

*The relationship of early maladaptive schemas
and specific pain beliefs
to adjustment to chronic pain*

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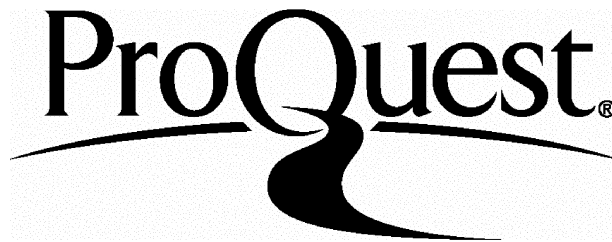
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INTRODUCTION

Overview

We all experience physical pain at some point in our lives and have some awareness of the distress that even short-lived pain can cause. The universal experience of pain, and the quest for its alleviation, presents a formidable challenge to sufferer, health professional and the wider society alike (Melzack and Wall, 1982). For some, pain unfortunately becomes a more permanent feature of life. Those suffering from chronic pain, generally defined as any pain persisting longer than three months (IASP, Subcommittee on Taxonomy, 1986), are experiencing a major health problem which creates serious demands on services and often results in devastating consequences for the sufferer and their family (Williams and Erskine, 1995). Epidemiological research estimates that, within the United Kingdom, chronic pain is a common cause of disability, with 13% of adults suffering from it (Croft, Rigby, Boswell, Schollum and Silman, 1993), and several million workdays lost per annum as a result (Pearce and Mays, 1994a). Furthermore, living with a long term painful condition results in inevitable psychological consequences (Turk, 1997).

Early conceptualisations of pain, which regarded it to be a direct and inevitable consequence of tissue damage, were not accepting of psychological influences (Gamsa, 1994a). However, there is often no strong evidence of organic disease associated with chronic pain, which can be understandably difficult for both the sufferer in search of some explanation and cure, and the theorist who subscribes to

this early medical model. A lack of organic evidence led, in the past, to the unhelpful and simplistic view that the problem was 'mental' rather than 'physical'. This was based on dualistic thinking, where a separation is made between mind and body (Sharpe, Mayou and Bass, 1995). However, although there may be no adequate organic explanation, physiological and psychosocial factors can co-exist and a perspective that considers both seems most appropriate. Indeed, over the last 40 years, chronic pain has come to be understood as a multidimensional experience which incorporates sensory, affective, motivational, environmental and cognitive components (Pearce and Mays, 1994b).

Traditional medical and surgical approaches to the treatment of chronic pain have had limited impact, helping psychological factors to be recognised as playing an important theoretical and treatment role (Pearce and Erskine, 1989). Increasing research attention has been paid to a wide array of psychological factors, such as attention, mood, expectations and personality, believed to exert some influence over the pain experience. Different psychological models, including behavioural, cognitive and psychoanalytic, have driven this research. Cognitive models have emphasised the particular importance of specific beliefs about pain on the actual experience of pain. However, it has recently been suggested that an individual's more general beliefs, developed from early experiences, and previously the domain of psychoanalytic accounts, may also be related to adjustment to 'illness' such as chronic pain and should be added to the cognitive framework (Williams, 1997).

The move towards multidisciplinary models and treatment of chronic pain has been a welcome advance from the previous divide between theoretical schools. It is thought that the current cognitive framework of pain can draw on the ideas of early psychoanalytic writers and be elaborated upon by looking at early experiences and their possible effects on current functioning. This study therefore aims to explore the relationship between general beliefs or 'schemas', which are thought to develop from early experiences, and the development and maintenance of chronic pain.

The introduction will first provide an outline of the definitions and theoretical models of pain. It will then go on to highlight the importance of general beliefs, firstly from a psychoanalytic perspective, and argue for their inclusion in a cognitive account of chronic pain. The role of specific pain beliefs, considered central within a cognitive-behavioural conceptualisation of chronic pain, will then be discussed. This will be followed by a summary of treatment models and outcome, particularly important given the potential clinical implications of the current research.

Pain: definitions and theoretical models

Definitions

General pain definition

Given the diversity and subjectivity of pain experience, an adequate definition of pain has remained elusive (Turk, 1997). The International Association for the Study of Pain (IASP, 1979) defines it as 'an unpleasant sensory and emotional experience which is associated with actual or potential tissue damage, or is described in terms of such damage'. However, it should be noted that, whilst usefully acknowledging the affective dimension of pain in addition to sensory qualities, this definition does seem to minimise the extent of suffering experienced by some (Melzack and Wall, 1982). This would seem particularly pertinent for those experiencing pain of long-standing nature.

Acute vs. chronic pain

A distinction is usually made between acute and chronic pain in terms of duration. However, a more useful argument is that differential characteristics are more than simply time related and can be reflected by the difference between acute and chronic models of illness generally. Acute models suggest that illness can be labelled, is caused by underlying disease, is short-term and can be treated and cured (Leventhal, Zimmerman and Gutmann, 1984). Acute pain, which results from physical injury or disease, can easily be considered within this framework. Both peripheral mechanisms, which include anatomic structures, pain pathways and physiological processes, and

central mechanisms, which are specific brain structures, are involved in the transmission and reception of such pain sensations (Hanson and Gerber, 1990).

As it is not temporary or always responsive to medical treatment however, chronic pain does not fit so comfortably with this model. If chronic pain is conceptualised within an acute framework, as both medical professionals and patients may do, there are two possible conclusions. Either the physiological source of pain has yet to be discovered, which can result in uncertain diagnoses and a series of referrals to other specialists, or it is psychologically determined and 'all in the mind'. This dualistic way of conceptualising pain leads to understandable confusion and frustration on behalf of the sufferer. Chronic illness models, which allow multicausal explanations, are much more suitable to the conceptualisation of chronic pain (Hanson and Gerber, 1990).

Just as central mechanisms are believed to be involved with both acute and chronic pain to some degree, it is important to recognise the role of peripheral factors in pain regardless of duration. Peripheral factors, such as tissue damage and physiological dysfunction, are regarded as paramount to the experience of acute pain, but they can not necessarily be dismissed in the experience of chronic pain. It may be that pain began as the result of some sort of peripheral injury, activating nerve fibres carrying pain messages to the brain which have since not been 'switched off'. Reasons for this remain unclear, but it is likely that there are a number of contributory psychological factors. While it is important to recognise that psychological factors are involved with both acute and chronic pain, they are likely to play a bigger role when pain endures (Hanson and Gerber, 1990).

Chronic pain

Chronic pain is generally defined as any pain persisting longer than three months (IASP, Subcommittee on Taxonomy, 1986). Although those suffering from chronic pain are not an homogenous group, there are certain problems which seem particularly characteristic. Multiple pains and other symptoms such as fatigue and dizziness, together with little relief from various treatments and a negative impact on the sufferer's lifestyle, are common (Williams and Erskine, 1995). It is important to recognise that the problems associated with this condition usually extend beyond the actual pain itself.

A frequent initial response to the symptom of pain is to rest and avoid activity. This, however, can have many detrimental effects. Firstly, inactivity can result in a decline in physical condition, muscle dysfunction and distorted posture, all of which can then exacerbate the pain. Secondly, such avoidance and inactivity can have a severe psychological impact: boredom, lowered self-esteem, depression, anxiety and preoccupation with bodily symptoms can all develop (Williams and Erskine, 1995). Thirdly, experience of chronic pain can have an even wider impact on the individual's life and lead to marital and family distress, work change, and a limited social life (Turk, Flor and Rudy, 1987). All this, together with the inevitable anxiety relating to the uncertainty of diagnosis and prognosis, makes life with long-lasting pain profoundly difficult.

There are, of course, differences in how people adjust to and cope with their pain. It is therefore extremely important to examine the factors that underlie differential

susceptibility to the effects of this condition (Jensen and Karoly, 1991). Psychological factors are now recognised as playing an important role in individual pain experience, as discussed below. This study therefore aims to expand on previous psychological research examining influential factors on adjustment to chronic pain.

Theories of pain

Biological mechanisms of pain

In the search for pain relief, much scientific research effort has gone into examining the biological mechanisms of pain and has revealed that there are a number of structures within the central nervous system (CNS) that contribute to pain. Peripheral nerve fibres carry information from receptors in the skin, muscles, joints and viscera to the cerebral cortex via specific afferent pathways to specific brain sites (Gatchel, Baum and Krantz, 1989). These pathways are modulated at various sites in the dorsal horn, the spinothalamic tract, and lower and higher brain centres. A more comprehensive account of the biological mechanisms of pain, outwith the scope of this introduction, is provided in numerous texts (e.g. Wall and Melzack, 1994).

Sensory model of pain

Early conceptualisations of pain took a simple linear view and regarded it to be a direct and inevitable consequence of tissue damage. This traditional biomedical model, focusing solely on biological mechanisms, presumed that the severity of pain was directly proportionate to the extent of pathological damage (Turk, 1997). However, by the 1960's it became apparent that a purely sensory explanation failed to

account for certain pain phenomenon, such as phantom limb pain and pain with no identifiable organic cause, thus giving way to alternative theoretical postulations (Gamsa, 1994a).

Gate-control theory of pain

A shift from the simple linear explanation came with the development of Melzack and Wall's Gate-control theory of pain (1965). This multidimensional model provided an account of pain that incorporated physiological with psychological factors, such as attention, mood, expectations and personality, believed to exert some influence over pain experience.

The model assumes that there are several structures within the CNS that are involved in the perception of pain, the interplay between which determines the extent to which a specific stimulus results in pain (Gatchel, Baum and Krantz, 1989). It is proposed that within the dorsal horns of the spinal cord there is a neurophysiological mechanism that acts as a 'gate', modulating the input it receives from two different directions. Peripheral nerve fibres which synapse at the gate are excited by injury, or other stimulation, and transmit messages concerning, for example, pain, pressure or heat. Meanwhile, also present are descending influences from the brain associated with the behavioural state of the individual, such as attention, past experiences and inhibitory mechanisms of the brain stem (Williams and Erskine, 1995). The balance of excitation and inhibition opens or closes the 'gate' and controls the transmission of messages to various regions of the brain (Melzack and Wall, 1982). Thus psychological factors exert their influence directly on the process of pain perception.

The Gate-control theory incorporated known biological mechanisms, yet provided some explanation for variable relationships between injury and pain. It allowed a shift away from a simple linear model and provided a conceptual framework for the integration of sensory, affective and cognitive dimensions of pain (Melzack and Wall, 1982). As such, it is the current working model for the conceptualisation of pain and has encouraged research into psychological factors associated with the experience of pain and the development of treatment taking these factors into account.

It is important to emphasise that biomedical factors commonly underlie the initial onset of pain, but that various psychosocial and behavioural factors may maintain and exacerbate this pain, rendering it chronic. Thus, it is argued, chronic pain can not be considered as either physical or psychological but rather as an experience that is maintained by the interplay of physiological and psychological factors (Turk, 1997). The influence of psychological factors on adjustment and associated disability has been explained within various theoretical frameworks, including behavioural and cognitive accounts, which will be considered below.

Behavioural model of pain

From the 1970's, behavioural and cognitive theorists have made various attempts to explain chronic pain from a psychological perspective. Fordyce (1978), as a behaviourist, considered only those aspects of the pain experience that were observable. He suggested, in concordance with principles of operant conditioning, that pain would become chronic and persistent if the environment provided sufficient reinforcement to pain behaviours. Examples of such reinforcement include the

avoidance of disliked tasks or the provision of solicitous attention upon pain behaviour. Behavioural theory formed the basis of operant pain management programmes which aimed to change pain behaviour by manipulating environmental contingencies (the removal of pain contingent reinforcers and introduction of reinforcement contingent on 'well behaviour'). However, this simple causal explanation of a link between pain and environmental reinforcers neglected factors relating to the psychosocial and emotional world of the individual (Gamsa, 1994a).

Cognitive model of pain

The cognitive theorists, inspired largely by the Gate-control theory which had established a role for cognitive-evaluative processes in the modulation of pain, considered the subjective experience and meaning of pain to the sufferer (Gamsa, 1994a). Their model suggests that behaviour and emotions associated with chronic pain are influenced by the meaning and appraisal of pain stimuli, rather than the experience of pain itself (Turk, Meichenbaum and Genest, 1983). The importance of cognitive variables such as beliefs, control, coping and expectations on the experience of pain are emphasised. Such variables are discussed in more detail later in this introductory chapter, in the section concerning specific beliefs. It should be noted that cognitive and operant models are not necessarily incompatible (Turk and Meichenbaum, 1994). Indeed, the impact of dysfunctional cognitions is usually considered alongside the impact of contingencies of reinforcement to yield a cognitive-behavioural approach to pain.

Cognitive models of illness behaviour suggest that dysfunctional illness behaviour is associated with inaccurate and unhelpful beliefs. Individuals actively process information to construct an understanding of their illness and their emotional reactions, behaviour and attempts at coping follow from this (Williams, 1997). There are cognitive approaches to the examination of several different illness presentations such as chronic fatigue and health anxiety, of which the cognitive model of pain (Turk, Meichenbaum and Genest, 1983) is one. Other models of illness behaviour, such as self-regulation theory (SRT; Leventhal, Meyer and Nerenz, 1980), differ slightly from the cognitive model in that they refer to all behaviour relating to health rather than to particular dysfunctional illness behaviours (Williams, 1997). SRT postulates that individuals react to illness on the basis of their beliefs about the threat to their health associated with that illness. It shares with the cognitive model a focus on behaviour and beliefs relating solely to illness. Both have typically avoided looking at less easily measured variables, such as motivation, and have failed to take early developmental experiences into account. Williams (1997) suggests that the individual's decision about how to respond to their illness may not only be based on their understanding of the illness itself but also, perhaps, on other non-illness related beliefs. He highlights how the role of general beliefs, or schemas, is seen as crucial in the cognitive model of depression, but that their role in areas such as health anxiety, fatigue and pain has been ignored so far.

It is therefore argued that the current cognitive model of pain has limitations derived from its focus on cognitive variables specific only to pain itself. As described in the following section, others, most notably Engel (1959), have previously emphasised the

importance of early experiences and associated general beliefs in the experience of pain. However, this postulation has been notoriously problematic to test. The present study is an attempt to ameliorate the neglect of general beliefs shown by cognitive models so far and to incorporate them into the cognitive framework of chronic pain.

The role of general beliefs in the experience of pain

Despite the tenacity of the sensory model, some theorists in the early twentieth century did give consideration to psychological factors and, indeed, regarded puzzling cases of pain with no identifiable organic cause as symptomatic of psychopathology (Gamsa, 1994a). This reflected the traditional dualistic thinking of the time, where a split was made between 'mind' and 'body', and pain tended to be seen as either organic or psychogenic.

Psychoanalytic hypothesis

A particularly influential paper, based on psychoanalytic theory and clinical experience, was published by Engel in 1959 providing an alternative to a sensory account for pain with no identifiable organic cause. He proposed a developmental theory for what was termed 'psychogenic pain': pain which he considered to have a psychological function particularly as a defence against psychic conflict.

According to Engel (1959), the individual gathers a 'library' of pain experiences, from birth, built up from pain initially caused by peripheral stimulation of anatomic structures. Pain derives meaning for the individual from the emotional and physical context within which it occurs. These meanings may then later become triggers for pain in the absence of any obvious peripheral stimulation. It is important to note that Engel did not suggest that this necessarily implied an absence of any physiological process in cases of 'psychogenic pain'. Indeed, physiological research at the time had

already suggested that activity within 'internal' pain circuits (nerve pathways) could continue after peripheral input had stopped (Livingston, 1953).

It was proposed that pain developed meaning and association during childhood in a variety of ways, including:

- Pain, often inflicted as punishment, could become connected with guilt. Following this association, 'psychogenic pain' could then be used unconsciously both as confirmation that one is 'bad' and as a means for appeasing guilt (Engel, 1959).
- Pain could become linked with aggression and power in light of the consequences of inflicting pain on others. By suffering 'psychogenic pain' the individual may then unconsciously control his/her own aggression (Engel, 1959).
- Pain is involved in relationships from a very early age. For example, a baby who cries from pain elicits a response from the caregiver and a connection is made between pain, pain behaviour and comfort and relief (Engel, 1959). 'Psychogenic pain' thus becomes a "cue for reunion with a love object" (Gamsa, 1994a, p.7). Certain individuals may strive for such a reunion and the associated comfort and relief and come to use pain unconsciously to achieve this.

Thus Engel argued that there is a psychodynamic process underlying the function of pain which eludes organic explanation. From early associations, some individuals may come to use pain unconsciously to resolve developmental conflicts. Pain, as a defence

mechanism, can ward off unbearably distressing feelings and emotions or can help to achieve certain desires. It is as if physical pain is more 'bearable' than the emotional pain that it represents (Gamsa, 1994a).

It was suggested that some individuals are more likely to use pain in this way, as a 'psychic regulator', and were described as 'pain-prone'. Certain developmental psychosocial factors, particularly maladaptive early family relationships and parental characteristics, were identified as characteristic of the child who later becomes a pain-prone patient (Adler, 1989; Engel, 1959). These included:

- Parents who were physically and/or verbally abusive to each other and/or to their child.
- The combination of one 'domineering, brutal parent' and one 'submissive parent'.
- A parent who punished frequently but who would then feel regretful and overcompensate with uncommon affection.
- A 'cold and distant parent' who mainly responded when their child was ill.
- A parent or close caregiver who suffered from illness or pain, with the child left feeling responsible and guilty for this, perhaps as result of associated angry thoughts and feelings.

Research supporting Engel's hypothesis

While Engel hypothesised on the basis of his clinical experience, some subsequent studies have provided support for such an explanation based on psychoanalytic theory. This has mainly been retrospective, with evidence of early difficulties in family

relationships, such as abuse, punishment, emotional neglect, family illness or loss of parent, found in individuals suffering chronic pain in later life (Gamsa, 1994a).

For example, histories of childhood neglect and deprivation were found in a series of 28 patients with chronic headache or facial pain (Violon, 1980). She argued that the high prevalence (86%) of negative childhood experiences reported by these patients was crucial in the explanation of why they had gone on to develop facial pain, whereas many individuals undergoing dental procedures or experiencing emotional distress are not 'pain-prone'. Another study described 'dysfunctional', and often violent, families of origin in a small group of 25 patients with chronic pelvic pain, with nine of these patients reported to have been victims of incest (Gross, Doerr, Caldirola, Guzinski and Ripely, 1980).

Of theoretical interest, but seriously lacking in methodological rigour, was the observation made during individual psychotherapy work with abused children that many of them elicited punishment from their caregivers by playing the 'bad' child and engaging in 'subtle forms of pain-dependent behaviour' (Green, 1978). Meanwhile, an uncontrolled study of 13 chronic pain patients reported that nine of them had experienced significant childhood trauma, including early parental loss, parental conflict, childhood physical problem, or an ill parent (Swanson, Swenson, Maruta and Floreen, 1978).

To highlight the importance of certain aetiological factors in Engel's conceptualisation, Roy (1982) described four individuals who suffered from chronic

headache and who fitted the description of 'pain-proneness' by presenting with histories of childhood abuse or neglect. These individuals experienced an exacerbation of pain when confronted with interpersonal difficulties or situations that provoked feelings of helplessness. This may have been as a result of increased physical tension in these situations, although they had all been in receipt of various unsuccessful medical and cognitive-behavioural treatment attempts which should have addressed this possibility. Dynamic psychotherapy was recommended for such patients who reveal intra- and interpersonal difficulties that relate back to negative childhood experiences.

