metaphors by the clinician. For patients, a systematic review has shown that the use of metaphors may be valuable for people in pain (Stewart & Ryan, 2020), which suggests that people should be encouraged to speak freely about their pain experience using their own metaphors throughout treatment. Use of the patient’s own metaphors throughout treatment can increase rapport and lead to more personalised, relevant treatment for the patient, which in turn may increase their engagement and motivation. Additionally, as metaphors may also underpin and contribute to negative or incorrect beliefs about pain, it stands to reason that addressing a patient’s unhelpful or maladaptive metaphors directly in treatment may also be of benefit.

6.8 Future Research

This remains a relatively novel area of research, and there are many exciting avenues for future exploration. One potential area is to explore how pain metaphor use is tied to pain catastrophising, which has been demonstrated to be a core component of the chronic pain experience and to be associated with higher ratings of pain intensity and disability (Ogunlana et al., 2015). Junghaenel et al. (2017) established linguistic markers for pain catastrophising in the form of increased first-person singular pronouns, pronouns referencing other people, and use of sadness and anger words. It would be interesting to see whether metaphorical pain descriptions could also serve as potential indicators of pain catastrophising.

This thesis research has shown that, although clinicians working in the field of chronic pain readily use information contained in patient metaphor to gain insights into pain type, psychopathology, and patient pain understanding, they remain unsure of how best to use metaphor more effectively in treatment. Research that focuses on the best ways to incorporate metaphor into treatment is therefore warranted. For example, although clinicians possess a variety of their own metaphors to explain pain concepts, future research might look into ways of using a patient’s individual metaphors in treatment. Clinicians currently do this by using patient metaphors as a personalised progress scale, but other avenues could include working directly on the metaphor to change it and make it more adaptive and less catastrophic, particularly as this thesis has shown that metaphors can contribute to negative, incorrect, and unhelpful beliefs about pain. This may echo the way that traditional CBT works to identify and then modify unhelpful thoughts to shift them into more helpful or adaptive ways of thinking. From an ACT perspective, future research may focus on how patient metaphors can be used to deepen understanding of the six core therapeutic processes, or adapted to reflect them, in order to increase psychological flexibility.

Although this thesis has begun the work of collating and establishing a taxonomy of the most common types of pain metaphors used by people with chronic pain, it is nonetheless preliminary research. Further work is needed to confirm the findings and to explore how these findings may differ between cultural and linguistic groups.

This thesis primarily looked at individual metaphor source domains and their associations with pain and mood related disability. Future research may focus on exploring metaphor profiles, to see whether certain configurations of source domains are associated with any specific pain diagnosis or psychosocial factors.

Lastly, further research into the language of chronic pain might examine the development of novel assessment tools. One example of a novel application of metaphor is the development of a ‘metaphor menu’ for people living with cancer by Semino (n.d.), which features illustrated metaphors such as “*Some journeys with cancer will be longer and others short, but what matters most is how we walk that journey.”* Future research into chronic pain communication should focus on developing similar tools in this area.

6.9 Conclusions

Despite the importance of language for pain communication, assessment, and treatment, with a few notable exceptions, there has been limited research in the area. This thesis aimed to begin the work of filling this gap by examining the language, in particular the metaphors, that people use to convey chronic pain. By using a mixture of qualitative and quantitative methodology, this thesis explored the language used by people with chronic pain, systematically analysed the metaphors most used and how these link to aspects of the pain experience, and investigated the clinician experience with metaphor when treating patients with chronic pain.

This thesis research found that people with chronic pain often use complex metaphorical descriptions to convey and make sense of their pain. Drawing on CMT, the most commonly used source domain was *Causes of Physical Damage,* although there was a wide variety of subdomains included in this category. Metaphor may be helpful by providing a way for patients to externalise or gain empathy and understanding from others. This thesis also shows that there may be metaphorical linguistic indicators for certain diagnoses, notably endometriosis, CRPS, neuropathic pain, and hypermobility, as well as for the extent to which pain interferes with daily activities. However, certain metaphors may be harmful to the person in pain and may reduce the patient’s credibility in healthcare encounters. Lastly, this thesis found clear impacts of pain on psychological and social functioning.

This thesis is one of the largest systematic investigations into metaphor use in populations with heterogenous chronic pain and has implications for the need for interdisciplinary treatment, the education of healthcare professionals, and the incorporation of metaphor into treatment of chronic pain. This thesis also highlights the need for further research into how best to apply metaphor in clinical practice, particularly in treatment phases.

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8. APPENDICES

8.1 Appendix A: Qualtrics Survey Study 4

QUALTRICS SURVEY

Start of Block: Introduction

You are invited to participate in a research study into the way health professionals perceive patient use of pain metaphors in chronic pain consultations. Your involvement will require the completion of a brief demographics survey and an individual interview conducted over Zoom. The survey will collect information about yourself and your work experience. Following this, if you meet the criteria for study inclusion, a member of the research team will be in contact to arrange the interview at a time convenient to you. It is important to note that we are seeking a limited number of participants for this study. As such, completion of this survey may not guarantee participation in the study. A member of the research time will inform you if you were not selected.

The study is being conducted by:
Imogene Munday, Psychologist, PhD Candidate, University of Technology Sydney.

Prof Ian Kneebone, Clinical Psychologist, Head of Discipline (Clinical Psychology), University of Technology Sydney.

Assoc. Prof Toby Newton-John, Clinical Psychologist, Associate Professor, University of Technology Sydney.

Before you decide whether or not you wish to participate in this study, it is important for you to understand why the research is being done and what it will involve. Please take the time to read the following information carefully.

End of Block: Introduction

Start of Block: PIS

1. What is the purpose of this study?

The purpose of this study is to investigate how health professionals working in the area of chronic pain perceive patient use of pain metaphors in consultations.

2. Why have I been invited to participate in this study?

You have been invited to participate in this study as you are a health professional who has been working in the chronic pain field for at least one year and whose clinical load consists of at least 50% of patients who have chronic pain.

3. What if I don't want to take part in this study, or if I want to withdraw later?

Participation in this study is voluntary. It is completely up to you whether or not you participate. You may exit this survey at any time once you have begun it and your data will not be retained. If, after completing this survey and the main interview, you decide you wish to withdraw from the study, we will not collect additional data from you, although data already collected will be retained to ensure that the results of the research project can be measured properly and to comply with law. You should be aware that data collected up to the time you withdraw will form part of the research project results. If you do not wish for us to do this, you must tell us before you join the research project.

4. What does this study involve?

If you agree to participate in this study, you will be asked to complete a brief survey which will collect basic information about you and your work experience. If you fulfil the study inclusion criteria, you may then be contacted by the research time to organise an individual interview to be conducted via Zoom. This interview will take no more than 20-30min of your time. Interviews will be recorded to enable transcription for data analysis.

5. How is this study being paid for?

The study is being undertaken by the University of Technology Sydney. No external funds are being used.

6. How will my confidentiality be protected?

In order to protect confidentiality, data will be de-identified after data collection has taken place. Only the researchers involved with the study will have access to this data, which will be held securely on a password protected server.

7. Are there risks to me in taking part in this study?

The possible risks or discomfort of the study are minimal. You may feel a little uncomfortable answering questions regarding topics you may not habitually think or talk about.

8. Will I benefit from the study?

This study aims to further knowledge and may improve future assessment of chronic pain, however it is unlikely to be of direct benefit to you.

9. What happens with the results?

We plan to publish the results in a peer-reviewed journal. In any publication, information will be provided in such a way that you cannot be identified.

10. What if I require further information?

Please contact a member of the research team should you wish to discuss the research further before deciding whether or not to participate.

Imogene Munday: imogene.munday@student.uts.edu.au
Toby Newton-John: toby.newton-john@uts.edu.au
Ian Kneebone: ian.kneebone@uts.edu.au

End of Block: PIS

Start of Block: Consent block

Consent 1. I agree to participate in the study described in the information page prior.