Methodological problems

It is recognised that support from such studies is, however, very limited by small sample sizes (sometimes as few as four individuals), a lack of control procedures, the use of anecdotal evidence and poorly defined childhood factors (Merskey and Spear, 1967; Roy, 1985). Without appropriate comparison groups it is difficult to assess the aetiological significance of certain childhood events, such as parents who argued or who were verbally abusive to the child, which may be relatively common in the general population (Gamsa, 1994b). This constitutes a major methodological flaw in all of the studies cited above. Studies have also relied heavily on autobiographical accounts of childhood events, with no verification from independent sources. This has serious implications for the validity of the information provided (Roy, 1985). Furthermore, childhood factors of proposed importance tend to be poorly defined, with a lack of information concerning the type and duration of abuse or neglect, the age when it began and the individual's experience following abuse (Roy, 1985).

Overall, a causal relationship between negative childhood experiences and development of pain-proneness has not been demonstrated on the basis of research to date.

Further research

Roy (1985) adopted a different approach in an attempt to elucidate the concept of pain-proneness and its supposed link with negative childhood experiences. He conducted a search of the child abuse literature published within the preceding two decades to see if it revealed any association between abuse and pain-proneness. However, no explicit evidence of pain-proneness as a long-term consequence of childhood abuse was found.

He did, however, comment on one particular study which looked at psychosexual functioning in adult women who had been sexually abused as children (Tsai, Feldman-Summers and Edger, 1979). Not surprisingly, it was revealed that a sub-group of these women, who were in receipt of therapeutic intervention for difficulties associated with their abuse, were significantly more psychosexually maladjusted according to their scores on the Minnesota Multiphasic Personality Inventory (MMPI) than a subgroup not in receipt of therapy and a control group who had not suffered abuse. Of particular interest, was the fact that their MMPI profiles were very similar to those found in chronic pain patients (Sternbach, 1974), with significantly high scores on scales of hypochondriasis, depression and hysteria. Roy (1985) recommended that a thorough examination of chronic pain issues in adults who had experienced emotional, physical or sexual abuse in childhood be conducted to further

elucidate potential long-term consequences. However, it should be noted that it has since been argued that such elevated scores on the MMPI are confounded by somatic items and, as such, are not truly representative of psychological disturbance in chronic pain populations (Gamsa, 1994b).

Only one controlled clinical study exploring the developmental psychosocial factors considered as characteristic for the child who later becomes pain-prone exists to date (Adler, Zlot, Hürrny and Minder, 1989). Four clinical groups, classified according to DSM-III, were compared – ‘psychogenic’ pain, organic pain, psychogenic bodily symptoms and organic disease. On the basis of information gathered from open-ended interviews it was revealed that, in comparison to the other groups, those with psychogenic pain had a significantly increased prevalence of certain psychosocial factors identified by Engel as contributory to the development of chronic pain. The factors revealed to have aetiological significance were ‘abuse between parents’, ‘abuse to child’, ‘child deflecting aggression from one parent onto him/herself’ and ‘parent suffering illness resulting in child’s guilt’.

Thus, there is some evidence to suggest that Engel’s theory is useful in explaining pain in a particular subgroup of patients with a DSM-III diagnosis of ‘psychogenic pain’. However, it can not be so easily applied to the general population of chronic pain patients (Gamsa, 1994a).

Limitations of research – summary

Although there is some research support for the hypothesis that psychodynamic conflict can manifest in physical pain for certain individuals, it is hindered by major methodological limitations. Generally, there has been an absence of control groups in these studies, making it difficult to ascertain the aetiological importance of certain childhood events which may actually be quite frequent in the general population (Gamsa, 1994*b*). The difficulty in generalising findings which are based on specialist pain clinic samples to the wider population of pain sufferers has also been highlighted, as the former are more likely to have a tendency towards neuroticism (Merskey, Brown, Brown, Malhotra, Morrison and Ripley, 1985) or emotional disturbance (Crook and Tunks, 1985).

In addition to the methodological problems of such research, certain conceptual difficulties need to be considered. There has been a tendency to make the following assumptions grounded in dualistic or 'linear causal' thinking: that pain is attributable to either organic or psychological factors, that pain of unknown organic origin is psychological by nature and that patients with non-organic chronic pain are an homogeneous group (Gamsa, 1994*b*). However, a direct causal link between specific psychosocial factors and non-organic pain has not yet been shown and there has been a move away from linear causal thinking towards increasingly sophisticated multicausal explanations, where psychosocial and physiological factors interact.

Hence Engel's hypothesis (1959), although it did highlight the potential importance of negative childhood experiences, awaits confirmation. Further studies, with improved

methodology, are required to explore the potential contribution of early experiences to the development of chronic pain. Cognitive models, particularly in relation to depression, have taken general beliefs that develop from early experiences into account. This now requires extension to the conceptualisation of chronic pain. A cognitive framework provides a methodology with which to explore the role of early experiences and is outlined below.

Beck's cognitive model

Beck's cognitive model was first developed to account for, and inform the treatment of, depression (Beck, 1967; 1976). It proposed that individuals acquire beliefs or 'schemas' about themselves and the world from both recent and early experiences. These beliefs, some helpful, some not so, can exert an influence on behaviour and functioning. When an event or 'critical incident' happens that colludes with an unhelpful belief system these beliefs are then activated and result in 'negative automatic thoughts' about the past, present and future which are not based in rational thinking. From this depression may follow. As such, dysfunctional thoughts are considered responsible for emotional disturbance (Beck, 1976). This can be diagrammatically represented, as shown overleaf:

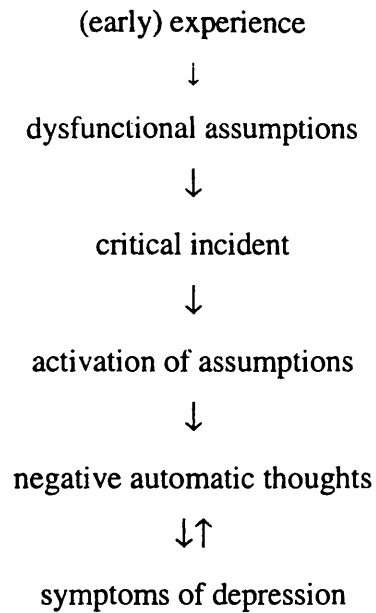


Figure 1. The cognitive model of depression (from Fennell, 1989)

Although first applied to the understanding of depression and emotional disorders, this model is relevant to information processing generally (Fennell, 1989). Furthermore, it has been extended to address a range of clinical disorders, including anxiety, obsessional problems and eating disorders, and informs their management. Cognitive therapy aims to help the patient challenge their dysfunctional thinking which is proposed to underlie their emotional disturbance. It has had a huge influence clinically, not least due to the profusion of outcome studies (McGinn and Young, 1996). However, the focus on automatic thoughts and cognitive distortions within cognitive therapy has been considered too 'superficial' to address some longer standing emotional problems and associated beliefs that are deeply entrenched (McGinn, Young and Sanderson, 1995). The role of schemas in this cognitive model has increasingly come to be recognised and is discussed in more detail overleaf.

Schemas

General schema definition

Schemas are defined as unconscious cognitive structures that develop in childhood and enable the individual to make sense of information they receive about themselves, others and their world. Schemas then serve as templates to process later experiences (Beck, 1996). An individual may have several schemas, not necessarily all active at once, but all with the potential to influence their thoughts, feelings and behaviour. They differ in characteristics and can, for example, be relatively rigid or amenable to change, particularly prominent or more dormant. When a schema is activated, it influences how the individual processes information. If a particular schema is highly active it may hinder alternative, more adaptive, schemas in a given situation (Beck, 1967). Beck (1967) considered a 'healthy' personality to possess stable, realistic and adaptive schemas while a less 'healthy' personality would have extreme, rigid and negative beliefs that would interfere with rational information processing and adaptive functioning.

The important influence of childhood events has been considered within a cognitive framework in relation to depression and cannot be ignored in relation to chronic pain. The work of Young (1990; 1994), driven by the need to address specific difficulties of individuals with long-standing personality or 'characterological' disorders, proposes a theoretical framework which expands on Beck's cognitive model and further integrates early experiences. This framework, outlined below, will be used in the present study as a means of incorporating early experiences into the cognitive model of pain.

Early Maladaptive Schemas

Young (1994) expanded on the description of schemas and identified a subgroup termed 'early maladaptive schemas' (EMSs). These beliefs develop as a consequence of dysfunctional experiences with parents, siblings and peers during childhood and are elaborated upon over time. They become deeply entrenched and are significantly maladaptive in that, when triggered, they distort information regarding the self and one's environment and lead to negative automatic thoughts and subjective distress. EMSs are triggered throughout life by environmental events salient to that particular schema. For example, an individual with a pre-existing 'vulnerability to harm' schema may have this triggered and confirmed by being attacked, or by the onset of pain. There are a range of possible psychological consequences if EMSs are triggered, including depression, anxiety, feelings of loneliness, failure, and involvement in destructive relationships (Young, 1994). Thus EMSs impact heavily upon an individual's thoughts, feelings, behaviour and relationships with others and, as they are self-perpetuating, are considered particularly difficult to change. It is highlighted that they are also resistant to change because, despite being destructive in the long term, they provide the individual with a sense of security and predictability, and he/she therefore accepts them unconditionally (Young, 1994).

EMS processes

Any potential change to EMSs will be perceived as threatening given that they are central to one's understanding of the world. Thus, the individual unconsciously adopts various cognitive and behavioural strategies, or 'schema processes', to maintain the EMS despite its maladaptive nature (Young, 1994). These processes are

initially adaptive in childhood, and relate to psychoanalytic concepts of defence and resistance, but later become maladaptive ways of coping that are both activated by, and strengthen, schemas. Three processes are proposed and outlined below. The term 'schema' will be used interchangeably with 'EMS'.

- **Schema maintenance:** refers to the particular ways of processing information and certain maladaptive behaviours that reinforce and sustain the schema (Young, 1990). For example, an individual with the 'emotional deprivation' schema may repeatedly choose unsuitable partners who are unable to provide adequate emotional support for him/her, which serves to strengthen the schema.
- **Schema avoidance:** pertains to the cognitive, behavioural and emotional strategies employed to avoid triggering the schema and the associated negative affect. The individual avoids either thinking about and/or being in situations that might trigger a particular schema (Young, 1990). For example, an individual with the 'abandonment' schema may avoid becoming involved in relationships for fear of being left. This in turn reinforces the schema with the belief that significant others are not available to provide support.
- **Schema compensation:** relates to cognitions or behaviours that overcompensate for the schema. This means that the individual consistently acts in a way incongruent with what might be expected given their schemas. Compensation is thought to reflect earlier, more adaptive, attempts in childhood to cope with difficult experiences (McGinn and Young, 1996). However, later in life, this

process often ‘backfires’. For example, an individual with the ‘dependency’ schema may overcompensate by being unable to accept any support or help from others whatsoever, even in appropriate situations (Young, 1990).

EMS domains

Young (1994) has identified 16 schemas, 15 of which are grouped within five domains as outlined below (for full descriptions see Appendix 1 and 2, pp. 147-152). Each domain is considered to interfere with a basic childhood need (McGinn and Young, 1996).

Disconnection and rejection

Individuals with these schemas generally believe that their need for ‘security, stability, nurturance, empathy, acceptance and respect’ will not be reliably met. This is considered to result from early experiences of a ‘rejecting, withholding, cold, unpredictable or abusive family environment’ (Young, 1994). Schemas grouped in this domain are: ‘abandonment/instability’, ‘mistrust/abuse’, ‘emotional deprivation’, ‘defectiveness/shame’ and ‘social isolation’.

Impaired autonomy and performance

Individuals holding these schemas have particular ‘expectations about themselves and their environment that interfere with their perceived ability to separate, function independently, or perform successfully’. It is suggested that such individuals have typically come from an enmeshed family background, with an undermining or

overprotection of the child, or lack of reinforcement for successful survival outside of the family (Young, 1994). Schemas within this domain are: 'dependence /incompetence', 'vulnerability to harm or illness', 'enmeshment/undeveloped self' and 'failure'.

Impaired limits

Individuals with these schemas are seen to lack 'internal limits, responsibility to others or long-term goal setting'. It is considered that their families of origin tended to have been permissive, indulgent and lacking in direction, with the child perhaps not provided with sufficient supervision or guidance (Young, 1994). Schemas within this domain are: 'entitlement/grandiosity' and 'insufficient self-control/self discipline'.

Other-directedness

Schemas within this domain reflect an exaggerated focus on the feelings and wishes of others, rather than on one's own needs, in pursuit of 'love and approval, to maintain a sense of connection or to avoid retaliation'. There is considered to be a suppression or lack of awareness of personal anger and other emotional needs in individuals with such schemas. Their family of origin is considered to have functioned on the basis of 'conditional acceptance where children must suppress important aspects of themselves to gain parental love and approval' (Young, 1994). Schemas within this domain are: 'subjugation' and 'self-sacrifice'.

Overvigilance and inhibition

Individuals with these schemas tend to 'control spontaneous feelings, impulses and choices to avoid making mistakes, or set rigid rules and expectations for themselves often at the expense of happiness, close relationships and self-expression'. Their families of origin can be punitive and pessimistic and are characterised by an emphasis on 'duty, performance and avoiding mistakes rather than pleasure and relaxation'. The overriding fear is that everything will fall apart if one fails to be vigilant and careful at all times (Young, 1994). Schemas within this domain are: 'emotional inhibition' and 'unrelenting standards'.

Application of schema model

This framework has been chiefly used to access the early experiences and associated general beliefs of those with long-standing characterological disturbance. The present study aims to adopt this structure to examine the general beliefs of individuals with chronic pain. The negative childhood experiences thought to lead to the development of EMSs, such as deprivation, rejection, abuse, criticism and abandonment (McGinn and Young, 1996), can be seen to reflect the developmental psychosocial factors, particularly maladaptive early family relationships, that Engel (1959) argued were of aetiological importance to chronic pain. Expanding upon this, it can be argued that EMSs relate to the defensive intrapsychic structures which Engel (1959) thought to underlie the function of pain. Young has developed a self-report questionnaire, designed to assess the presence of EMSs (1990; revised 1991), which therefore provides a good opportunity to operationalise the view regarding chronic pain held by

earlier psychoanalytic writers. This questionnaire is discussed in detail in the Methods chapter (pp.55-57).

Therapeutic approach

Young's therapeutic approach, schema-focused therapy, was developed specifically to address the needs of individuals with long-standing characterological problems (1994). An integration of cognitive, behavioural, experiential and interpersonal techniques are used, together with a greater emphasis on the therapeutic relationship, early experiences and childhood origins of difficulties than in traditional cognitive therapy (McGinn and Young, 1996). Schema identification and subsequent change are thought to be required for successful treatment and the maintenance of benefits. This has strong implications for those suffering from chronic pain. Reports of relapse following multidisciplinary pain treatment programmes are disappointingly high (Turk and Rudy, 1991). Investigation as to whether this could be explained by the presence of active EMSs that are not addressed during pain management programmes is warranted.

Summary

It is suggested that schemas should be added to cognitive models of health and illness as cognitive structures that interact with the beliefs about illness to influence illness behaviour (Williams, 1997). An individual may hold a number of dysfunctional general beliefs that underpin their maladaptive specific illness beliefs and illness behaviours. It would seem that the exploration of schemas is a way of operationalising the view, held by Engel (1959) and others, that early experiences are

important in the development and maintenance of chronic pain. EMSs may also be related to more specific pain beliefs and their change may be necessary to change pain beliefs and adjustment, and to prevent relapse following treatment. A discussion of the important role of these specific beliefs follows.

Specific Pain Beliefs

It is hypothesised that general beliefs, such as those discussed in the previous section, may interact with more specific beliefs to impact upon an individual's adjustment to chronic pain. A wide range of specific pain beliefs has been examined in pain research, using a variety of measures. Within the present study, beliefs about the nature of pain and expectancies about *its* prognosis are considered.

Given the differences found among sufferers in levels of adjustment to chronic pain, it is particularly important to examine factors of influence which may differentiate between those functioning well and those not (Jensen, Turner, Romano and Lawler, 1994). In concordance with a cognitive model of pain, the extent to which patients' specific beliefs regarding their pain experience affect their adjustment and functioning has come under scrutiny. Pain beliefs are defined as individuals' "own conceptualisations of what pain is and what pain means for them" (Williams and Thorn, 1989, p.351).

Within a cognitive framework, individuals are seen to instinctively process information regarding their condition, such as diagnosis and symptomatology, and incorporate this with long-standing personal meanings assigned to health and illness to develop specific pain beliefs (Leventhal, Zimmerman and Gutmann, 1984). Thus, chronic pain patients may hold a number of beliefs regarding their experience of pain, which are hypothesised to impact on their adjustment (Jensen and Karoly, 1992). Beliefs relating to the aetiology and subjective meaning of pain, prognosis and

personal ability to control it have all been acknowledged as influential. It is important to recognise that these beliefs do not necessarily concur with current scientific thinking about chronic pain (Williams and Thorn, 1989) and may indeed be maladaptive. Beliefs are hypothesised to exert their influence, adaptive or maladaptive, on all aspects of life with pain, including general functioning, coping, mood and psychological distress, treatment compliance and treatment outcome. For example, specific beliefs about one's personal capacity to control pain could be expected to influence one's actual ability to cope with it. A strong sense of personal control may lead to substantial employment of active coping strategies, while also impacting positively on mood by preventing a sense of helplessness (Jensen and Karoly, 1992).

Assessment of specific pain beliefs

The potential impact of pain beliefs has wide theoretical and clinical implications (Jensen, Turner, Romano and Lawler, 1994) and thorough, standardised assessment is therefore important. Schwartz, DeGood and Shutty (1985) employed a methodology to assess pain beliefs in which patients rated their levels of agreement/disagreement with information presented on a chronic pain educational videotape. Williams and Thorn (1989), meanwhile, suggested that the "commonalities in the content patients use to formulate an understanding of their condition" (p.352) were examined in order to tap into pertinent beliefs. They refer to an earlier, unpublished, study in which they asked chronic pain patients to freely describe their beliefs about their condition and which highlighted several common issues (Williams and Thorn, 1989). Factor

analysis of these issues revealed three central dimensions of pain beliefs which related to: (1) its intermittent vs. continuous nature, (2) its future duration and (3) self-blame.

The authors went on to develop a convenient measure, the Pain Beliefs and Perceptions Inventory (PBAPI: Williams and Thorn, 1989), which assesses beliefs regarding 'self-blame', the 'mysteriousness' of pain and the 'time' factor of pain. This questionnaire, along with other psychometrically valid measures available for such purposes (for example, the Survey of Pain Attitudes: Jensen, Karoly and Huger, 1987), has enabled further research into those specific beliefs considered to be intervening variables in the experience of pain. Examples of such research will be outlined below.