2. I acknowledge that I have read the information page, which explains why I have been selected, the aims of the study and the nature and the possible risks of the investigation.

3. I understand that I can withdraw from the study at any time and completion of the survey and any subsequent interview is completely voluntary.

4. I understand that if I withdraw after completion of the interview, any existing data will be retained and form part of the research results.

5. I agree that the research data gathered from the results of the study may be published, provided that I cannot be identified.

6. I understand that as this study is seeking a limited number of participants, completion of this survey does not guarantee inclusion in the study.

7. I understand that if I have any questions relating to my participation in this research, I may contact any of the researchers involved who will be happy to answer them.

Note: This study has been approved by the University of Technology Sydney Human Research Ethics Panel. If you have any complaints or reservations about any aspect of your participation in this research, which you cannot resolve with the researcher, you may contact the Ethics Panel through the Research Ethics Officer (ph: +61 2 9514 9772 Research.Ethics@uts.edu.au) and quote the UTS HREC reference number ETH20-4713. Any complaint you make will be treated in confidence and investigated fully and you will be informed of the outcome.

○ I consent (1)

○ I do not consent (2)

End of Block: Consent block

Start of Block: Inclusion Criteria

Have you been working in the chronic pain field for at least 12 months?

○ Yes (1)

○ No (2)

End of Block: Inclusion Criteria

Start of Block: Inclusion 2

Do you work with adult chronic pain patients for at least 50% of your clinical load?

○ Yes (1)

○ No (2)

End of Block: Inclusion 2

Start of Block: Inclusion 3

Do you currently work in Australia?

○ Yes (1)

○ No (2)

End of Block: Inclusion 3

Start of Block: Demographics

What is your full name?

○ First name (1) ____

○ Last name (2) ____

What is your age in years?

____

What is your gender?

○ Male (1)

○ Female (2)

○ Other (3)

Did you grow up primarily speaking a language other than English?

○ No (1)

○ Yes, please specify: (2)
____

What is your discipline?

○ Medical Doctor - GP (1)

○ Medical Doctor - all other specialties (2)

○ Physiotherapist (3)

○ Psychologist (including Clinical, Health Psychologists etc.) (4)

○ Occupational Therapist (5)

○ Other - please specify (6)
____

How many years have you been qualified in this discipline?

____

Approximately how many hours per week do spend working clinically?

____

How many years have you spent working with chronic pain clients?

____

What is your ethnic/racial identity?

○ Caucasian (1)

○ Asian (2)

○ Aboriginal/Torres Strait Islander (3)

○ African (4)

○ Middle Eastern (5)

○ Other/Mixed - please specify (6) ____

Please provide an email so that we can contact you to arrange a time for the interview.

____

End of Block: Demographics

8.2 Appendix B: Interview Schedule

Initial open ended question: I would like to start with the situation when you are assessing or talking with a patient, and the patient uses a metaphor or metaphors to describe their pain. As you know, a metaphor is a figure of speech that describes something in a way that isn't literally true, but helps explain an idea or make a comparison. So an example would be “my pain feels like a knife slicing into me” or like “my leg is on fire.” Can you tell me a bit about your experiences of patients using metaphors to describe their pain?

Additional prompts if required;

How do you use patient metaphors in making a diagnosis?
How do you use patient metaphor use as an indicator of pain intensity?
How do you use patient metaphor use as an indicator of psychopathology?
Do you think patients who use a lot of metaphors have different outcomes?
How does it change your perception of the patient or how you feel?
Overall, are there times when it is helpful?
Overall, are there times when it is unhelpful?

8.3 Appendix C: COREQ

Table 1. COREQ: Consolidated criteria for reporting qualitative research: a 32-item checklist for interviews and focus groups

Section/Topic	Item No	Checklist item	Reported on page No
Domain 1: Research team and reflexivity			
Personal Characteristics			
Interviewer/ facilitator	1	Which author/s conducted the interview or focus group? The first author conducted interviews.	106
Credentials	2	What were the researcher's credentials? E.g. PhD, MD Registered psychologist/PhD candidate	106
Occupation	3	What was their occupation at the time of the study? Registered psychologist/PhD candidate	106
Gender	4	Was the researcher male or female? Female	106
Experience and training	5	What experience or training did the researcher have? Registered psychologist and MClinPsych who had experience in research of metaphor and pain.	106
Relationship with participants			
Relationship established	6	Was a relationship established prior to study commencement? No, interview did not have a relationship to participants prior to study.	106
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research Participants knew the interview was for research purposes. The researcher's name was given in the information and consent section and as such they had access to publicly available information about the researcher online.	N/A
Interviewer characteristics	8	What characteristics were reported about the interviewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	106

		Female registered psychologist and PhD candidate actively researching metaphor and pain.	
Domain 2: study design			
Theoretical framework			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis Thematic analysis and interpretative descriptive (Braun & Clarke, 2006)	106
Participant selection			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball Recruitment was purposive.	104
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email Online via twitter and Australian chronic pain organisations.	104
Sample size	12	How many participants were in the study? 18	105
Non-participation	13	How many people refused to participate or dropped out? Reasons? All participants who completed the online survey to give consent and demographics took part in the interview section of the study. There were no drop outs.	N/A
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace Online via Qualtrics and Zoom.	104
Presence of non-participants	15	Was anyone else present besides the participants and researchers? No, they were private interviews.	104
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date Age, gender, ethnicity, occupation, years qualified in that occupation, years of experience working with chronic pain patients.	105
Data collection			

Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested? A semi structured interview guide is provided as a supplemental file, as well as the Qualtrics survey used to collect demographics. The interview guide was developed collaboratively and evaluated by two experienced clinicians.	106 + Appendix A/B
Repeat interviews	18	Were repeat interviews carried out? If yes, how many? No, this was not necessary.	N/A
Audio/visual recording	19	Did the research use audio or visual recording to collect the data? Audio recorded.	106
Field notes	20	Were field notes made during and/or after the interview or focus group? No, notes were not made during the interview.	N/A
Duration	21	What was the duration of the interviews or focus group? 14 – 38 minutes (average 22 min)	106
Data saturation	22	Was data saturation discussed? Yes	106
Transcripts returned	23	Were transcripts returned to participants for comment and/or correction? Transcripts were not returned to participants, as is consistent with the methodology used - thematic analysis (Braun & Clarke, 2006)	NA
Domain 3: analysis and findings Data analysis			
Number of data coders	24	How many data coders coded the data? The first author generated initial codes and potential themes, before all 3 authors collaboratively reviewed these and refined them into final themes through recursive thematic analysis and ongoing discussion until consensus was reached.	106
Description of the coding tree	25	Did authors provide a description of the coding tree? Coding process is described via the 6 step	106, 108-9

		method of thematic analysis. 38 initial codes were generated, before being refined into the resultant themes described and set out in Table 2	
Derivation of themes	26	Were themes identified in advance or derived from the data? Themes were derived from data during thematic analysis.	106
Software	27	What software, if applicable, was used to manage the data? NVivo was used to manage the data.	106
Participant checking	28	Did participants provide feedback on the findings? Participants did not provide feedback on the findings, as is consistent with the methodology used – thematic analysis (Braun & Clarke, 2006)	N/A
Reporting			
Quotations presented	29	Were participant quotations presented to illustrate the themes / findings? Was each quotation identified? e.g. participant number Yes, participant quotations were presented both in Table 2 and the description of the themes under Results. Each quotation was identified with the respondent number.	107-113
Data and findings consistent	30	Was there consistency between the data presented and the findings? Yes consistency was present between the data presented and findings.	107-113
Clarity of major themes	31	Were major themes clearly presented in the findings? Yes, major themes were clearly presented in the results and discussion.	107-113
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes? Yes, minor themes and diverse cases within themes were discussed.	107-113

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

8.4 Appendix D: Qualtrics Survey for Studies 2-3

Start of Block: Introduction

You are invited to participate in a research study into the way individuals with chronic pain experience and talk about their pain.