Research evidence for the impact of specific pain beliefs

Using their questionnaire mentioned above, Williams and Thorn (1989) conducted a study with 87 chronic pain patients to examine the relationship between specific pain beliefs and subjective pain, treatment compliance, psychological distress and health care attributions. It was revealed that the belief that pain will last for a long time was associated with both greater subjective pain intensity and decreased compliance with medical and psychological treatment (as rated by therapists). The belief that pain was mysterious was found to be associated with both decreased compliance and little improvement post-treatment in psychological distress. Furthermore, the belief that pain was mysterious and would last a long time was found to be associated with "negative perceptions of the self and a diminished sense of internal personal control over health issues" (p.357).

This study constituted one of the preliminary investigations into the relationship of specific pain beliefs to the experience of chronic pain. However, the authors did acknowledge that there were serious limitations regarding the generalisability of the results. The sample was obtained from a group of workers claiming compensation who, it was argued, as a population do not tend to self-blame and are likely to be more resistant to treatment.

Individual beliefs and attributions about the cause of pain have also come under consideration. Leventhal *et al.*'s health model (1980) suggested that the personal explanation for an illness held by an individual would contribute to the way in which they cope with that illness and respond to treatment. Within this framework, Edwards, Pearce, Turner-Stokes and Jones (1992) hypothesised that if pain symptoms are attributed to an 'external' cause they will have less of a negative impact on functioning than if attributed to an 'internal' or personal cause. In addition, as pain continues the behaviours and emotions associated with it are likely to strengthen negative attributions and limit coping ability and response to treatment. Using a newly developed questionnaire that contained items relating to the causes and consequences of pain, they compared beliefs held by a group of 100 sufferers of chronic pain of mixed aetiology with those of non-patient controls. Following factor analysis, two important belief subgroups were revealed:

1. A belief in the significance of organic factors in the experience of pain, associated with the belief that 'fate' or others, usually medical professionals, control one's health situation. This was considered to imply the existence of a "sense of

dissociation between the experience of pain and the individuals themselves” (p.271) and individuals within this subgroup were seen to have a tendency to deny the importance of psychological influences.

2. A belief in the importance of personal, psychological factors in the experience of pain, with individuals feeling that they themselves were in control of their well-being.

Chronic pain and no-pain controls were found to differ in their beliefs about pain. Those with chronic pain endorsed organic aspects, while those without pain were more likely to acknowledge that psychological factors contribute to the experience of pain. The authors hypothesised that the long-term suffering of chronic pain patients may provoke changes in their belief system and a shift away from recognising the importance of psychological factors. Alternatively, certain beliefs may predispose someone to becoming a chronic pain patient. No conclusion regarding this could be made, but certain clinical implications were highlighted within the study. It would seem that beliefs about causality might affect the way in which an individual presents their pain problem to health professionals. Furthermore, it is likely that these beliefs will impact upon an individual’s response to various treatment methods. The authors suggested that the assessment of causality beliefs might indicate those likely to benefit from cognitive-behavioural treatment components (Edwards, Pearce, Turner-Stokes and Jones, 1992)

Further implications for treatment were suggested by Jensen and Karoly (1992), who examined the relationship between specific pain beliefs and adjustment to chronic pain in a group of 118 chronic pain patients following completion of an inpatient pain management programme. Those who believed themselves to be disabled by their pain indicated significantly lower levels of activity and psychological well-being, and greater use of professional services. In addition, those who continued to believe in a medical cure for their pain were more likely to continue to use professional services. It was suggested that certain individuals might benefit from multidisciplinary treatment focusing on the use of self-reliance rather than ongoing medical intervention.

A related concept to the attributional perspective about the causes of pain is that of 'locus of control'. This framework has been widely used to consider the ways in which people explain the cause of events, with a distinction made between 'internal' and 'external' locus (Rotter, 1966), and is applicable to the way individuals regard responsibility for their health and pain. The specific impact that beliefs about locus of control can exert on mood has been examined. Crisson and Keefe (1988) found that chronic pain patients who held beliefs that their health was controlled by chance were more likely to be depressed, anxious and to have greater psychological distress than those without such beliefs. Chance beliefs were also associated with greater use of the coping strategies of praying and hoping, alongside greater helplessness with regards effective problem solving.

Relationship between pain beliefs and coping

Coping is defined as 'purposeful effort to manage the negative impact of stress' (Lazarus, 1966). Models of stress and coping are applicable to the conceptualisation of pain (Jensen and Karoly, 1991), with pain as the source of stress and coping as the attempt to manage it. Within such a framework, specific pain beliefs are considered to impact upon the attempts to cope and subsequent functioning.

People adopt various individual strategies in order to cope with their pain, such as avoidance of physical activity or seeking out alternative treatments. Coping attempts are likely to be influenced by social, cultural and developmental factors, alongside psychological determinants (Skevington, 1995) and will vary in their usefulness. Several measurements have been designed to examine a range of coping strategies in those with pain, of which the Coping Strategies Questionnaire (CSQ; Rosenstiel and Keefe, 1983) is most commonly employed.

As certain pain beliefs may induce maladaptive coping strategies, it is important to examine their influence on the use, and perceived effectiveness of, coping strategies in response to pain (Williams and Keefe, 1991). This relationship was examined in a group of chronic pain inpatients prior to participation in a pain management programme (Williams and Keefe, 1991). Following cluster analysis, three pain belief subgroups (as assessed by the PBAPI) were identified, that differed in their use of certain pain coping strategies (as assessed by the CSQ). The respective beliefs and coping strategies for each subgroup are described below, alongside the authors' clinical recommendations based on their findings. However, it should be noted that

no empirical information was gathered regarding whether these subgroups differed in terms of pain behaviour and functioning.

1. The most common subgroup (70%) was comprised of those who held the belief that their pain was mysterious and long-lasting. These patients' ratings of their ability to decrease and control pain through the use of various strategies were lower than the other subgroups. They catastrophised more, while also reinterpreting pain sensations less. They were described as those who strongly believed that their pain would last, but felt that neither they nor others could explain it well enough. This has clear implications for treatment, as if such individuals do not understand their pain they may not feel that the coping skills taught as a core part of multidisciplinary programmes would be relevant (Williams and Keefe, 1991).
2. A smaller proportion (17.5%) thought that their pain was long lasting but actually felt that they had a good understanding of it. This subgroup rated their personal ability to decrease pain as low and reported the employment of praying or hoping strategies less than other subgroups. It was suggested that they might consider such strategies pointless, as they believe pain is going to endure regardless (Williams and Keefe, 1991). Clinically, they could be considered as suffering from 'learned helplessness' (Seligman, 1972), having accepted chronicity, become complacent and seeing no value in behaviour change.

3. Finally, there was a small group of patients (12.5%) who thought that their pain would not last long and that they understood it, despite their actual duration of pain being similar to the other two groups. They rated their ability to decrease their pain significantly higher than the other two groups. It seemed that they viewed pain as a temporary problem that they could exert influence over. Not surprisingly, it was felt that individuals who held these beliefs may be those who would respond best to cognitive-behavioural treatment (Williams and Keefe, 1991). It is unfortunate that they would seem to be in the minority.

Limitations

Such studies do provide valuable information regarding the impact of specific pain beliefs on adjustment to chronic pain. However, there are inevitable limitations of the findings which require consideration. Firstly, given the heterogeneous nature of the wider client group under consideration, generalisability across studies is problematic (Holzman, Rudy, Gerber, Turk, Sanders, Zimmerman and Kerns, 1985). Samples are biased towards those presenting themselves at pain clinics and/or in receipt of treatment for their pain, leaving those members of the target population who suffer in silence, or refuse certain treatments, unaccounted for.

A prime example of sampling difficulties is evident in the series of studies conducted by Jensen *et al.* (1991; 1992; 1994). Of those invited to participate in this research, 52% did not. The authors compared participants with non-participants to find that the former were, on average, two years older and had suffered pain for 1.7 years

longer than the latter. Furthermore, this research was carried out with individuals who had completed a multidisciplinary treatment programme and who may have therefore held very different beliefs to those who had not had such treatment or who had dropped out. It was highlighted that the sample might therefore not be representative of patients seen for multidisciplinary assessment or be generalisable to other pain clinic samples.

Importantly, it has also been pointed out that results tend to be correlational and, therefore, do not provide support for causal relationships between pain beliefs and adjustment. A cognitive model proposes that pain beliefs influence functioning, but the current research does not confirm this. Nor does it rule out the possibility that adjustment influences beliefs or that there is a two-way relationship between them (Jensen, Turner, Romano and Lawler, 1994). Furthermore, a large amount of the statistical variance in adjustment to pain often remains unaccounted for by specific pain beliefs (e.g. Turner, Whitney, Dworkin, Massoth and Wilson, 1995). This may indicate that there is scope for the role of other factors that have yet to be evaluated, such as more general beliefs as hypothesised in the present study.

In addition, as yet no information has been provided on how such beliefs are formed and maintained. The possible influential impact of factors such as personality, individual development and significant others' beliefs on the formation of specific pain beliefs has yet to be considered (Jensen, Turner, Romano and Lawler, 1994). This would surely have far-reaching clinical implications.

Summary

Although a causal link between specific pain beliefs and functioning can not be made at present, the research to date has served to highlight the important role certain beliefs may play in long-term adaptation to chronic pain (Jensen and Karoly, 1992). Clinical implications stemming from this have been raised, highlighting the potential effect beliefs about pain may have on treatment process and outcome (Williams and Keefe, 1991).

However, although pain beliefs appear important in adjustment to pain, a substantial degree of variance within studies remains unaccounted for. It would therefore seem appropriate to advance research efforts regarding the factors relating to individual adjustment to chronic pain by conducting an investigation into the role of more general beliefs. In this way, psychoanalytic ideas can be married with the cognitive model and it is hoped that some light can be shed on the role of both specific and general beliefs.

Treatment

This study examines the possible impact of both EMSs and specific pain beliefs on the subjective experience of pain, the ability to use positive coping strategies and on treatment outcome. It is therefore important to outline the current treatment model and reflect on previous outcome research.

Current treatment model

As chronic pain has come to be understood as a multidimensional experience involving sensory, affective, motivational, environmental and cognitive components, it has become generally accepted that the most appropriate treatment is multidisciplinary (Pearce and Mays, 1994b). The aim of treatment is not to render the individual 'pain-free' on completion, although it is hoped that pain severity and frequency will be reduced through the adoption of cognitive and behavioural coping skills, increased activity and physical rehabilitation. Instead, treatment is aimed at rehabilitation and an improvement in quality of life (Turk and Meichenbaum, 1994).

Multidisciplinary treatment is conducted on an individual or group basis, in inpatient or outpatient settings. Yalom (1986, cited in Pearce and Erskine, 1989) emphasises the particular therapeutic advantages of group intervention, several of which are considered of particular importance to individuals with chronic pain. These include: cohesiveness, altruism, universality, installation of hope, guidance and identification. In addition, groups enable modelling and feedback, both invaluable, and are often more cost-effective than individual treatment packages.

Assessment

Initial assessment includes a functional analysis of the individual's pain problem, which involves the identification of exacerbating and maintaining factors, cognitive distortions and personal beliefs about the efficacy of their coping strategies to manage pain. An attempt is made to explain the current working model of chronic pain and to highlight the contribution of psychological factors. Suitability for multidisciplinary treatment is determined and treatment expectations and goals assessed (Williams and Erskine, 1995).

Intervention components

A variety of techniques are employed to address the wide array of factors influential on the experience of pain. Psychological input in such programmes tends to be cognitive-behavioural in orientation and aims to help restructure the way the person thinks about their pain, to increase perceived personal control and to increase day to day activity (Williams and Erskine, 1995). A collaborative approach is emphasised together with a strong educative element (Turk and Meichenbaum, 1994). The operant and cognitive methods typically used are briefly outlined below (from Williams and Erskine, 1995).

Exercise / physical fitness

In order to improve flexibility, strength and activity levels, individuals are taught a graded exercise routine that is adapted to their level. It is hoped that, together with information concerning joints, posture, healing and the nature of chronic pain, this will

discourage the tendency to avoid movement and that the effects of disuse will be gradually overcome (Williams and Erskine, 1995).

Pacing / activity management and goal setting

For a sufferer of chronic pain, overdoing 'tolerances' for everyday activities, such as standing, sitting and walking, leads to an increase in their pain. 'Pacing' refers to the technique of breaking down activities into manageable time periods, gradually increasing the tolerances as fitness, flexibility and confidence improve. Activities thus become time-contingent rather than pain-contingent. Individuals are then encouraged to return to those activities which they have been avoiding or found difficult through the use of realistic goal setting (Williams and Erskine, 1995).

Improving mood

Standard techniques of cognitive therapy are employed to enable the individual to cope better with the negative emotions, such as anxiety, depression, anger and low self-esteem, which are often present as a consequence of living with pain. Individuals are taught general cognitive skills for the identification and challenging of negative thinking. Cognitive techniques are also aimed at the modification of pain-related cognitions, and individuals are encouraged to develop effective cognitive coping strategies, such as coping self-statements, in response to their pain. The enhancement of problem solving and stress management techniques is also addressed within this component of the programme (Williams and Erskine, 1995).

Relaxation

Increased muscle tension and high levels of anxiety are common features of chronic pain. Therefore, individuals are taught applied relaxation strategies which help to reduce tension and arousal, improve performance, and are particularly helpful during periods of increased pain (Williams and Erskine, 1995).

Managing flare-ups and skill maintenance

'Flare-ups' refer to increases in an individual's usual level of pain and are an inevitable feature of chronic pain. Individuals are taught to recognise the precipitants to these flare-ups, to distinguish between helpful and unhelpful ways of managing them, and to create their own 'first aid plan' to be used during such episodes. The aim is to foster a self-management approach to increases in pain, although follow-up sessions on completion of treatment are thought to be particularly useful to enhance maintenance (Williams and Erskine, 1995).

Outcome research

There are several controlled outcome studies which report improvement on completion of multidisciplinary treatment on variables such as coping, medication use, pain intensity and functioning (Linton, 1994). A meta-analysis of 65 such studies revealed that treatment was more beneficial, in terms of both subjective ratings of pain and behavioural measures such as use of health care services, than no treatment (Flor, Fydrich and Turk, 1992). In addition, multidisciplinary treatment appeared to be more effective than treatment utilising only one discipline such as medication or physical therapy.

Limitations

There are, however, inevitable methodological limitations to such reports. Linton (1994) highlights the substantial variation between treatment programmes in terms of, for example, patient characteristics and treatment content, which makes comparisons between studies difficult. Flor *et al.* (1992) point out that many of the studies used in their meta-analysis had not employed appropriate control groups, which may have had implications for the effect size reported.

In addition, longer-term follow-up data is often not reported. When such data is available, it can be quite disheartening, revealing relapse rates of between 30–60% (Turk and Rudy, 1991). For example, Maruta, Swanson and McHardy (1990) found that, of those regarded as treatment successes on completion of multidisciplinary treatment, 53% had not maintained improvements in attitude, medication use and physical functioning at a three-year follow-up.

Relationship between outcome and specific beliefs

In concordance with the cognitive-behavioural model of pain, it is thought that the effects of treatment on pain and related functioning may be partly mediated by the effect of treatment on pain beliefs and/or coping strategies (Jensen, Turner and Romano, 1994). However, relatively few studies have specifically examined the relationship between treatment outcome and pre- to post-treatment changes in beliefs and coping. A preliminary examination of the postulated association between changes in coping and treatment benefits was carried out with a group of 74 chronic pain sufferers following receipt of a cognitive-behavioural group programme (Turner and

Clancy, 1986). It was revealed that pre-to-post increase in the use of praying/hoping strategies was associated with decreased pain intensity. In addition, decreased catastrophising was linked to pre-post decrease in pain intensity and increased psychosocial functioning.

A later study found that post-treatment benefits were associated with both changes in coping strategies employed and in certain pain beliefs (Jensen, Turner and Romano, 1994). Following inpatient multidisciplinary treatment, improved psychological and physical functioning was associated with less endorsement of beliefs that there is a medical cure for pain, that pain is a sign of damage, and that disability is associated with pain. Furthermore, decreased use of catastrophising and praying strategies was related to improved psychological well-being and decreased health-care use. However, changes in particular behavioural coping strategies addressed within treatment, such as exercise and relaxation, did not significantly account for post-treatment improvement. As the authors pointed out, this may have quite serious implications for the appropriateness and efficacy of the content of multidisciplinary treatment programmes.

Future needs

Little is known about which particular components of multidisciplinary programmes and which patient beliefs and behaviours are associated with improvement. Research is needed to elucidate questions regarding the process of improvement with treatment. In particular, issues concerning why some improve and others do not, the maintenance of treatment benefits, and what treatments are suited to which individual

psychological and clinical characteristics all need to be addressed (Turner, Whitney, Dworkin, Massoth and Wilson, 1995).

Moreover, further research is required regarding the appropriateness of current treatment programmes and the theoretical models that underpin them. Hanson and Gerber (1990) highlight the danger of the rigid and exclusive use of a cognitive-behavioural approach and suggest that a significant number of individuals with chronic pain need specific psychodynamic or systemic issues addressed through longer-term psychotherapy or family therapy. It is hoped that the present study will add to this discussion of appropriate treatment by exploring the potential role of schemas in adjustment to chronic pain.

The present study

The debilitating experience of chronic pain has come to be viewed within a multidimensional perspective, which integrates social, psychological and physiological dimensions. The present study is an attempt to advance previous psychological research that has investigated factors thought to be influential on an individual's adjustment to chronic pain. It adopts the cognitive framework of early maladaptive schemas as a way of operationalising the view, held by Engel (1959), that early experiences are important in the development and maintenance of chronic pain.

Proposed model

The hypothetical model employed within the present study can be seen diagrammatically below. It should be noted that the arrows do not indicate causality.

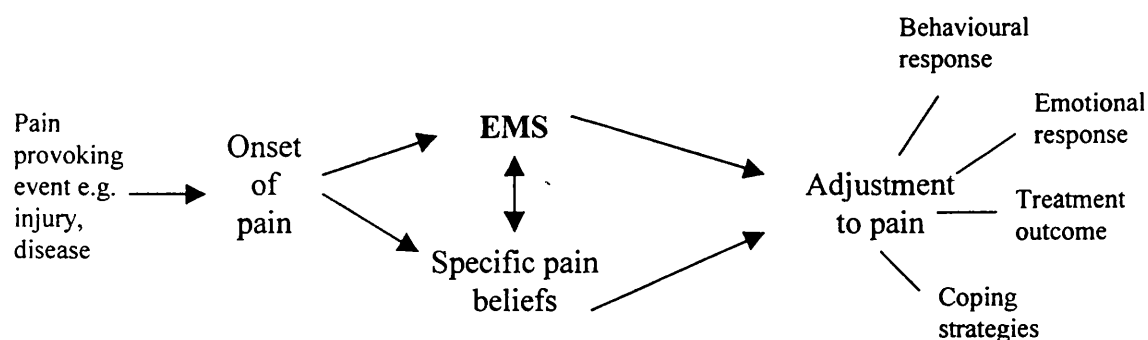


Figure 2. Schema model of chronic pain (adapted from Williams, 1997)

It is suggested that an event leads to the experience of pain which then triggers both early maladaptive schemas (EMSs) and specific pain beliefs. These then may both impact on the subjective experience of pain, the ability to use positive coping strategies and on treatment outcome. It is proposed therefore that the exploration of EMSs, alongside more specific pain beliefs, may enrich our understanding of the experience of chronic pain and reveal implications for treatment. Changes in EMSs may be necessary to change pain beliefs and functioning and prevent relapse.