Your involvement will require the completion of a brief survey, including information about yourself, your pain, and current mood, followed by a survey about the language you use to describe your pain. This will take approximately 10-15 minutes to complete.

As thanks for completing the survey, you will have the chance to win one of five $100 vouchers.

The study is being conducted by:

Dr Toby Newton-John, Clinical Psychologist, Associate Professor, University of Technology Sydney.

Prof Ian Kneebone, Clinical Psychologist, Head of Discipline (Clinical Psychology), University of Technology Sydney.

Imogene Munday, Psychologist, PhD Candidate, University of Technology Sydney.

Before you decide whether or not you wish to participate in this study, it is important for you to understand why the research is being done and what it will involve. Please take the time to read the following information carefully.

End of Block: Introduction

Start of Block: PIS

1. What is the purpose of this study?

The purpose is to investigate the way language is used by people with chronic pain. Of specific interest is how people talk about their pain and the language employed by them to describe their pain. This may have implications for understanding and treating pain in the future.

2. Why have I been invited to participate in this study?

You are eligible to participate in this study as you are currently living with chronic pain.

3. What if I don't want to take part in this study, or if I want to withdraw later?

Participation in this study is voluntary. It is completely up to you whether or not you participate. You may exit the survey at any time once you have begun it.

4. What does this study involve?

If you agree to participate in this study, you will be asked to complete an online survey, which will take approximately 10-15 minutes to complete. It will ask you questions regarding yourself, your pain, your mood, and the language you use to talk about your pain.

5. How is this study being paid for?

The study is being undertaken by the University of Technology Sydney. No external funds are being used.

6. How will my confidentiality be protected?

In order to protect confidentiality, the survey will be anonymous. We will not ask for your name or contact details. Only the researchers involved with the study will have access to this data, which will be held securely on a password protected server.

7. Are there risks to me in taking part in this study?

The possible risks or discomfort of the study are minimal. You may feel a little uncomfortable answering questions which draw attention to your pan. If you do experience distress, you are encouraged to contact Lifeline on 13 11 14. Lifeline is a free, 24 hour crisis support service.

8. Will I benefit from the study?

This study aims to further knowledge and may improve future treatment of chronic pain, however it is unlikely to be of direct benefit to you.

9. What happens with the results?

We plan to publish the results in a peer-reviewed journal. In any publication, information will be provided in such a way that you cannot be identified.

10. What if I require further information?

Please contact Imogene Munday, Dr Toby Newton-John, or Prof Ian Kneebone should you wish to discuss the research further before deciding whether or not to participate.
Imogene Munday: imogene.munday@student.uts.edu.au
Toby Newton-John: toby.newton-john@uts.edu.au
Ian Kneebone: ian.kneebone@uts.edu.au

End of Block: PIS

Start of Block: Consent block

1. I agree to participate in the study described in the information page prior.

2. I acknowledge that I have read the information page, which explains why I have been selected, the aims of the study and the nature and the possible risks of the investigation.

3. I understand that I can withdraw from the study at any time and completion of the survey is completely voluntary.

4. I agree that the research data gathered from the results of the study may be published, provided that I cannot be identified.

5. I understand that if I choose not to participate, or withdraw my participation one started, it will not affect my access to treatment in the future.

6. I understand that if I have any questions relating to my participation in this research, I may contact any of the researchers involved who will be happy to answer them.

Note: This study has been approved by the University of Technology Sydney Human Research Ethics Committee. If you have any complaints or reservations about any aspect of your participation in this research, which you cannot resolve with the researcher, you may contact the Ethics Committee through the Research Ethics Officer (ph: +61 2 9514 9772 Research.Ethics@uts.edu.au) and quote the UTS HREC reference number (insert #here after ethics approval). Any complaint you make will be treated in confidence and investigated fully and you will be informed of the outcome.

○ I consent

○ I do not consent

End of Block: Consent block

Start of Block: Demographics

What is your age in years?

____

What is your sex?

○ Male
○ Female

What is your marital status?

○ Married
○ Widowed
○ Divorced
○ Separated
○ Single
○ In a Long Term Relationship

How many years of formal education have you completed? (e.g. completion of year 12/HSC = 13 years)

____

Which of the following best describes your current job status?

○ Employed full time

○ Employed part time

○ Unemployed

○ Homemaker

○ Retired

○ Student

○ Not working because of pain

○ Other

What is your ethnic/racial identity?

○ Caucasian

○ Asian

○ Aboriginal/Torres Strait Islander

○ African

○ Middle Eastern

○ Other

Have you been diagnosed with chronic pain by a health professional?

○ Yes

○ No

Do you have a diagnosis for your pain? (e.g. arthritis) If yes, please write below. If no, leave blank.

____

Have you had your pain for 3 months or longer?

○ Yes

○ No

How long has it been since you first had your pain?

○ Years ____

○ Months ____

End of Block: Demographics

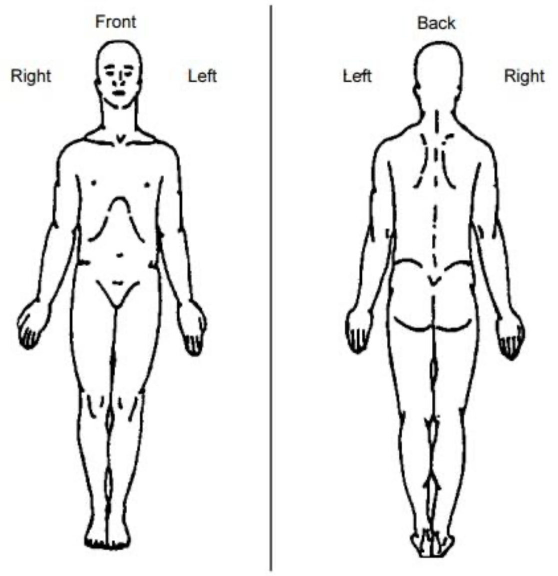
Start of Block: Brief Pain Inventory - Short Form

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?

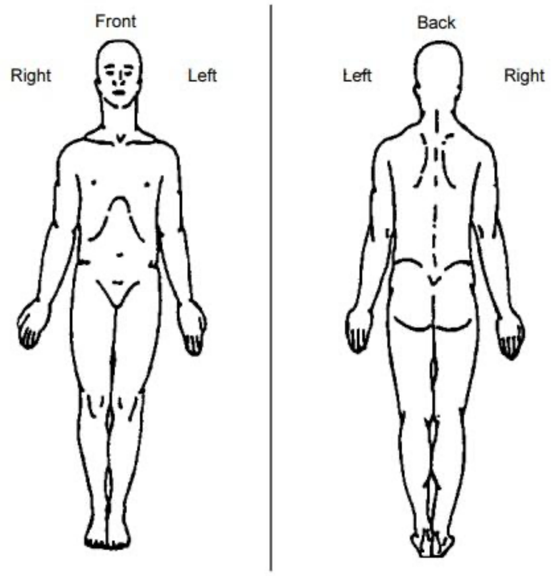
○ Yes

○ No

2. On the diagram, shade in the areas where you feel pain (click area to select; you may select multiple areas).



2a. On the diagram, shade in the area which hurts the **most.**



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

	No Pain 0	1	2	3	4	5	6	7	8	9	Pain as bad as you can imagine 10
Please select	○	○	○	○	○	○	○	○	○	○	○

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

	No Pain 0	1	2	3	4	5	6	7	8	9	Pain as bad as you can imagine 10
Please select	○	○	○	○	○	○	○	○	○	○	○

5. Please rate your pain by selecting the number that best describes your pain on the **average**.

	No Pain 0	1	2	3	4	5	6	7	8	9	Pain as bad as you can imagine 10
Please select	○	○	○	○	○	○	○	○	○	○	○

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

	No Pain 0	1	2	3	4	5	6	7	8	9	Pain as bad as you can imagine 10
Please select	○	○	○	○	○	○	○	○	○	○	○

7. What treatments or medications are you receiving for your pain? Please state name, dosage and frequency (e.g. Lyrica, 100mg, 3x day). If none, please leave empty.