Research questions

This study asks a series of research questions as follows:

1. What sort of early maladaptive schemas do people with chronic pain have?
2. Do early maladaptive schemas and specific pain beliefs relate to each other?
3. Do people with chronic pain have significantly more early maladaptive schemas than people with acute pain?
4. Is there a relationship between early maladaptive schemas, specific pain beliefs and post-treatment benefits?
5. Is there a relationship between early maladaptive schemas and the maintenance of treatment benefits?

METHOD

Settings

Chronic pain

The chronic pain sample was obtained from a multidisciplinary chronic pain service in a large London teaching hospital. Their outpatient group pain management programme aims to teach individuals suffering from chronic pain a variety of self-management strategies in order to improve their overall coping with pain and its long-term consequences. Following comprehensive individual assessment, participants join a group of ten for the programme which runs for nine separate days over an eight-week period. Treatment consists of the following components: dissemination of information about pain; exercise/physical fitness; pacing/activity management; management of flare-ups; cognitive therapy and relaxation/self-hypnosis.

Acute pain

The acute pain sample was obtained from a specialist dental hospital in London where routine procedures are carried out in an outpatient day care unit. Patients are admitted for a half-day and their procedure is carried out under general anaesthetic. Following surgery, patients recover in the unit, receive appropriate after-care instructions and are given a supply of analgesic medication. They usually go home one to three hours after their operation. The sample was drawn from patients undergoing either wisdom teeth extraction, cyst removal or implants. Implants refers to a procedure carried out following teeth extraction. It involves drilling 'pegs' into the jawbone, on to which prostheses are then attached. All these procedures result in

some degree of post-operative pain. It is predicted that this will be at its worse on the day following the operation, when anaesthetic effects have worn off.

Cognitive effects of anaesthetic drugs are usually short lived, from a few hours to a few days depending on the length and type of surgery and various patient characteristics (Mewaldt, Ghoneim and Block, 1994). The dental surgery which patients included in this study underwent was brief and uncomplicated. There is no evidence to suggest that they would have experienced cognitive effects as a result of anaesthesia that would interfere with their ability to complete the questionnaires.

There were several reasons behind the choice of an acute pain sample as a comparison group. From a theoretical viewpoint, since it is hypothesised that those who develop chronic pain have had EMSs triggered by their experience of pain, it seemed most appropriate to have a comparison group who had also had this experience of pain but in whom the time factor was excluded. They are an important group to use in an examination of whether there are differences with regards EMSs between those who experience pain and go on to become chronic pain patients as opposed to those who experience pain and do not.

Acute dental pain was chosen above other forms of acute pain, as it is relatively 'non-traumatic' or invasive. It was hoped that this would reduce the risk of additional EMSs, triggered by trauma for example, rather than those triggered by the subjective experience of pain *per se*. In addition, the dental surgery was relatively short and involved minimal levels of anaesthetic drugs. From a more practical perspective, an

acute dental pain sample was thought to be relatively accessible and has been used as a comparison group in previous studies on chronic pain (e.g. Ackerman and Stevens, 1989).

Design

This study comprised of three elements and was of mixed design:

1. An initial descriptive analysis of the chronic pain sample.
2. A cross-sectional descriptive comparison between the chronic pain and the acute pain sample.
3. A short-term longitudinal study, using a repeated measures design, which examined responses made by the chronic pain sample before and after treatment in a multidisciplinary pain management programme and at a three-month follow-up.

Participants

Chronic pain sample

Participants were recruited from individuals in receipt of the established outpatient multidisciplinary pain management programme. They were suffering from chronic pain of mixed aetiology, which was considered to be of either 'gradual' (no clearly identifiable cause) or 'traumatic' onset (accidental or deliberate physical trauma, e.g. due to surgery). Each treatment group contained a maximum of ten individuals and five such groups were run during the recruitment phase of March 1998 to April 1999. A total of 44 individuals took part in these groups. Criteria for inclusion in the treatment group included an ongoing experience of pain, which had lasted for a minimum of three months, with associated interference in customary activities and

behavioural and functional goals. Current psychiatric illness was considered to be an exclusion criteria for the group. To be included in this study, participants had to meet these criteria and also have sufficient English to complete the measures. Thirty-eight individuals met the inclusion criteria and, of these, four declined participation. Thus, 34 individuals provided pre-treatment data. Twenty-five participants completed treatment prior to the end of the data collection period and, of these, 22 provided post-treatment data. One individual who had initially been included in the study dropped out of the treatment programme. Meanwhile, of the 19 participants who completed treatment three months prior to the end of the data collection period and who were therefore asked to complete the follow-up questionnaires, 15 did so.

Acute pain sample

Participants with post-surgical acute pain were recruited from a consecutive series of individuals admitted to the dental hospital for routine, outpatient procedure under general anaesthetic. Exclusion criteria included insufficient English to complete the questionnaires and previous experience of chronic pain and/or a personal history of psychiatric illness. During the recruitment phase, between March 1998 and April 1999, 58 individuals were available to be approached regarding the study. Of these, 50 met the inclusion criteria and agreed to take part following their operation. Twenty-eight (56%) individuals subsequently returned their questionnaires and were included in the study. Twenty-four had undergone wisdom tooth extraction, one had undergone molar extraction, one had undergone an implant procedure and one had undergone removal of a cyst. All procedures were done under general anaesthetic and resulted in some degree of post-surgical pain.

Measures

Predictive measures

Young's Schema Questionnaire (SQ; Young and Brown, 1990; revised 1994. Appendix 3, pp.153-165)

A 205-item self-report questionnaire designed to assess the presence of 16 early maladaptive schemas (EMSs) identified by Young (1990, 1994) through his clinical experience of working with chronic and/or 'difficult' psychotherapy patients. The schemas are labelled as follows: 'emotional deprivation'; 'abandonment/instability'; 'mistrust/abuse'; 'social isolation/alienation'; 'defectiveness/shame'; 'social undesirability'; 'failure'; 'dependence/incompetence'; 'vulnerability to harm or illness'; 'enmeshment/undeveloped self'; 'subjugation'; 'self-sacrifice'; 'emotional inhibition'; 'unrelenting standards'; 'entitlement/grandiosity' and 'insufficient self-control/self-discipline' (see Appendix 1, pp.147-150 for definitions). Fifteen of these EMSs are grouped within the following five higher-order schema domains – 'disconnection and rejection', 'impaired autonomy and performance', 'impaired limits', 'other directedness' and 'overvigilance and inhibition' (see Appendix 2, pp. 151-152, for higher-order domain structure). Factor analysis of the questionnaire found that the 'social undesirability' schema merged with the conceptually similar 'defectiveness/shame' schema (Schmidt, Joiner, Young and Telch, 1995). It is currently not included within the higher-order domain structure.

Each item on the questionnaire is a self-statement relating to one of these schema and is rated using a six-point scale (1 = 'completely untrue of me', 2 = 'mostly untrue of

me', 3 = 'slightly more true than untrue', 4 = 'moderately true of me', 5 = 'mostly true of me', 6 = 'describes me perfectly'). Clinically, Young (1994) suggests that items scored 5 or 6 should be discussed with the individual. The more items scored 5 or 6 within each EMS factor subscale, the more prominent it is assumed that EMS is for the individual. This may indicate potentially important areas for therapeutic intervention. For research purposes, scores are summed for each schema and it is assumed that the higher the score the more the individual loads on that EMS (Schmidt *et al*, 1995). Prior to analysis in the present study, scores on each schema and higher-order schema domain were summed then divided by the number of items within that schema/domain to provide mean scores.

No statistical norms are currently available for this Schema Questionnaire, although preliminary validation has been provided by Schmidt *et al.* (1995). They conducted a factor analysis of the questionnaire, using both an undergraduate population and a smaller clinical sample, which largely confirmed the EMS factor structure proposed by Young (1990). Both internal consistency and test-retest reliability were also shown. Convergent and discriminant validity were tested with respect to measures of self-esteem, psychological distress and cognitive vulnerability for depression. As predicted, EMSs were found to be negatively correlated with high self-esteem and positively correlated with dysfunctional attitudes and distress.

Although the authors acknowledged the limitations associated with the reliance on self-report measures, they concluded that the questionnaire was a valuable tool in

both research and clinical practice. Moreover, it is presently the only available measure with which to assess EMSs.

A shorter version of the questionnaire (160 items) has been developed by using the five highest loading items on each of the factors found in Schmidt *et al.*'s (1995) preliminary psychometric research. Although Young felt that this would be appropriate for use in research and likely to assess EMSs fairly accurately (personal communication, 1998), no research has yet been completed with it and issues of reliability and validity remain unclear. It was therefore decided, despite its length, to use the original version of the questionnaire in this study.

Pain Beliefs and Perceptions Inventory (PBAPI; Williams and Thorn, 1989. Appendix 4, pp. 166-168)

This is a 16-item questionnaire designed to assess the presence of three, factor analytically derived, pain belief dimensions: (1) 'self-blame' – the belief that pain is caused or maintained by the individual; (2) 'mystery' – the perception of pain as mysterious and poorly understood and (3) 'time' - beliefs about the duration of pain.

The scale measures the extent of agreement/disagreement with each individual pain belief using a four-point Likert scale, ranging from -2 (strongly disagree) to +2 (strongly agree), with no zero point. Scores are then summed for each belief dimension, with a low or negative score indicating a lack of presence of that belief and a high, positive score indicating a strong belief.

Considerable attention has been paid to the psychometric properties of this questionnaire, with good reliability and construct validity revealed (DeGood and Shutty, 1992). While initial factor analysis resulted in three dimensions, there is some evidence for a four-factor structure. Later studies have found that 'mystery' and 'self blame' remain but 'time' is split into two factors of 'permanence', the belief about long-term chronicity, and 'constancy', the belief that pain is constant (Herda, Siegeris and Basler, 1994; Strong, Ashton and Chant, 1992). The authors acknowledge that this discrepancy may be due to a variety of differences between the samples used in the respective studies. For example, in later studies the duration of pain is longer (an average of ten years as opposed to an average of three years), they had an older mean age and were recruited from a hospital based outpatient pain clinic as opposed to an industrial rehabilitation centre.

It was decided to adopt the four-factor solution for the present study, as the chronic pain sample appears more similar to the samples in those studies finding four-factor solutions in that it is from a British population (as in Strong *et al.*, 1992), has a longer mean duration of pain and is from a NHS outpatient pain service. In addition, it was felt that, conceptually, a four-factor solution which recognised a difference between believing that pain was 'always present' and believing that it 'always will be' made more sense particularly with respect to an acute pain sample. Indeed, Williams and Thorn (1989) themselves originally suggested this distinction in their initial beliefs structure.

There are several available questionnaires designed to measure pain beliefs such as one's ability to control pain, the cause of pain and the feasibility of a medical cure. The PBAPI was chosen for the purposes of this study as beliefs regarding pain constancy, permanency, mysteriousness and self-blame are thought to be particularly pertinent to adjustment to long-term pain and treatment outcome (Williams and Keefe, 1991). For example, the treatment programme in this study has a strong educational component which is hypothesised to change beliefs about mystery in particular. On a more practical note, the measure is brief and simple to administer and patients have reported it to be easily completed (Williams and Thorn, 1989).

Outcome measures

Hospital Anxiety and Depression Scale (HADS; Zigmond and Snaith, 1983. Appendix 5, p.169)

This is a widely used self-report measure developed to assess mood state in a hospital outpatient population, with both anxiety and depression subscales. Assessment of mood in chronic pain patients can be problematic as certain somatic symptoms of depression and anxiety, such as fatigue, appetite disturbance and insomnia, are also common symptoms associated with the physical aspects of chronic pain itself (Pearce and Mays, 1994a). The HADS is an important measure for all pain assessment and research in that it almost entirely avoids somatic symptoms. It has been shown to be both a reliable and valid measure for the detection of clinically significant anxiety and depression in medical outpatient settings (Aylard, Gooding, McKenna and Snaith, 1987; Lewis and Wessely, 1990).

There is some uncertainty as to the most appropriate clinical cut-off score for this measure. The authors suggested that, for optimum sensitivity, a distinction be made between 'non-cases' (a score of 0-7), 'doubtful cases' (a score of 8-10) and 'definite cases' (a score of 11 or more) for both anxiety and depression subscales (Zigmond and Snaith, 1983). Others have agreed with this distinction (Wilkinson and Barczak, 1988) while some have argued for the use of a more stringent 10/11 threshold (Lewis and Wessely, 1990). In the present study, it is not diagnosis of mood disorder that is of interest but rather some indication of the extent of psychological distress experienced by the samples. A score between 8-10 will therefore be taken as borderline and indicative of some sign of clinical anxiety or depression.

Visual Analogue Scale (VAS; Scott and Huskisson, 1976. Appendix 6, p170)

Pain intensity, both 'at the moment' and 'over the past week', was measured by a 10cm horizontal VAS on which the individual indicated perceived intensity. End-points were labelled 'no pain' and 'worst pain imaginable'. A similar scale was employed to measure pain distress, with end-points labelled 'the least distressing you can imagine' and 'the most distressing you can imagine'.

The VAS is a quick and easy measure to administer and score, described as "...robust, sensitive and reproducible.... enabling a patient to express the severity of their pain in such a way that it can be given a numerical value" (Huskisson, 1983). It has been shown both to correlate with other more objective measures of pain intensity (Gaston-Johansson and Gustafsson, 1990) and to be internally consistent (Price and Harkins, 1987).

Although such rating scales are the most common method with which to measure the intensity and quality of pain, they have been subject to criticism. For example, it is argued that simple, one-dimensional scales fail to adequately address the complexity and multidimensional nature of pain (Pearce and Mays, 1994a; Skevington, 1995). The distinction between the 'intensity' and the 'distressing nature' of pain is an attempt to address this. The VAS was employed in the present study due to its simplicity, practicality and widespread research use.

Coping Strategies Questionnaire (CSQ; Rosensteil and Keefe, 1983. Appendix 7, pp. 171-173)

A well validated, 44-item self-report questionnaire developed to assess a range of behavioural and cognitive coping strategies which an individual may employ. The following strategy subscales are assessed: (1) diverting attention; (2) coping self-statements; (3) praying or hoping; (4) increased behavioural activity; (5) reinterpretation of pain sensations; (6) ignoring pain sensations and (7) catastrophising. It should be noted that the subscale 'catastrophising' is generally considered to be a maladaptive strategy (Jensen, Turner and Romano, 1994). Individuals rate each item, with regards to how often they use that coping strategy, on a seven-point scale, ranging from 0 = 'never' to 6 = 'always'. Also included are two ratings of perceived effectiveness of such strategies in terms of ability to control pain and ability to decrease pain. The questionnaire has been shown to be internally consistent (Rosensteil and Keefe, 1983).

Initial factor analysis identified three factors that accounted for most of the variance in CSQ responses (1. cognitive coping and suppression; 2. helplessness and 3. diverting attention or praying) and predicted concurrent functioning and adjustment to chronic pain (Jensen and Karoly, 1991; Rosensteil and Keefe, 1983). The factor 'cognitive coping and suppression', which includes subscales of 'coping self-statements', 'reinterpretation of pain sensations' and 'ignoring pain sensations', is thought to represent a more proactive way of coping with chronic pain. In the present study it was used as a measure of outcome as it was thought to correspond to the positive coping strategies encouraged within the cognitive-behavioural component of the treatment programme.

The MOS 36-Item Short-Form Health Survey (MOS-36; Ware and Sherbourne, 1992. Appendix 8, pp.174-178)

A standardised self-report, multi-item scale, for use in clinical practice and research, designed to assess health status. The scale assesses eight health concepts: (1) Physical functioning; (2) Social functioning; (3) Limitations in usual role activities due to physical health problems; (4) Bodily pain; (5) General mental health; (6) Limitations in usual role activities due to emotional problems; (7) Vitality and (8) General health perception.

Responses are scored in three steps according to the scoring information provided with the questionnaire – (1) item recoding; (2) transformation of raw scores to raw scale scores and (3) transformation of raw scale scores to a 0 – 100 scale. The

questionnaire is scored so that a higher score indicates a better health state. For example, a high score on the bodily pain scale indicates relative freedom from pain.

The psychometric properties of the scale have been evaluated, with good reliability and validity shown (McHorney, Ware, Lu and Sherbourne, 1994). This questionnaire was used in the present study as a measure of current functioning.

Procedure

Ethical considerations

Local Research Ethical committee approval for the study was sought and granted (see Appendix 9, p.179).

Chronic pain treatment group

All individuals enrolled for the group pain management programme attended a pre-treatment preparatory session with the multidisciplinary team. During this session the researcher approached those individuals who met inclusion criteria (as verified by the team) and explained the purpose and nature of the study. It was explained that participants would be asked to complete a set of questionnaires, in addition to those routinely used as part of the pain management programme, on three occasions – before entering the programme, on completion of it, and at three-months follow-up. They were assured that their decision whether or not to participate would not affect their care and management in any way, and that they were free to leave the study at any time should they wish. They were asked to read an information sheet (see Appendix 10, p.180) and invited to ask any questions.

For those who agreed to take part in the study, written informed consent was obtained (see Appendix 11, p.181). All participants were assured of the confidentiality of their responses. The researcher then introduced the questionnaires to the individual, explaining the various requirements of each. Individuals were given the choice of completing the questionnaires while at the programme meeting or taking them home to complete that evening and return in the stamped addressed envelope provided. This was because the questionnaires were quite lengthy, taking on average one hour to complete, and participants were likely to be tired following the session. All participants were given a contact number for the researcher so that they could discuss the study or any issues raised during or following completion of questionnaires. This was particularly important as there was a small possibility that, for some, completing the questionnaires may prove distressing. Indeed, it is important to note that the researcher took care to explain that some of the questionnaires were of a personal nature, which asked questions about past and present experiences, thoughts and feelings, that may have proved difficult to think about. It was ensured that each individual was fully aware of this and the steps to take should they have become distressed as a consequence of participation.

The researcher met with participants again on the last day of the treatment programme and, if it took place within the data collection period, at the three-month follow-up session, to provide them with further questionnaires. Individuals were again given the choice of completing the questionnaires while at the programme meeting or taking them home to complete that evening and return in the stamped

addressed envelope provided. At these times an opportunity was always provided to discuss any difficulties with the questionnaires or with the study in general.

Acute pain comparison group

Individuals were approached by the researcher on admission to the surgical ward. Firstly, the purpose and nature of the study was verbally explained, in addition to the provision of an information sheet (see Appendix 12, p.182). Inclusion and exclusion criteria were verified, followed by an invitation to participate. For those who agreed to take part in the study, written informed consent was obtained (see Appendix 13, p.183). The researcher then introduced the questionnaires to the individual, explaining the various requirements of each. All participants were assured of the confidentiality of their responses. They were asked to complete the questionnaires on the morning following their operation, when pain was predicted to be at its maximum, and were provided with a stamped addressed envelope in which to return them. Acute pain participants completed the questionnaires on one occasion only. As with the chronic pain sample, it was ensured that each individual was made aware of the potentially distressing nature of the questionnaires. All participants were given a contact number for the researcher so that they could discuss the study or any issues raised if necessary.