____

____

____

____

____

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.

	No Relief 0%	10 %	20 %	30 %	40 %	50 %	60 %	70 %	80 %	90 %	Complete Relief 100%
Please select	○	○	○	○	○	○	○	○	○	○	○

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

	Does Not Interfere 0	1	2	3	4	5	6	7	8	9	Completely Interferes 10
A. General Activity	○	○	○	○	○	○	○	○	○	○	○
B. Mood	○	○	○	○	○	○	○	○	○	○	○
C. Walking Ability	○	○	○	○	○	○	○	○	○	○	○
D. Normal Work (includes both work outside the home and housework)	○	○	○	○	○	○	○	○	○	○	○
E. Relations with other people	○	○	○	○	○	○	○	○	○	○	○
F. Sleep	○	○	○	○	○	○	○	○	○	○	○
G. Enjoyment of life	○	○	○	○	○	○	○	○	○	○	○

End of Block: Brief Pain Inventory - Short Form

Start of Block: Mood Questionnaire - DASS 21

Please read each statement and select the answer which indicates how much the statement applied to you over the past week. There are no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:
0 Did not apply to me at all - NEVER
1 Applied to me to some degree, or some of the time - SOMETIMES
2 Applied to me to a considerable degree, or a good part of time - OFTEN
3 Applied to me very much, or most of the time – ALMOST ALWAYS

	Never	Sometimes	Often	Almost Always
I found it hard to wind down	○	○	○	○
I was aware of dryness of my mouth	○	○	○	○
I couldn't seem to experience any positive feeling at all	○	○	○	○
I experienced breathing difficulty (eg, excessively rapid breathing, breathlessness in the absence of physical exertion)	○	○	○	○
I found it difficult to work up the initiative to do things	○	○	○	○
I tended to over-react to situations	○	○	○	○
I experienced trembling (eg, in the hands)	○	○	○	○
I felt that I was using a lot of nervous energy	○	○	○	○
I was worried about situations in which I might panic and make a fool of myself	○	○	○	○
I felt that I had nothing to look forward to	○	○	○	○
I found myself getting agitated	○	○	○	○
I found it difficult to relax	○	○	○	○

I felt down-hearted and blue	○	○	○	○
I was intolerant of anything that kept me from getting on with what I was doing	○	○	○	○
I felt I was close to panic	○	○	○	○
I was unable to become enthusiastic about anything	○	○	○	○
I felt I wasn't worth much as a person	○	○	○	○
I felt that I was rather touchy	○	○	○	○
I was aware of the action of my heart in the absence of physical exertion (eg, sense of heart rate increase, heart missing a beat)	○	○	○	○
I felt scared without any good reason	○	○	○	○
I felt that life was meaningless	○	○	○	○

End of Block: Mood Questionnaire - DASS 21

Start of Block: Metaphors

Many people use metaphors in order to describe their pain. Metaphors are figures of speech that describe something in a way that isn't literally true, but helps explain an idea or make a comparison.

These can be statements such as;

"It feels like ants in my body."
"It feels like a knife slicing into me."
"It feels like something that is burning inside you."
"It feels like I carry a very heavy load."

How would you describe your pain and what it feels like? What metaphors or descriptions do you use to talk about your pain?

Please feel free to write as many different metaphors or descriptions as you have used over the time you have had chronic pain. You may use the prompts below if you like to help you get started.

Living with pain is like...

The pain feels like...

____

____

____

____

____

End of Block: Metaphors

Start of Block: Incentive

Do you wish to enter the draw to win one of five $100 vouchers? If you select yes, you will be taken to a second survey so that you can enter your email address.

Your email address will not be associated with your responses to this survey.

○ Yes

○ No

Incentive

To enter the draw to win one of five $100 vouchers, please enter your email below. This will not be linked to your survey results in any way.

____