Statistical analysis

Statistical analysis of the data was undertaken using SPSS for Windows Release 7.5.1. (Dec. 20 1996). An initial descriptive analysis of the data was undertaken, followed by the employment of inferential statistical procedures. Statistical

associations between variables such as EMSs, pain beliefs and measures of functioning were measured through correlation coefficients. The exploration of differences between chronic and acute groups was conducted with multivariate analysis of variance (MANOVA) and independent t-tests. Repeated measures analysis of variance tested for changes across time with the longitudinal data. Multiple regression analyses examined the relationship between EMSs, pain beliefs and outcome, while discriminant function analysis was used to predict membership of 'improved' or 'not improved' groups.

RESULTS

Overview

The Results chapter addresses each research question in turn and is divided into four main sections. The first section describes a brief examination of the psychometric properties of the Schema Questionnaire and the Pain Beliefs and Perceptions Inventory. The second section provides a detailed description of the characteristics of the chronic pain sample, including their demographic details and scores on predictive and outcome measures. The following section continues with a cross-sectional descriptive comparison of EMS scores and specific pain belief scores between this chronic pain sample and the acute pain comparative sample. The final section presents results from the short-term longitudinal study, using a repeated measures design, which examined responses made by the chronic pain sample before and after treatment and at a three-month follow-up.

Data preparation

Prior to analysis, all variables were examined for accuracy of data entry, missing values, and distribution. Missing values were replaced with the appropriate group mean, as recommended by Tabachnik and Fidell (1989). In order to meet the assumptions of multivariate analysis, skewness and kurtosis were reduced through transformation of data where required, again following Tabachnick and Fidell (1989). The variables were first examined separately for the chronic and acute groups. Subsequently, to allow for longitudinal comparison, the chronic pain

sample's post-treatment and follow-up data were subject to identical transformations as for their pre-treatment data.

Schema Questionnaire (SQ) variables of 'emotional deprivation', 'abandonment', 'social undesirability', 'failure', 'dependence', 'enmeshment' and 'entitlement' required logarithmic transformation. Square root transformations were performed on SQ variables of 'mistrust', 'social isolation', 'defectiveness', 'vulnerability to harm', 'subjugation', 'emotional inhibition', 'unrelenting standards' and 'insufficient self-control'. Square root transformations were also necessary for higher-order variables of 'disconnection and rejection', 'impaired autonomy' and 'overvigilance and inhibition', while 'impaired limits' required a logarithmic transformation. All MOS 36-item Short-Form Health Survey (MOS) variables were subject to square root transformation and subsequently met or approached the assumption of normality, with the exception of the variable 'role physical'. It was decided to keep this variable in the analysis, but to interpret any findings relating to it with caution.

The comparative data was also examined for the presence of outliers by means of boxplots. One acute pain case with an extremely high score on the PBAPI subscale of 'self-blame' was revealed and two chronic pain cases with extremely high scores were identified, one on the SQ higher-order factor 'disconnection and rejection' and the other on the SQ higher-order factor 'impaired autonomy'. In order to retain these cases for analyses, it was decided to alter their scores on these variables by reducing them slightly (so that they are still greater than the next greatest score in the distribution), as suggested by Tabachnik and Fidell (1989).

Section 1: Psychometric properties

Reliability analysis of the Schema Questionnaire (SQ): internal consistency

Given the limited published data on the psychometric properties of Young's schema questionnaire (1990), it was decided to examine the internal consistency of each proposed domain by calculating Cronbach's alpha coefficient (α) before proceeding with the description of EMSs in the chronic pain sample and the subsequent comparison with an acute pain sample. The SQ consists of 205 items that are divided into 16 schemas and five higher-order schema domains. Using data from both chronic and acute pain samples ($N = 62$), Cronbach's alpha suggested that all EMSs and higher-order domains were reliable (α range = 0.88 - 0.94).

Pain Beliefs and Perceptions Inventory (PBAPI): validity analysis

The internal consistency of the PBAPI subscales was also computed by calculating Cronbach's alpha coefficient (α), using both chronic and acute pain samples ($N = 62$), and showed that all four subscales 'mystery', 'self-blame', 'constancy' and 'permanency' were reliable ($\alpha = 0.90$; $\alpha = 0.86$; $\alpha = 0.89$; $\alpha = 0.93$ respectively).

Given the debate over the most appropriate factor structure for the PBAPI, it was decided to carry out a correlational analysis between the two time factors 'constancy' and 'permanency'. Pearson product-moment correlations were carried out for the chronic pain ($N = 34$) and acute pain ($N = 28$) samples independently. No significant

correlation between these two factors was revealed for either group ($r = .165, p = .352$; $r = .154, p = .434$ respectively), which suggests that they are measuring different concepts and supports the decision to adopt the four-factor structure in the present study.

Coping Strategies Questionnaire (CSQ): composite score

In order to reduce the number of variables entered into the analyses, an a priori decision, based on the results of a factor analysis (Rosensteil and Keefe, 1983), was made to reduce the CSQ data. A composite score was calculated which included the subscales of 'coping self-statements', reinterpretation of pain sensations' and 'ignoring pain sensations'. This was named 'cognitive coping and suppression'. Pearson product-moment correlations ($N = 34$) revealed that 'ignoring pain sensations' positively correlated with both 'reinterpretation of pain sensations' and 'coping self-statements' ($r = .410, p = .042$; $r = .517, p = .008$ respectively). However, 'coping self-statements' and 'reinterpretation of pain sensations' did not correlate ($r = .256, p = .216$).

Section 2: Descriptive analysis of a chronic pain sample

Description of the chronic pain sample

The sample was obtained from a multidisciplinary chronic pain service. Descriptive information was gathered from 34 people suffering from chronic pain. More females ($N = 28$) than males ($N = 6$) comprised this sample. Their average age was 47.2 years (range = 22-74 years, $SD = 12.96$). The majority of the sample (67.7%) were married or co-habiting, with the rest single (32.3%). 73.5% of the sample were not working at time of assessment – 85.2% primarily due to pain.

The mean duration of pain complaint was 7.76 years (range = 1.5-20 years, $SD = 5.36$). Pain was of mixed aetiology, with onset considered as ‘gradual’ (no clearly identifiable precipitating event) for 79.4% of the sample, and ‘traumatic’ (accidental or deliberate physical trauma) for 20.6%. Participants presented with a number of primary pain sites including back, neck, shoulders and legs. Most commonly, individuals reported pain in three or more sites (58.8%), followed by two sites (32.4%). Only 8.8% of individuals experienced pain in a single site.

Subjective pain intensity and distress

As measured by the Visual Analogue Scale (VAS; 0 = ‘no pain’ to 100 = ‘worst pain imaginable’), the average pain intensity at time of assessment was 57.54 (range = 20–90, $SD = 17.92$) and over the past week was 70.66 (range = 30-100, $SD = 18.04$). Average pain distress at time of assessment was 50.80 (range = 10–100, $SD = 22.40$) and over the past week was 67.84 (range = 20-100, $SD = 21.84$).

Mood and current functioning

Mean ratings of mood, measured by the Hospital Anxiety and Depression Scale (HADS), and current functioning, measured by MOS subscales, were calculated for the chronic pain sample and are shown in Table 1.

Table 1. Scores on HADS and MOS-36 subscales for the chronic pain sample pre-treatment ($N = 34$)

Measure subscale	Mean	SD	Range
HADS anxiety	11.97	3.77	3 – 21
HADS depression	9.12	3.85	3 – 16
MOS physical functioning	33.53	21.97	5 – 95
MOS role physical	5.15	14.79	0 – 75
MOS bodily pain	19.56	12.09	0 – 62
MOS general health	42.19	22.14	5 – 92
MOS vitality	28.38	18.33	5 – 85
MOS social functioning	42.42	23.79	0 – 100
MOS role emotional	24.50	36.97	0 – 100
MOS mental health	49.53	19.27	8 - 80

Note. MOS raw scale scores were transformed to a 0 – 100 scale. A higher score indicates a better state of health.

As can be seen from Table 1, there was a large degree of variation in the range of responses on each MOS subscale. However, group mean scores indicate that the sample were considerably limited across each health concept.

Using a clinical cut-off/threshold point of 7/8 for the HADS, as recommended by Wilkinson and Barczak (1988), 88% of the chronic pain sample displayed signs of clinical anxiety and 73.5% displayed signs of clinical depression. Using a more stringent 10/11-point cut-off, as recommended by Lewis and Wesley (1990), 64.6% of the chronic pain sample scored within the clinical range for anxiety and 32.3% for depression.

Coping strategies

Mean scores for the employment of a range of cognitive and behavioural coping strategies, as assessed by the CSQ, were calculated for the chronic pain sample (0 = 'never use' to 6 = 'always use'). Certain strategies are considered adaptive, while others are considered to be maladaptive. The adaptive strategy with the highest mean score was 'coping self-statements' ($M = 3.61$, $SD = 0.90$), followed in decreasing order by 'diverting attention' ($M = 2.82$, $SD = 1.33$), 'increased behavioural activities' ($M = 2.74$, $SD = 1.08$), 'ignoring pain sensations' ($M = 2.51$, $SD = 0.93$), 'praying' ($M = 2.48$, $SD = 1.77$) and 'reinterpreting pain sensations' ($M = 1.41$, $SD = 1.03$). The maladaptive strategy of 'catastrophising' had a mean score of 2.71 ($SD = 1.14$).

Summary

The above results show that the chronic pain sample had low scores on measures of current functioning and high scores on measures of psychological distress. Their scores on the employment of particular adaptive coping strategies varied, but overall were not optimal. An exploration of their responses on the predictive measures follows.

Research Question 1

What sort of early maladaptive schemas do people with chronic pain have?

To address the question of what sort of EMSs people with chronic pain held, responses made on the SQ were rigorously explored and are described in detail below. An initial analysis of the mean scores for each schema was conducted and is shown in Table 2.

Table 2. Early maladaptive schema mean scores, standard deviation and range for the chronic pain sample pre-treatment ($N = 34$)

Early maladaptive schema	Mean	SD	Range
Self-sacrifice	3.52	0.84	2.12 – 5.53
Unrelenting standards	3.07	1.11	1.44 – 5.81
Emotional deprivation	2.80	1.45	1.00 – 5.67
Emotional inhibition	2.61	1.22	1.00 – 5.67
Insufficient self-control	2.54	0.98	1.00 – 4.87
Social isolation / alienation	2.47	1.22	1.00 – 5.70
Failure	2.47	1.23	1.00 – 5.00
Vulnerability to harm or illness	2.45	0.99	1.00 – 5.62
Subjugation	2.40	1.11	1.10 – 5.80
Social undesirability	2.38	1.02	1.00 – 4.67
Abandonment / instability	2.28	1.11	1.00 – 5.39
Entitlement / grandiosity	2.20	1.06	1.00 – 5.73
Mistrust / abuse	2.19	0.87	1.00 – 4.41
Dependence / incompetence	2.07	0.76	1.00 – 4.47
Defectiveness / shame	1.97	0.84	1.00 – 4.27
Enmeshment / undeveloped self	1.77	0.97	1.00 – 5.00

Note. Ratings were on a six-point scale from 1 = ‘completely untrue of me’ to 6 = ‘describes me perfectly’.

These EMSs are also conceptually grouped within five higher-order domains. Higher-order scores are derived from the mean of those EMS scores included within that higher-order domain. Table 3 provides these mean scores for each higher-order schema domain for the chronic pain sample pre-treatment.

Table 3. Mean, standard deviation and range of higher-order schema domain scores for the chronic pain sample pre-treatment ($N = 34$)

Higher-order schema domain	Mean	SD	Range
Other directedness	2.96	0.77	1.71 – 4.58
Overvigilance & inhibition	2.84	1.08	1.33 – 5.74
Impaired limits	2.37	0.87	1.14 – 4.61
Disconnection & rejection	2.34	0.92	1.00 – 5.09
Impaired autonomy & performance	2.19	0.85	1.00 – 4.88

As can be seen from the tables, the chronic pain sample as a whole seemed to have relatively low scores on the SQ. However, it should be noted that there was a wide variation in scores, as shown by the range, and that some domains with a lower mean score actually had a higher maximum score. It was felt that a group mean score does not adequately provide information that could be considered clinically relevant. Clinically, Young (1994) suggests that any question rated with a 5 or 6 ('mostly true of me' or 'completely true of me') should be discussed with the client. It is assumed that the more items scored 5 or 6, the higher the individual is on that schema dimension. Therefore, in order to gather a richer clinical picture of the presence of early maladaptive schemas in people with chronic pain, it was decided to calculate the percentage of the sample scoring within a 'clinical range' on each EMS in turn.

Given that the primary focus of Young's work was on the assessment and treatment of EMSs in those with personality disorders, it was felt that a 'clinical scoring criteria' of 5 or 6 would be too stringent for the current research purposes. For the present data analysis it was therefore decided that positive endorsement of an item, indicated by a score greater than the median of the possible range of scores (3.5), would be considered to be within the 'clinical range'. Scores were categorised into 'clinical' (scoring ≥ 3.5) and 'non-clinical' (scoring < 3.5) and their respective frequencies calculated for each schema as shown in Figures 1 – 5.

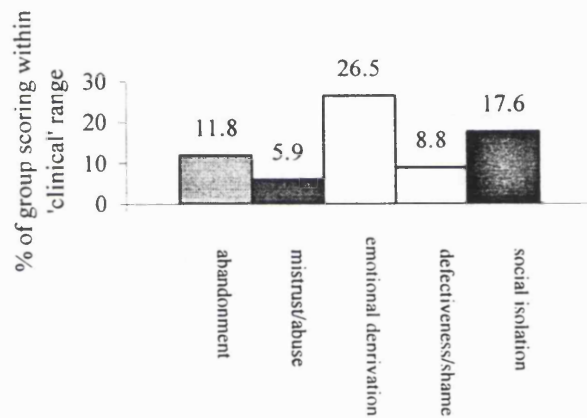


Figure 1. Disconnection and rejection

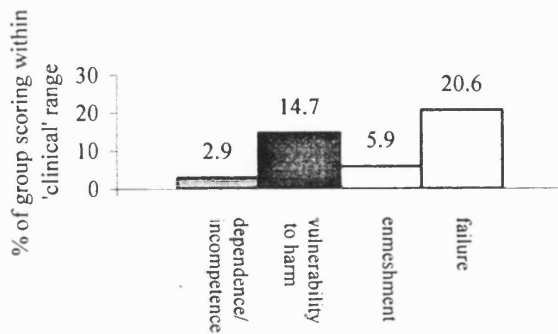


Figure 2. Impaired autonomy and performance

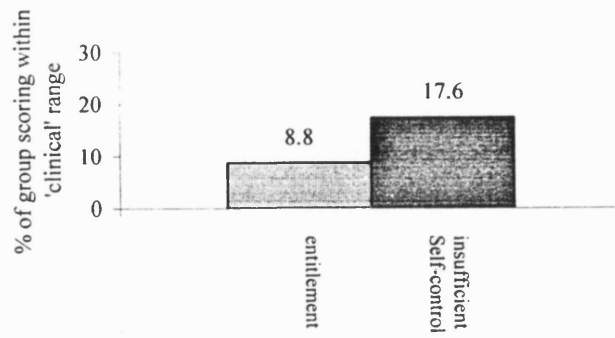


Figure 3. Impaired limits

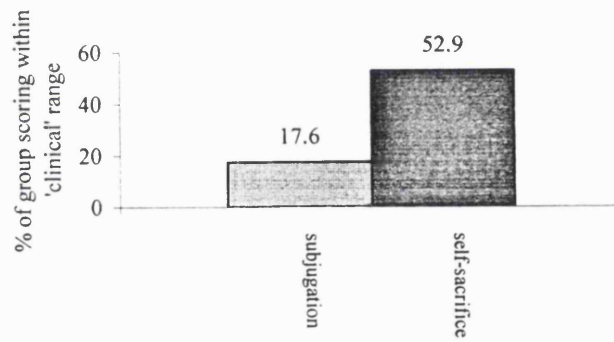


Figure 4. Other directedness

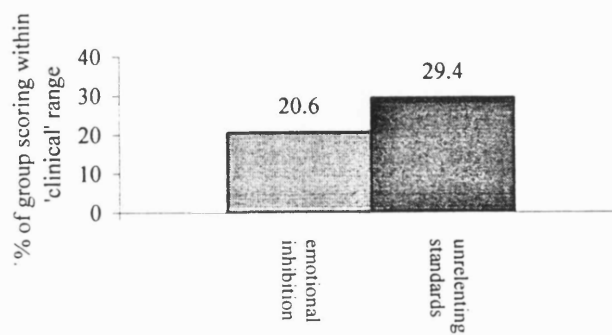


Figure 5. Overvigilance and inhibition

As can be seen from these figures, over half of the chronic pain sample positively endorsed the 'self-sacrifice' schema (example items: *'I put others' needs before my own or else I feel guilty'*; *'No matter how busy I am I can always find time for others'*; *'It's very difficult for me to ask others to take care of my needs'*). A substantial proportion of the sample (29.4%) positively endorsed the 'unrelenting standards' schema (example items: *'I try to do my best, I can't settle for good enough'*; *'I must meet all my responsibilities'*). The schema 'emotional deprivation' (which includes items *'People have not been there to meet my emotional needs'* and *'For the most part I have not had someone who really listens to me, understands me, or is tuned into my needs and feelings'*) also appeared quite prominent for this chronic pain sample. In addition, a fifth of the group were scoring above 3.5 on the schemas of 'failure' (*'I often compare my accomplishments with others and feel that they are much more successful'*) and 'emotional inhibition' (*'A lot of anger builds up inside me that I don't express'*; *'I find it hard to be warm and spontaneous'*).

Specific pain beliefs

The mean, standard deviation and range of the four PBAPI subscales for the chronic pain sample pre-treatment ($N = 34$) are shown in Table 4. These statistics were computed using the original -2 to +2 response scale, with raw scale scores summed and divided by the number of items in that scale, following Williams and Keefe (1991).

Table 4. Mean, standard deviation and range of the four PBAPI subscales for the chronic pain sample pre-treatment ($N = 34$)

PBAPI subscale	Mean	SD	Range
Pain constancy	1.10	0.67	-1.00 - +2.00
Pain permanence	0.67	0.77	-1.00 - +2.00
Mystery	0.66	0.89	-1.25 - +2.00
Self-blame	-0.41	1.02	-2.00 - +1.67

Note. A positive score indicates endorsement of the belief, a negative score indicates that the belief is not endorsed.

On average, the beliefs that pain is constant, permanent and mysterious were endorsed by the sample, while the belief that individuals themselves are to blame for their pain was not. Given the variance in responses, the percentage of the sample that endorsed each belief was also examined. 79% believed their pain would be permanent, 91.2% believed that it was constant, 70.6% felt it to be mysterious and 35.3% felt that they were to blame for their pain.

Research Question 2

Do EMSs and specific pain beliefs relate to each other?

Pearson product-moment correlations were used to determine whether there was a relationship between the five higher-order EMS domains and specific pain beliefs for the chronic pain sample ($N = 34$). Scatterplots were inspected to check for the degree of linear association and verified the correlations that are presented in Table 5.

Table 5. Correlation matrix of higher-order EMS domains and PBAPI subscales for the chronic pain sample pre-treatment ($N = 34$)

	Disconnection & rejection	Impaired autonomy & performance	Impaired limits	Other directedness	Overvigilance & inhibition
PBAPI constancy	-.230	-.357*	-.210	-.373*	-.251
PBAPI permanency	.342*	.146	.278	.167	.100
PBAPI mystery	.441**	.405**	.398*	.418*	.322
PBAPI self-blame	.300	.246	.430*	.336	.571**

* $p < 0.05$; ** $p < 0.01$

All significant correlations found between the scores on the PBAPI subscales of ‘permanency’, ‘mystery’ and ‘self-blame’ and higher-order EMS scores were positive, showing that a larger schema score was linked with greater endorsement of a specific pain belief. Meanwhile, the significant correlations found between the PBAPI subscale ‘constancy’ and higher-order EMS scores were negative, indicating

that a higher score on one of the measurements was linked with a lower score on the other.

Are EMSs and PBAPI correlated with functioning pre-treatment?

In order to examine whether there was a relationship between the measures of functioning and EMSs and/or specific pain beliefs, Pearson product-moment correlation coefficients were calculated. Scatterplots were again inspected to check for the degree of linear association and confirmed the findings shown in Table 6.

Table 6. Correlation matrix of higher-order EMS domains and pain intensity, pain distress, mood and cognitive coping strategies pre-treatment ($N = 34$)

	VAS intensity (past week)	VAS distress (past week)	HADS anxiety	HADS depression	CSQ: cognitive coping strategies
Disconnection & rejection	-.387*	-.279	.430*	.584**	-.397*
Impaired autonomy	-.293	-.126	.309	.544**	-.403*
Impaired limits	-.302	-.101	.390*	.547**	-.194
Other directedness	-.417*	-.121	.430*	.451**	-.160
Overvigilance & inhibition	-.393*	-.173	.443**	.379*	.044

* $p < 0.05$; ** $p < 0.01$

Note. For VAS scores – a higher score indicates a greater subjective level of pain intensity/distress

For HADS scores – a higher score indicates a greater degree of mood disturbance

For CSQ score – a higher score indicates greater employment of coping strategies

A number of significant correlations were revealed, most notably between EMSs and mood. With the PBAPI, three significant correlations with measures of mood were revealed as follows: ‘constancy’ was negatively associated with HADS anxiety

scores ($r = -.434, p = .010$), while 'mystery' was positively correlated with both HADS anxiety and depression scores ($r = .392, p = .022$ and $r = .622, p = .000$ respectively). No significant correlations were found between the PBAPI and pain intensity/distress over the past week or the CSQ cognitive coping strategies.

With regards the relationship between EMSs and scores on the MOS outcome measure of health functioning, the only significant correlations found were with the mental health subscale. All EMS domains significantly correlated with this subscale ($r = -.395$ to $-.574, p < 0.05$). As might be expected, higher EMS scores were associated with lower MOS mental health scores.

Significant correlations were also found between the PBAPI subscales and certain MOS subscales. 'Constancy' negatively correlated with 'bodily pain' ($r = -.484, p = .004$) while 'permanency' negatively correlated with 'role physical' ($r = -.340, p = .049$), with higher PBAPI scores linked with lower MOS scores in both cases. Greater endorsement of the PBAPI subscale of 'mystery' was associated with lower scores on 'general health', 'social functioning' and 'mental health' ($r = -.378, p = .028$; $r = -.352, p = .041$; $r = -.367, p = .033$ respectively).

Section 3: Cross-sectional descriptive comparison between a chronic pain sample and an acute pain sample

In Section 2, a descriptive analysis of the chronic pain sample on a range of outcome and predictive measures was presented. In order to explore whether the pattern of results that was revealed was particular to the chronic pain sample, a comparison group of people with acute pain was introduced. This cross-sectional descriptive comparison is presented in Section 3. The chronic pain sample used in this comparison is the one described in the previous section.

Description of the acute pain sample

The sample was obtained from a specialist dental hospital. Descriptive information was gathered from 28 people suffering from acute post-operative dental pain. More females ($N = 18$) than males ($N = 10$) comprised this sample. Their average age was 29.25 years (range = 18-65 years, $SD = 10.39$). 46.4% of the sample were married or co-habiting, with the rest single (53.6%). 82.1% of the sample were working at time of assessment. The sample had undergone a range of procedures – 82.1% wisdom teeth extraction, 10.7% implants, 3.6 % other extraction and 3.6% cyst removal.

Subjective pain intensity and distress

As measured by the VAS (0 = 'no pain' to 100 = 'worst pain imaginable'), the average pain intensity at time of assessment was 34.75 (range = 5 – 90, $SD = 23.55$). Average pain distress at time of assessment was 30.14 (range = 0 – 90, $SD = 24.34$).

Mood

Using the clinical threshold of 7/8 points, 50% of the acute pain sample displayed signs of clinical anxiety and 10.7% displayed signs of clinical depression as measured by the HADS. With the 10/11 cut-off, 25% scored within the clinical range for anxiety and 3.6% for depression.

Comparison of pain intensity, pain distress and mood between chronic and acute pain samples

Independent t-tests were carried out in order to examine whether there were significant differences between the chronic and acute groups in terms of age, pain intensity, pain distress and mood. The results are shown in Table 7. Levene's Test for equality of variance was employed to test the homogeneity of the data. When significant, revealing that an assumption necessary for the t-test had not been met, the t value for equal variances not assumed was used.

Table 7. Group differences in age, VAS and HADS

	Chronic pain (N=34) Mean (SD)	Acute pain (N=28) Mean (SD)	t value (d.f.)	p
Age	47.24 (12.96)	29.25 (10.39)	5.94 (60)	<0.001
VAS pain intensity at time of assessment	57.54 (17.92)	34.75 (23.55)	4.21 (49.64)	<0.001
VAS pain distress at time of assessment	50.80 (22.40)	30.14 (24.34)	3.48 (60)	<0.01
HADS anxiety	11.97 (3.77)	7.39 (3.50)	4.91 (60)	<0.001
HADS depression	9.12 (3.85)	3.11 (3.01)	6.73 (60)	<0.001

The two groups differed significantly across age, pain levels and mood. The acute pain group was significantly younger than the chronic pain group and they scored significantly lower on subjective pain and mood. Chi-square statistics (χ^2) were computed to compare the two groups on sex, work situation and marital status. No significant difference was found with regards sex ($\chi^2 (1) = 2.62, p = 0.11$). However, the two groups were significantly different in terms of marital status ($\chi^2 (2) = 6.03, p = .049$), with those with chronic pain more likely to be married, and work situation ($\chi^2 (1) = 19.06, p = .000$), with 82.1% of acute pain group currently in employment as compared to only 26.5% of the chronic pain group.

Comparison of specific pain beliefs between chronic and acute pain samples

To allow for a comparison between chronic and acute groups, the mean, standard deviation and range of the four PBAPI subscales for the acute pain sample ($N = 28$) were computed in the same way as for the chronic pain group and are shown in Table 8.

Table 8. Mean, standard deviation and range of the four PBAPI subscales for the acute pain sample ($N = 28$)

PBAPI subscale	Mean	SD	Range
Pain constancy	-0.95	0.79	-2 - +1
Pain permanence	-1.59	0.40	-2 - -0.60
Mystery	-1.30	0.68	-2 - +0.5
Self-blame	-1.64	0.60	-2 - +0.8

Note. A positive score indicates endorsement of the belief, a negative score indicates that the belief is not endorsed

As can be seen from the table, none of the beliefs, which were endorsed by the chronic group, about their pain being constant, permanent and mysterious, were also endorsed by this acute pain sample. Nor did they believe themselves to be to blame for their pain. Given the variance in responses, the percentage of the sample that, to some extent, endorsed each belief was also examined. None of the sample (0%) believed their pain would be permanent, 21.6% believed that it was constant, 7.2% felt it to be mysterious and 3.6% felt that they were to blame for their pain.

Independent t-tests which compared the chronic and acute pain samples with regards their specific pain beliefs confirmed that the two groups differed significantly on each PBAPI subscale of 'permanency', 'constancy', 'mystery' and 'self-blame' ($t(60) = 14.02, p = .000$; $t(60) = 11.03, p = .000$; $t(60) = 9.58, p = .000$; $t(54.71) = 5.87, p = .000$ respectively). Unlike the results shown for the chronic pain group, only one significant correlation was found between EMSs and PBAPI for the acute pain group. This was between the 'overvigilance and inhibition' higher-order domain and 'constancy' ($r = .375, p = .049$).

Research Question 3

Do people with chronic pain have significantly different early maladaptive schemas than people with acute pain?

In order to investigate possible differences between the chronic pain ($N = 34$) and acute pain ($N = 28$) samples on each schema and higher-order schema domain, a multivariate analysis of variance (MANOVA) was carried out. Results revealed that, overall, there was a significant multivariate effect (Wilks' Lambda = .470, $F(21,40) = 2.15$, $p = .018$). Table 9 shows the results from follow-up one-way analyses of variance (ANOVAs).

Table 9. Group differences in early maladaptive schema mean scores

Early maladaptive schema	Chronic pain ($N=34$) Mean (SD)	Acute pain ($N=28$) Mean (SD)	F	d.f.	p
Self-sacrifice	3.52 (0.84)	3.13 (0.80)	3.43	1,60	.069
Unrelenting standards	3.07 (1.11)	3.11 (1.17)	0.00	1,60	.954
Emotional deprivation	2.80 (1.45)	2.07 (0.82)	4.18	1,60	.045
Emotional inhibition	2.61 (1.22)	2.26 (1.06)	1.44	1,60	.234
Insufficient self-control	2.54 (0.98)	2.66 (0.78)	1.50	1,60	.226
Social isolation / alienation	2.47 (1.22)	2.05 (0.95)	2.15	1,60	.147
Failure	2.47 (1.23)	1.73 (0.67)	6.97	1,60	.011
Vulnerability to harm or illness	2.45 (0.99)	1.92 (0.72)	5.72	1,60	.020
Subjugation	2.40 (1.11)	1.88 (0.59)	4.60	1,60	.036
Social undesirability	2.38 (1.02)	1.77 (0.72)	5.97	1,60	.018
Abandonment / instability	2.28 (1.11)	1.99 (0.70)	0.74	1,60	.394
Entitlement / grandiosity	2.20 (1.06)	2.79 (1.28)	4.06	1,60	.048
Mistrust / abuse	2.19 (0.87)	2.28 (0.80)	0.29	1,60	.594
Dependence / incompetence	2.07 (0.76)	1.68 (0.68)	5.21	1,60	.026
Defectiveness / shame	1.97 (0.84)	1.81 (0.84)	0.63	1,60	.429
Enmeshment / undeveloped self	1.77 (0.97)	1.51 (0.56)	1.02	1,60	.317

Note. Ratings were on a six-point scale from 1 = 'completely untrue of me' to 6 = 'describes me perfectly'.

It was revealed that the chronic pain group scored significantly higher than the acute pain group on each of the following schemas:

- Emotional deprivation: e.g. *'For the most part I have not had someone who really listens to me, understands me, or is tuned into my true needs and feelings'*
- Social undesirability: e.g. *'People don't want to include me in their groups; I never know what to say socially'*
- Failure: e.g. *'I'm a failure'; 'Most other people are more capable than I am in areas of work and achievement'*
- Vulnerability to harm or illness: e.g. *'I take great precautions to avoid getting sick or hurt'; 'I can't seem to escape the feeling that something bad is about to happen'*
- Subjugation: e.g. *'I worry a lot about pleasing other people so they won't reject me'; 'I get back at people in little ways instead of showing my anger'*
- Dependence/incompetence: e.g. *'I do not feel I can cope well by myself'; 'I find the responsibilities of everyday life overwhelming'*

The chronic pain group scored significantly lower than the acute pain group on one schema, that of 'entitlement/grandiosity (example items: *'I can't tolerate other people telling me what to do'; 'I usually put my needs ahead of the needs of others'*).

With regards higher-order domains, significant differences were found between the two groups on the 'impaired autonomy and performance' domain ($F(1,60) = 6.87, p = .011$) and the 'other directedness' domain ($F(1,60) = 6.95, p = .011$). The mean scores of the chronic pain group were significantly higher than those of the acute pain group on these domains.

Section 4: Longitudinal study

Section 4 reports the results of a short-term longitudinal study which used a repeated measures design to follow a group of individuals, from the chronic pain sample already described, through a treatment programme. Responses made by this group were examined before and after treatment and at a three-month follow-up with the use of repeated measures ANOVAs. As follow-up data were not available for all those who had provided post-treatment data, it was necessary to conduct separate analyses for treatment outcome and for maintenance of treatment benefits.

Treatment outcome

In order to examine treatment outcome, a repeated measures ANOVA was carried out to identify change in the outcome measures from pre- to post-treatment. No significant multivariate effect was revealed (Wilks' lambda = .179, $F(8,13) = 2.83$, $p = .073$). However, follow-up univariate tests revealed significant differences between pre- and post-treatment scores on several of the outcome measures, as shown in Table 10.

Table 10. Treatment outcome as measured by change in scores on the VAS, HADS, CSQ ($N = 21$) and MOS ($N = 22$)

Outcome measure	Pre-treatment Mean (SD)	Post-treatment Mean (SD)	<i>F</i>	d.f.	<i>p</i>
Pain intensity over past week	69.35 (18.08)	60.88 (19.52)	3.60	1,20	.072
Pain distress over past week	67.73 (21.68)	51.94 (23.56)	6.33	1,20	.020
HADS anxiety	11.90 (3.10)	10.23 (2.66)	7.64	1,20	.012
HADS depression	8.38 (3.54)	6.67 (3.84)	8.55	1,20	.008
MOS physical functioning	33.41 (24.07)	40.45 (23.29)	4.64	1,21	.043
MOS role physical	5.68 (17.13)	15.44 (26.14)	4.20	1,21	.053
MOS bodily pain	20.59 (13.79)	26.57 (15.80)	5.73	1,21	.026
MOS general health	41.02 (19.93)	56.26 (20.82)	12.96	1,21	.002
MOS vitality	29.32 (19.48)	40.50 (18.83)	7.12	1,21	.014
MOS social functioning	45.45 (22.67)	46.41 (24.74)	0.02	1,21	.877
MOS role emotional	27.25 (36.55)	40.90 (43.56)	2.68	1,21	.117
MOS mental health	52.54 (18.61)	54.54 (18.37)	0.34	1,21	.567
CSQ cognitive coping strategies	2.51 (0.75)	2.85 (0.80)	4.62	1,20	.044

Note. For VAS scores – a higher score indicates a greater subjective level of pain intensity/distress
 For HADS scores – a higher score indicates a greater degree of mood disturbance
 For MOS scores – a higher score indicates a better state of health
 For CSQ score – a higher score indicates greater employment of coping strategies

Results show that, following treatment, the chronic pain sample had improved scores on all variables but could only be considered significantly improved on some measures.

Change in EMSs following treatment

A repeated measures ANOVA was also carried out to examine whether EMSs and higher-order domain scores changed from pre- to post-treatment ($N = 22$). The multivariate effect was not revealed to be significant (Wilks' lambda = .008, $F(1,21) = 5.72$, $p = .320$), but follow-up one-way ANOVAs revealed that two of the 16 schema domains had significantly reduced scores pre- and post-treatment: 'dependence/incompetence' ($F(1,21) = 5.90$, $p = .024$) and 'vulnerability to harm or illness' ($F(1,21) = 4.75$, $p = .046$). Meanwhile, scores on the schema domain 'entitlement / grandiosity' (example item: '*I usually put my needs ahead of the needs of others*'; '*I can't tolerate other people telling me what to do*') significantly increased from pre- to post-treatment ($F(1,21) = 4.48$, $p = .046$). The results of the higher-order schema domain change are shown in Table 11.

Table 11. Repeated measures ANOVA on higher-order EMS scores pre- and post-treatment ($N = 22$)

	Pre-treatment Mean (SD)	Post-treatment Mean (SD)	F	d.f.	p
Disconnection & rejection	2.15 (0.83)	2.04 (0.60)	0.61	1,21	.443
Impaired autonomy & performance	2.17 (0.78)	1.95 (0.50)	4.73	1,21	.041
Impaired limits	2.25 (0.85)	2.36 (0.79)	1.81	1,21	.193
Other directedness	2.88 (0.80)	2.74 (0.65)	2.13	1,21	.197
Overvigilance & inhibition	2.67 (1.00)	2.39 (0.76)	4.59	1,21	.044

As can be seen from the table, scores on the higher-order schema domains of ‘impaired autonomy and performance’ and ‘overvigilance and inhibition’ showed a statistically significant reduction over the course of treatment.

Change in specific pain beliefs following treatment

To investigate whether specific pain beliefs also changed over the course of treatment, a repeated measures ANOVA was carried out to identify possible differences between responses on the PBAPI pre- and post-treatment. Results are shown in Table 12.

Table 12. Results from the repeated measures ANOVA on PBAPI scores pre- and post-treatment ($N=22$)

	Pre-treatment Mean (SD)	Post-treatment Mean (SD)	<i>F</i>	d.f.	<i>p</i>
PBAPI mystery	0.58 (0.88)	-0.16 (1.14)	15.82	1,21	.001
PBAPI self-blame	-0.29 (0.89)	-0.67 (0.83)	3.69	1,21	.077
PBAPI constancy	1.03 (0.47)	0.61 (0.98)	5.38	1,21	.030
PBAPI permanency	0.57 (0.68)	0.26 (0.79)	5.09	1,21	.035

Note. A positive score indicates endorsement of the belief, a negative score indicates that the belief is not endorsed.

As shown, all specific pain beliefs with the exception of ‘self-blame’ showed a statistically significant reduction over the course of treatment. On completion of treatment, 54.4% still endorsed to some degree the belief that their pain was

permanent, 63.6% that it was constant, 36.3% that it was mysterious and 22.7% that they were to blame for it.

Maintenance of treatment benefits

The results so far indicate the presence of treatment benefits. In order to assess maintenance of such benefits following treatment completion, a repeated measures ANOVA was conducted on outcome data collected from 15 of the individuals in the treatment sample at a three-month follow-up. HADS and CSQ data was missing for one individual. No significant multivariate effect was found (Wilks' lambda = .248, $F(26,28) = 1.08$, $p = .416$). However, follow-up one-way ANOVAs revealed significant changes across treatment on several outcome measures as shown in Table 13.

Table 13. Significant changes revealed by a repeated measures ANOVA on HADS ($N=14$) and MOS ($N= 15$) pre- and post-treatment and at a three-month follow-up

Measure	Pre- Mean (SD)	Post- Mean (SD)	Follow-up Mean (SD)	<i>F</i>	d.f.	<i>p</i>
HADS depression	8.71 (3.69)	6.21 (3.79)	7.36 (4.62)	3.90	2,26	.033
MOS physical functioning	33.33 (21.44)	45.00 (22.04)	38.67 (26.08)	3.94	2,28	.031
MOS role physical	6.67 (19.97)	22.65 (29.15)	17.78 (30.52)	2.44	2,28	.105
MOS bodily pain	23.53 (15.06)	31.47 (15.08)	29.21 (19.10)	2.64	2,28	.089
MOS general health	45.42 (21.49)	62.79 (18.28)	48.73 (17.14)	5.55	2,28	.009
MOS vitality	29.00 (20.20)	47.06 (17.38)	35.98 (21.23)	4.39	2,28	.022

Note. For HADS scores – a higher score indicates a greater degree of mood disturbance
For MOS scores – a higher score indicates a better state of health

The results revealed that this cohort of individuals with chronic pain showed post-treatment benefits as indicated in Table 13, but had not improved on measures of pain distress, anxiety or CSQ as the larger pre-post treatment sample had ($F(2,26) = 2.27, p = .123$; $F(2,26) = 1.88, p = .172$; $F(2,26) = .478, p = .625$ respectively). Subsequent repeated contrasts revealed that there were some changes in mean scores between post-treatment assessment and the three-month follow-up, although these were chiefly non-significant. Therefore, treatment benefits were shown to be maintained at a three-month follow-up with the exception of 'general health' and 'vitality' which significantly reduced from post-treatment to follow-up ($F(1,14) = 11.14, p = .005$ and $F(1,14) = 5.14, p = .040$ respectively).

Research Question 5

Is there a relationship between EMS and PBAPI

scores and post-treatment benefits?

The hypothesis that EMSs and/or specific pain beliefs may relate to post-treatment outcome was examined for those outcome variables that had shown significant pre- to post-treatment change. These included the HADS depression and anxiety subscales, the CSQ cognitive coping strategies and several of the MOS subscales. Pearson product-moment correlations revealed that the MOS subscales of 'physical functioning' and 'vitality' were significantly correlated ($r = .601, p = .003$) and so they were combined to make a MOS composite outcome measure. For these outcome or 'dependent' variables, change scores were calculated and a series of four standard multiple regressions were performed to explore the extent to which post-treatment benefits could be accounted for by EMS and PBAPI scores pre-treatment.

According to Tabachnik and Fidell (1989), a minimum requirement is to have at least five cases for each independent variable. Given the sample size of $N = 22$, it was decided to enter a maximum of three independent variables. The EMS independent variables were taken as 'impaired autonomy and performance' and 'other-directedness', as these had been shown to be significantly greater for the chronic pain sample than the acute pain sample in the comparative analysis. A decision was made to choose the PBAPI subscale of 'mystery' as the third variable as it had undergone the most significant change over treatment.

Pre-treatment scores for the outcome variable were statistically controlled for by also entering them into the equation. Results revealed that neither 'impaired autonomy and performance', 'other directedness' or 'mystery' pre-treatment scores significantly contributed to the prediction of change in either HADS depression, HADS anxiety, CSQ cognitive coping strategies ($N = 21$) or MOS composite scores ($N = 22$) over treatment ($R^2 = .180$, $F(4,16) = .879$, $p = .498$; $R^2 = .387$, $F(4,16) = 2.53$, $p = .081$; $R^2 = .198$, $F(4,16) = .990$, $p = .441$ and $R^2 = .343$, $F(4,17) = 2.22$, $p = .110$ respectively). Despite the fact that, overall, the regression was not significant, pre-treatment scores for anxiety and MOS functioning did predict their corresponding change scores as shown by semi-partial correlations ($sr^2 = .34$, $p = .010$ and $sr^2 = .28$, $p = .019$ respectively). This indicated that those individuals with a higher anxiety score pre-treatment showed a greater improvement in anxiety following treatment, and those that were functioning less well, according to the MOS, showed a greater improvement following treatment. However, those more impaired have greater scope for improvement, and it is well known that change scores tend to correlate with the initial level (Cronbach and Furby, 1970).

Research Question 6***Is there a relationship between EMSs and the
maintenance of treatment benefits?***

In order to investigate whether there was a relationship between EMS scores pre-treatment and the maintenance of treatment benefits, further standard multiple regression procedures were carried out using the follow-up data. The independent variables were higher-order factors of 'impaired autonomy and performance' and 'other-directedness', while post-to-follow-up change on HADS depression and anxiety, CSQ cognitive coping strategies ($N = 14$) and the MOS composite ($N = 15$) again served as the dependent variables. No significant predictions were found ($R^2 = .372$, $F(3,10) = 1.97$, $p = .182$; $R^2 = .156$, $F(3,10) = .615$, $p = .621$; $R^2 = .122$, $F(3,10) = .461$, $p = .715$ and $R^2 = .133$, $F(3,11) = .562$, $p = .651$ respectively). Thus, none of the independent variables were found to account for a significant degree of the variance in maintenance scores.

Despite the lack of prediction found for the EMSs in treatment benefits in the above regression analyses, it was hypothesised that the presence of EMSs either pre- or post-treatment could contribute to a lack of post-treatment improvement on outcome measures. Indeed, the important issue of variability within the sample has been neglected thus far. There was a significant variance both in the degree of EMSs held by individuals and in their responses to treatment, as shown by the previously reported range and standard deviation statistics. It therefore seemed appropriate to scrutinise the data more closely and give consideration to individual differences, as follows.

Reliable change and clinical significance

Although statistically significant mean changes on certain measures following treatment have been revealed, this does not address the important issue of variability of responses within the sample. In order to elucidate the clinical significance of the reported pre-post treatment changes, a closer examination of the longitudinal data is necessary. There are several recent suggestions as to the measurement of individual change. For example, Jacobson and Truax (1991) provide a means of calculating an 'index of reliable change' (RC), which allows individuals to be classified as 'improved' or 'not improved' following treatment on the basis of clinically significant criteria.

The calculation of this index requires the test-retest reliability coefficient of the outcome measure. In the present study, it was only possible to calculate this index for the HADS outcome measure whose psychometric properties feature in previous publications (Herrmann, 1997). Test-retest reliability was not available for the other outcome measures employed in this study. The reliable change index was calculated according to Jacobson and Truax (1991) and revealed that, following treatment, only two of the 21 individuals in the chronic pain sample could be considered to have reliably improved on anxiety and depression subscales respectively.

This index has, however, been criticised as being too conservative (Tingey, Lambert, Burlingame and Hansen, 1996 cited in Lunnen and Ogles, 1998). It was therefore decided to assign individuals to one of two groups, 'improved' or 'not improved', on the basis of a median split of the outcome measures change score. Adoption of a median split would have been problematic if the entire sample had either improved

or not improved, but inspection of the data revealed this not to be the case. The following degree of individual change was therefore required to be classified as 'improved': anxiety and depression subscales – 2 point change; MOS functioning – 10 point change and CSQ cognitive coping strategies – 0.28 point change.

Is there a difference between those that improve following treatment and those that do not?

In order to examine whether a reliable prediction could be made as to which of these two categories an individual fell on the basis of their EMS scores pre-treatment, a stepwise discriminant function analysis was carried out ($N = 21$) with the higher-order schema domains serving as independent variables. Results revealed that 'impaired autonomy and performance' pre-treatment was found to predict membership of 'improved' or 'not improved' outcome groups on the dependent variable of HADS depression ($\chi^2 (1) = 6.00, p = .014$). With the use of this predictor, 76.2% of cases were correctly classified. A subsequent independent t-test showed that those who improved had a significantly higher 'impaired autonomy and performance' mean score pre-treatment than those 'not improved' ($t (1) = 2.70, p = .014$). None of the other independent variables were found to predict discrimination on any of the other outcome measures.

It was hypothesised that this result indicated that those individuals with greater 'impaired autonomy and functioning' pre-treatment had greater scope for change. An independent t-test was therefore used to compare change scores for those who were considered to have improved on the measure of depression and those who were not.

As predicted, this revealed that those who had improved had greater 'impaired autonomy and performance' change than those who had not improved ($t(19) = 3.05$, $p = .007$).

It was also hypothesised that the presence of EMSs post-treatment could be linked to a lack of improvement on outcome measures. Stepwise discriminant function analysis ($N = 21$) revealed that 'other-directedness' post-treatment was found to predict discrimination between 'improved' and 'not improved' on the dependent variables of HADS anxiety and MOS composite ($\chi^2(1) = 6.06$, $p = .014$ and $\chi^2(1) = 6.38$, $p = .012$ with 76.2% and 68.2% of cases correctly classified respectively). Subsequent independent t-tests were carried out to investigate the direction of differences between those that had improved and those that had not, and revealed that the former had a significantly higher 'other directedness' mean score than the latter for both outcome measures ($t(19) = 2.71$, $p = .014$ and $t(20) = 2.78$, $p = .012$ respectively). None of the independent variables predicted discrimination on the outcome measures of HADS depression or CSQ cognitive coping strategies.

Summary of results

The results revealed that there were particular EMSs, namely 'self-sacrifice', 'unrelenting standards', 'emotional deprivation', 'emotional inhibition' and 'failure' that were positively endorsed by a substantial proportion of the chronic pain sample. Furthermore, in comparison with the acute pain group, the chronic pain group scored significantly higher on several EMSs and on two of the higher-order schema domains: 'impaired autonomy and performance' and 'other directedness'.

On average, the chronic pain sample, unlike the acute pain sample, endorsed the specific pain beliefs of 'mystery', 'constancy' and 'permanency'. Several significant correlations were found between these pain beliefs and the higher-order schema domains. In addition, several significant correlations were found between EMSs, specific pain beliefs and current functioning.

Analysis of the longitudinal data revealed that, following treatment, the group as a whole had made significant improvements on several of the measures of functioning. Small, but significant, changes were found in the higher-order schema domains of 'impaired autonomy and performance' and 'overvigilance and inhibition'. Meanwhile, all specific pain beliefs positively endorsed by the group prior to treatment were significantly reduced on completion of treatment. Treatment benefits, on the whole, were maintained at a three-month follow-up, although showed signs of non-significant decline.

EMS levels, pre-treatment, were not found to predict either post-treatment benefits or benefit maintenance. However, the results showed that a higher score on 'impaired autonomy and performance', pre-treatment, predicted membership of the 'improved' group post-treatment. It was also revealed that those who were considered to have improved on anxiety and MOS functioning scales had higher scores, post-treatment, on the schema domain of 'other directedness' than those who were considered not to have improved.

DISCUSSION

This study was an attempt to examine early maladaptive schemas and specific pain beliefs in people with chronic pain. Within an overarching cognitive framework, this was addressed from three different perspectives: an initial exploratory description of EMSs in people with chronic pain, a comparison of EMSs between chronic and acute pain samples, and a longitudinal approach which considered the presence of EMSs over the course of treatment and their potential influence on outcome.

This discussion will first present an examination of the main findings from the results, with implications relating to each research question highlighted en route. Issues relating to specific schemas will be addressed individually in the first instance and then considered within the broader theoretical framework. Due consideration will then be given to the methodological limitations of the study, followed by a discussion of the clinical implications and suggestions for future research.

Research findings

Although individuals with chronic pain are not an homogeneous group (Crombie, Davies and Macrae, 1994), results from the initial descriptive analysis suggested that the chronic pain sample used in this study had, on average, similar demographic and clinical characteristics, such as age, site and duration of pain, to those samples from multidisciplinary treatment programmes used in other recent studies (see Flor, Fydrich and Turk, 1992). Further discussion of the generalisability of findings from such

samples is found later, in the methodological limitations section of this discussion (p.127).

Consistent with findings from other recent studies (e.g. Jensen, Turner and Romano, 1994), individual subjective pain intensity and distress tended to be high. Alongside these high levels of pain, mood and current functioning were found to be seriously compromised. These together suggest that this was a group similar to other pain clinic samples.

Consideration will now be given to the general beliefs found among the chronic pain sample as a result of both the descriptive analysis and the comparison with the acute pain sample. Specific reference to Young's definitions of EMSs (1994) will be made to facilitate the interpretation of findings.

What sort of EMSs do people with chronic pain have?

Analysis of the responses made to Young's Schema Questionnaire revealed that, although no particular EMS was universally held within this chronic pain sample, some schemas did seem to be more pertinent for this group than others. Schemas of 'self-sacrifice' and 'unrelenting standards' achieved the highest mean scores among individual schemas. Example items from these include *'It's very difficult for me to ask others to take care of my needs'* and *'My health is suffering because I put myself under so much pressure to do well'* respectively. Meanwhile 'other-directedness', which encompasses 'subjugation' and 'self-sacrifice' schemas, was the highest rated higher-order schema domain.

However, mean scores on the Schema Questionnaire were actually quite low. This may indicate a genuinely modest level of EMSs held by the chronic pain group, or it may be that the criteria of scoring 5 or 6 to indicate presence of EMSs, originally designed for personality disordered individuals, was too stringent. EMSs are considered to exist on a continuum, and it may be that people with chronic pain hold certain EMSs less severely than people with personality disorders but more than a non-clinical population. Furthermore, given the notable variance between individuals' responses, it was felt that mean scores provided little useful information. It was therefore thought appropriate to examine the data for any positive endorsement of a schema. When scores greater than 3.5 (bearing in mind that 3 = 'slightly more true than untrue') were considered in the analysis, several of the EMSs were highlighted as of potential importance to this group of people.

In concordance with the findings from the assessment of mean scores, closer inspection of responses revealed both schemas of 'self-sacrifice' and 'unrelenting standards' to be of particular note. Over half of this sample positively endorsed, to some degree, the 'self-sacrifice' schema. According to Young's theoretical definition (1994), 'self-sacrifice' refers to 'an extreme focus on voluntarily meeting the needs of others in daily situations, at the expense of one's own gratification'. He suggests that this schema can arise from a need to prevent causing pain to others or to avoid feeling guilty about paying attention to one's own needs. Consequently, this can result in feeling that one's own needs are not actually being met. This schema may have particular relevance to the development and maintenance of chronic pain.

A substantial proportion of the group endorsed the schema 'unrelenting standards' which encompasses a belief regarding extremely high personal standards that the individual feels they must meet. Young (1994) hypothesises that people who hold this schema often present with a 'difficulty in slowing down' which can lead to problems with relaxation, health, and satisfying relationships. This could be considered to relate to clinicians' observations that individuals with chronic pain often submit to their personal 'expectations or role demands' (Williams and Erskine, 1995). For example, on an occasion when their pain is less severe, an individual may over exert themselves in an attempt to compensate for recent inactivity and meet their high standards of functioning. This in turn can exacerbate their pain.

The schema of 'emotional inhibition', which refers to 'an extreme inhibition and inability to communicate feelings such as anger or sexual excitement as well as difficulty expressing vulnerability', also appeared to be quite prominent within this sample. So too did 'emotional deprivation', which refers to the belief that 'one's natural desire for emotional support, in terms of nurturance, empathy and protection, will not be adequately met by others', and 'failure' which essentially reflects the belief that one is inadequate (Young, 1994).

The suggestion that these certain EMSs may be particularly pertinent to people with chronic pain must be purely speculative, not least due to the fact that there are currently no norms available for this schema questionnaire. Standing alone, it is impossible to tell how unusual such a pattern of findings might be. Given this, an important component of the study was the cross-sectional comparison between the

chronic pain sample and acute pain sample in order to elucidate whether this pattern of schemas was of particular relevance to those individuals with enduring, rather than short-lived, pain.

Do people with chronic pain have significantly different early maladaptive schemas than people with acute pain?

First of all, it must be noted that the two groups differed in ways other than duration of pain, most notably in terms of pain intensity and distress, age and employment. The choice of comparison group was a difficult one, which will be discussed further under methodological limitations (p.128).

Results of the analysis investigating possible differences between the chronic pain and acute pain groups with regards EMSs revealed that there were indeed significant differences. The chronic pain group scored significantly higher than the acute group on each of the following schemas as defined by Young (1994):

- Social undesirability – the belief that one is isolated from others due to some outwardly undesirable feature.
- Failure – the belief that ‘one has failed, or will fail, or is inadequate to their peers’.
- Dependence/incompetence – the belief, which can manifest as helplessness, that one is ‘unable to cope with everyday responsibilities without help from others’.
- Vulnerability to harm or illness – an ‘exaggerated fear that a non-preventable medical, emotional or natural catastrophe could strike at any time’.
- Emotional deprivation – the ‘expectation that emotional support will not be adequately met by others’.

- Subjugation – an ‘excessive surrendering of control to others because one feels coerced – usually to avoid anger, retaliation or abandonment’.

Although none of the questionnaire items refer specifically to pain, it is felt that responses on ‘social undesirability’, ‘failure’, ‘dependence/incompetence’ and ‘vulnerability to harm or illness’ could be confounded by the experience of ongoing pain itself. This would have led to an inevitably higher score for the chronic pain sample. For example, endorsement of items from the social undesirability schema such as ‘*I am very self-conscious around other people*’ or ‘*I am not sexually attractive*’ may chiefly result from the direct physical consequences of long-term pain. However, this does not rule out the possibility that the experience of pain could trigger or exacerbate such pre-existing schemas in certain people, which in turn may maintain their condition. For example, for someone who holds a belief regarding vulnerability to harm or illness, the experience of pain may serve as proof that this belief is valid and that their pain is a sign of medical trauma.

Although the four schemas described above may, in part, be considered as directly consequential to the experience of pain, ‘emotional deprivation’ and ‘subjugation’ are less easily understood in this way. ‘Emotional deprivation’ (example item – *for the most part, I have not had someone who really listens to me, understands me, or is tuned into my true needs and feelings*) may have some relevance in the context of the interaction between individuals with chronic pain and the medical profession. This relationship can often be described as tense, with patients being left with a sense of not being listened to or understood by the medical profession (Skevington, 1995). It

may be that an earlier held belief of 'emotional deprivation' leads them to perceive their treatment in a negative way, or perhaps their dissatisfactory experience with professionals acts as confirmation of this schema. There are certainly important implications for professional style and practice stemming from this. Despite not necessarily being able to provide definitive answers or disconfirm fears, professionals need to engage clients at assessment, recognise the difficulties inherent in uncertain diagnoses and listen carefully to their concerns.

The 'emotional deprivation' schema may also have pertinence to the sufferer's interaction with his/her wider social context. Skevington (1995) emphasises the importance of social support in adjustment to chronic pain and states that "the need to seek social support from others and to utilise other resources available within the family and social network require a variety of skilled interpersonal behaviours, which may suffer attrition as chronicity encroaches" (p.294). It would seem that strong beliefs regarding the emotional unavailability of others, inherent in the 'emotional deprivation' schema, would render this even more difficult and negatively impact upon an individual's perceived social support.

A further striking difference between the two groups was the chronic pain sample's comparatively inflated score on the 'subjugation' schema. Young (1994) defines subjugation as the 'excessive surrendering of control to others because one feels coerced – usually to avoid anger, retaliation or abandonment'. He adds that this tends to 'involve the perception that one's own desires, opinions, feelings are not valid or important to others'. Interestingly, he highlights that subjugation can lead to a build

up of anger, resulting in difficulties such as psychosomatic symptoms. This strongly reflects the theoretical framework of pain with no identifiable organic cause provided by the work of Engel (1959).

One schema, 'entitlement', was revealed to be stronger for the acute than chronic pain group. This refers to the belief that one should be able to do, or have, what one wants. At the extreme end of the continuum, this schema can result in difficulties with respecting, or co-operating with, others. The level found among the acute pain group is perhaps more likely to reflect a healthy ability to assert oneself and achieve one's desires. With respect to the chronic pain group, it is easy to see how this may be hampered by the experience of long-term pain. In addition, it is interesting to note that 'entitlement', which requires a focus on one's own desires, is in stark contrast to 'subjugation' where the focus is on others. The chronic pain group's low endorsement of this schema may therefore serve as indirect evidence that subjugation is indeed an important schema for this population.

The findings relating to the higher-order schema domains were predictable from the differences found between the two groups among the individual schema scores. The chronic pain group scored higher on both the 'impaired autonomy and performance' (dependence, vulnerability, enmeshment and failure) and 'other-directedness' (self-sacrifice and subjugation) schema domains. 'Impaired autonomy and performance' reflects an 'expectation about oneself and the environment that interfere with perceived ability to function independently and successfully' while 'other-

directedness' refers to an 'excessive focus on the needs and desires of others' (Young, 1994).

Later in this discussion, further consideration will be given to the theoretical postulations regarding the development of such schemas in a chronic pain sample and their potential role in the maintenance of pain. Prior to this, the specific pain beliefs held by the sample will be examined.

What are the specific pain beliefs of individuals with chronic pain?

Results revealed that the chronic pain sample, as might be expected, largely endorsed the beliefs that their pain was constant, permanent and mysterious. Individuals did not tend to believe that they themselves were to blame for their pain, a finding consistent with previous studies (Williams and Keefe, 1991; Williams and Thorn, 1989). As expected, the chronic pain and acute pain groups differed in terms of their specific pain beliefs. Unlike the chronic group, those experiencing short-lived pain did not strongly endorse beliefs about their pain being constant, permanent and mysterious. The question remains as to whether such beliefs precede chronicity or develop as pain endures. A related and important issue concerns whether EMSs are linked to specific pain beliefs, as examined in the following section.

Do EMSs and specific pain beliefs relate to each other?

Several interesting correlations were found between the higher-order schema domains and specific pain beliefs for the chronic pain group. These will be considered in turn. Firstly, endorsement of the belief that pain was permanent was associated with a

greater loading on the 'disconnection and rejection' schema domain. Within this domain there are several schemas that could be hypothesised as underlying this belief that pain will never remit. For example, 'abandonment' and 'mistrust/abuse' schemas refer respectively to the beliefs that others will not be able to provide support and protection, and an expectation that others will lie or cheat (Young, 1994). Both of these could be considered to relate to the idea that the medical profession is often seen as failing in cases of chronic pain with no identifiable organic cause. Sufferers may feel that no one can explain what is wrong with them, or that no one is telling them the truth about their condition and that no one is going to be able to provide a cure for it. If the schema is present before the onset of pain, the individual may be more sensitive to the 'incompetence' of medical professionals and attribute this to a lack of support. In addition, the schema 'defectiveness/shame', which reflects a belief that one is inherently inferior/flawed (Young, 1994), may be triggered or strengthened by the experience of pain which serves as proof of this flaw and reinforces a more specific belief that pain is irreversible and everlasting. With hindsight, in light of these findings, it might have been useful to also assess individual's beliefs regarding the underlying cause of their pain.

The specific pain belief relating to the mysteriousness of one's pain was shown to be associated with four of the higher-order schema domains. Of particular interest, was the link found between high endorsement of the mystery subscale and the 'disconnection and rejection' domain. Again this could be considered in terms of mistrust of others, but might also be influenced by the 'emotional deprivation' schema which reflects an absence of understanding/listening or strength/direction from others

(Young, 1994). Interestingly, in previous studies, mysteriousness has been found to be linked with high levels of psychological distress (Williams and Thorn, 1989), which is seen as an inevitable consequence of active EMSs (McGinn and Young, 1996).

A stronger sense of self-blame in relation to pain was associated with a higher score on the higher-order domain of 'overvigilance and inhibition'. This is perhaps unsurprising given the definition of this domain which refers to 'meeting rigid, internalised rules and expectations about performance, a tendency to perfectionism and an avoidance of making mistakes' (Young, 1994). An individual who holds this schema may, at the onset and subsequent maintenance of pain, feel that in some way they have failed or 'made a mistake' and blame themselves for their pain. Finally, the belief that pain is constant was negatively associated with the schema domain of 'other directedness'. It could be hypothesised that the more focused you are on other people's needs (other-directedness) the less you are aware of, or pay attention to, your pain.

Importantly, no association was found between any of the specific pain beliefs and EMSs for the acute pain group. This may suggest that a relationship between general and specific beliefs is a result of chronicity, which is consistent with the cognitive model of pain proposed in the present study. It is possible that this relationship develops and then serves to maintain the pain.

Thus, the individuals within this study held an array of beliefs, both specific and general, which may provide some insight into adjustment to, and maintenance of, their

chronic pain. First, however, it was important to establish whether there was any relationship between such beliefs and functioning.

Relationship between EMSs, specific pain beliefs and current functioning

Current functioning was taken as pain intensity and distress, mood, health functioning and the use of adaptive cognitive coping strategies. It was revealed that EMSs showed more associations with current functioning than did the specific pain beliefs. Of particular note was that all five higher-order schema domains were significantly correlated with depression. This is perhaps unsurprising given the literature on general beliefs and their role in mood disorder (Beck, 1967; 1976). Given the high incidence of depression in people with chronic pain (Banks and Kerns, 1996) it is important to recognise this link and the ensuing clinical considerations, which will be outlined later. In addition, four of the five higher-order schemas were associated with high levels of anxiety, the only exception being 'impaired autonomy'. Again this is unsurprising given the general mood disturbance experienced by those with active or prominent schemas (McGinn and Young, 1996).

With regards cognitive coping strategies, a higher score on either 'disconnection and rejection' or 'impaired autonomy and performance' indicated less employment of adaptive, proactive techniques. This certainly makes sense with regards the 'impaired autonomy' domain, which incorporates beliefs about an inability to perform successfully or function independently and often presents as helplessness. The 'disconnection and rejection' domain (e.g. defectiveness/shame, social isolation) could perhaps be seen to reflect a sense of having 'given up' and a belief that nothing can be

changed, which would lend itself to a belief in the futility of adopting personal coping strategies. The individual holding this schema may also be more internally focused, with few pleasant distractions, and less able to shift the focus away from pain.

The belief that pain is mysterious related to both anxiety and depression, which is consistent with previous research (Williams and Thorn, 1989). Interestingly, the only health subscale that was linked with the specific pain beliefs was that of mental health. Although causal relationships remain unknown, perhaps the fear of the unknown or of the worst with regards diagnosis and prognosis has an inevitable impact upon mood.

The present study certainly suggested that, to some extent, particular schemas and more specific beliefs were present among the chronic pain sample and were related to their adjustment to pain. This was elaborated upon by the adoption of a longitudinal perspective in an attempt to ascertain the clinical significance of the findings and how they might relate to the treatment process.

Treatment outcome

First of all, it is important to acknowledge that, on average, there were significant improvements in functioning found in the sample following receipt of the multidisciplinary treatment. Psychological distress, in terms of both anxiety and depression, was significantly reduced. Furthermore, health functioning improved in certain areas and the employment of cognitive coping strategies increased. As predicted, pain intensity did not alter, but pain distress did significantly reduce. These were promising results, which were concordant with those of a recent outcome study

of a very similar NHS outpatient multidisciplinary group (Skinner, Erskine, Pearce, Rubenstein, Taylor and Foster, 1990).

Change in EMSs following treatment

On average, both the 'dependence/incompetence' and 'vulnerability to harm or illness' schema domains were found to slightly reduce for the group over the course of treatment. Although treatment did not explicitly aim to address such schemas, both of these could be seen as implicitly targeted within the overall treatment philosophy and the cognitive-behavioural component of the programme. Interestingly, scores on the 'entitlement/grandiosity' domain, which were lower for the chronic group than the acute group in the comparative analysis, actually increased over treatment. This raises the question of whether the presence of this schema to such a degree is necessarily maladaptive. As mentioned previously, it may be that it reflects a healthy advocacy for one's own rights rather than a detrimental area of functioning.

The higher-order schema domains 'impaired autonomy and performance' and 'overvigilance and inhibition', both of which would seem to have important implications for the experience of chronic pain, reduced slightly over the course of treatment. 'Impaired autonomy and performance', which covers issues regarding failure, vulnerability and dependence, was considered prominent following the initial descriptive analysis. It would seem particularly important that such beliefs, although not necessarily approached explicitly, have been challenged in order to enable improved functioning. Meanwhile, it is promising that 'overvigilance and inhibition', which incorporates the schema of 'unrelenting standards', reduced over treatment and

may reflect a move towards more realistic goal setting and standards that would have been encouraged within the treatment programme.

Despite such favourable findings however, the question of how clinically significant this EMS change was remains. This may be particularly important to consider given that EMSs are thought to be extremely resistant to change (Young, 1994) and that the treatment programme did not address them directly. It may be that genuine shifts are easier to make when the schemas exist at the lower end of the spectrum and that schemas are not deeply held unless scored 5 or 6. Overall, it remains unclear as to whether the change in EMSs revealed is of clinical importance.

Change in specific pain beliefs following treatment

As would be hoped, specific beliefs considered unhelpful in adjustment to chronic pain (Williams and Thorn, 1989) were, on average, lessened over the course of treatment. In particular, the belief that pain was mysterious reduced, presumably due, in part, to the educational component of the treatment programme. However, it should be noted that the belief that pain is permanent can be considered realistic rather than necessarily maladaptive (Lipchik, Milles and Covington, 1993), and the group is not taught that their pain will remit. The reduction in the endorsement of this belief may have been due to an absence of thinking that their pain is definitely permanent rather than a belief that it is not.

Both general and more specific beliefs were shown to change over the course of treatment. The next step was to examine whether this change contributed to post-treatment benefits in functioning.

Is there a relationship between EMS and PBAPI scores and post-treatment outcome?

There was no evidence from the results of the sample as a whole that there was a relationship between the pre-treatment presence of EMSs or specific pain beliefs and post-treatment outcome. However, it may be that initial levels of EMSs need to be higher in order for them to impact upon treatment outcome. Furthermore, as it was not examined directly, the possible influence that a lack of change in maladaptive beliefs might have on treatment outcome can not be excluded.

In addition, it may have been useful to examine alternative outcome criteria. For example, it has been found that improvement after treatment was associated with decreases in negative cognitions, such as catastrophising or helplessness (Flor, Behle and Birbaumer, 1993), rather than increases in the positive cognitions that were considered in the present study.

Maintenance of treatment benefits

A small group of the chronic pain sample was assessed at a three-month follow-up, allowing for some examination of the extent of treatment benefit maintenance. Their outcome differed slightly from the larger group, but the apparent improvements were largely maintained at the follow-up, with the exception of general health and vitality, which fell back to pre-treatment levels. Although promising, it should be noted that

all mean scores at three months had actually dropped, although not significantly, since post-treatment assessment. It would be interesting, and clinically important, to know if they would continue to decline. For this, longer-term follow-ups are required. Indeed, recent discussion of treatment outcome in the literature reveals a “disheartening trend toward regression to pre-treatment baselines” (Turk and Rudy, 1991, p.6). Such problems with the maintenance of treatment benefits are often linked to difficulties in the generalisation of skills to everyday life and adherence to management strategies (Linton, 1994).

In the present study, it was felt important to examine the possible role of EMS change for the maintenance of treatment benefits. Although no evidence was found to suggest that EMS levels pre-treatment contributed to maintenance, it is still worth considering that any underlying beliefs which remain unchanged through treatment may contribute to a lack of maintenance. This necessitates further investigation.

Following from this, it was decided to address the issue of reliable change and to explore possible differences between those that were considered to have made clinically significant improvement following treatment and those that were not.

Is there a difference in EMSs between those that improve following treatment and those that do not?

It is hoped that the assessment of differences between individuals who improve and those who do not in multidisciplinary programmes could shed some light on the

psychosocial variables associated with poor outcome. Results from the present study revealed that there was some difference in pre-treatment EMS levels found between those who had improved with regards depression and those who had not. The former had a greater 'impaired autonomy and performance' schema domain mean score pre-treatment than the latter. It was hypothesised that this may reflect that there was more scope for change for these individuals. Indeed, further investigation revealed that those who had improved mood following treatment had a greater degree of 'impaired autonomy and performance' improvement than those who had not improved. It would seem logical to acknowledge that depression may be alleviated by a change in such beliefs as those regarding one's failure and vulnerability.

Another interesting, but unexpected, difference was found between those that improved and those that did not. It was revealed that those that had improved on measures of anxiety and health functioning had greater 'other-directedness' ('subjugation' and 'self-sacrifice') post-treatment than did the 'non-improvers'. Thus, the presence of this schema did not seem have a detrimental impact on the efficacy of the treatment in the short-term. However, those individuals who continue to hold the beliefs relating to 'other-directedness' and act accordingly, may find in the longer term that this impacts on the maintenance of their treatment benefits. It could be hypothesised, for example, that those holding this belief completed the treatment programme for the sake of others, rather than truly for themselves, and that the beneficial effects may therefore be short-lived. Furthermore, they may have been subject to 'demand characteristics' or social desirability, where they fulfil what is expected of them and 'dismiss' their symptoms at the end of treatment (Turk, Rudy

and Sorkin, 1993). Alternatively, it may be that those who hold the 'other directedness' schema typically engage in more extreme maladaptive behaviours, such as excessive activity for the sake of others but to the detriment of pain. In this case, there would be more choice of target goals and scope for improvement than for those with less extreme behaviours.

Overall, the findings revealed that the chronic pain sample did hold certain schemas that, within the theoretical context of schema definitions, seem meaningful given their condition. Some of these appear to have been addressed, albeit indirectly, during treatment. Those that did not change, in particular 'other-directedness', may still be present and, although there is no current evidence to suggest that they negatively impact on adjustment, could have a detrimental effect on adjustment to chronic pain in the longer term.

Theoretical considerations

It has been argued that early experiences play a central role in the development and maintenance of chronic pain (Engel, 1959). The present study employed a cognitive framework, with the exploration of early maladaptive schemas as a way of operationalising this view. Attention will therefore now be given as to the possible interpretation of the findings within the wider psychoanalytic context. The focus will remain on those schemas least likely to be confounded by pain itself, namely 'emotional deprivation', 'subjugation' and 'self-sacrifice'.

Engel (1959) proposed a developmental theory for pain without obvious organic cause. He considered that, for some individuals, pain comes to serve as a defence against unconscious psychic conflict. The development of pain was thought to be attributable to the presence of, for example, repressed hostility and aggression, guilt, fear of the threatened loss of a relationship and childhood deprivation (Gamsa, 1994a). The schema of 'other-directedness' (encompassing 'subjugation' and 'self-sacrifice'), prominent within the current chronic pain sample, may be explained from this perspective with several examples.

Firstly, the individual could be seen as protecting themselves from abandonment, or attempting to gain love, by focusing on the needs of others. Secondly, suppression of one's anger is strongly associated with this schema domain. Again, this fits with Engel's theory in which he proposed that pain is linked with aggression and is used as an unconscious means of controlling it. The suppression of anger and aggression may well lead to increased muscle tension, which results in an exacerbation of pain. Furthermore, the issue of guilt is prominent within the 'other directedness' schema. Within a schema framework it is suggested that an individual holding this schema does everything for everyone else to avoid feeling guilty (Young, 1994). This can be seen to reflect Engel's hypothesis that pain is used as an unconscious means of appeasing guilt.

It is important to remember that, in the present study, those who had improved following treatment had a greater level of 'other-directedness' post-treatment. It may be that, in the absence of pain, these individuals use 'other-directedness' as a defence

to ward off unbearable feelings of anger, or to help achieve certain desires such as love and affection. An attempt to alter this schema may, therefore, not be the most appropriate action in terms of the experience of pain *per se*, as pain may then become unconsciously re-employed as the defence. However, deeper investigation as to the reasons underlying these defensive mechanisms may be appropriate.

Engel (1959) identified certain developmental psychosocial factors, particularly in relation to maladaptive early family relationships, that were important for the unconscious adoption of pain as a defence. Although there is no direct information regarding this from the present study, the schema questionnaire does seem to access this to some extent, most particularly with the 'emotional deprivation' schema items. Interestingly, this schema was shown to be significantly higher for the chronic pain than the acute pain group, providing some support for Engel's hypothesis. Certain studies have previously aimed to provide evidence for the role of maladaptive early family relationships in the development of chronic pain by examining the prevalence of abuse in sufferers (e.g. Roy, 1985). This 'emotional deprivation' schema would seem a good adjunct to the assessment of the importance of maladaptive early relationships in the adjustment to chronic pain.

The 'self-sacrifice' schema may have important implications for the development of chronic pain. It may be hypothesised that the experience of initial pain, through injury for example, triggers this schema which leaves an individual unable to pay adequate attention to their own needs. They experience guilt at the need to attend to themselves and therefore continue to do everything for everyone else. They do not

take adequate preventative action by, for example, resting or seeking appropriate help, which then exacerbates the pain problem and renders it chronic. Given that people with enduring pain are inevitably required to address their needs in order to alleviate their suffering, this EMS seems of particular relevance.

An interesting suggestion, that may also relate to the implications of the 'other directedness' schema, concerns the possible role of assertiveness deficits in the aetiology and maintenance of chronic pain (Beutler, Engle, Oro'-Beutler, Daldrup and Meredith, 1986). Pearce and Erskine (1989) recommend teaching for individuals suffering from chronic pain to enable them to communicate their needs to others and to cope with interpersonal conflict. This may also relate to the increase in 'entitlement' following treatment found in the present study, which may be regarded as more to do with appropriate assertiveness skills than maladaptive beliefs.

The presence of the 'other-directedness' schema domain in this chronic pain sample also ties in with previous suggestions regarding chronic illness and primary and secondary gain (Erskine, 1994). The primary gain refers to the relief from anxiety and psychic conflict afforded by the symptom's presence (Pinsky, 1975 cited in Erskine, 1994) which, with regards chronic pain, concurs with Engel's hypothesis (1959). The secondary gain refers to the more practical benefits that can be reaped by using symptoms to influence or manipulate others. In this sense, if an individual was unable to communicate their needs to others, as is the case when subscribing to the belief of 'other-directedness', they may use their pain to do so.

The presence of early maladaptive schemas found within the present study does offer some support for the psychoanalytic view that early experiences are important in the development of chronic pain. The proposed cognitive model of chronic pain is able to account for such findings and affords early maladaptive schemas an important role in an individual's adjustment to chronic pain. However, it should be emphasised that this is not to encourage or revert to a dualistic way of thinking and suggest that early maladaptive schemas, resulting from negative childhood experience, actually cause pain. Rather, it is argued that it is the event of pain itself that triggers both general and specific beliefs, which may then influence its maintenance.

Methodological limitations

The particular model assumed for the exploration of EMSs and specific pain beliefs in the adjustment to chronic pain has raised some interesting findings, but it is essential to consider the limitations of the study. Aside from the obvious constraints of a small sample size, there were several limitations regarding the measures employed, the generalisability of results, the comparison group and clinical significance, which will be discussed in turn.

Measures

All measures employed within this study were necessarily self-report by nature. Alongside the inherent difficulties with this; such as social desirability bias, individuals tended to choose to take the questionnaires home rather than completing them at the clinic. Although it was felt useful to allow them to do this, in order to optimise participation and reduce inconvenience, it may have increased the likelihood that they

may, for example, confer with others, fake, or take much longer than desirable to complete them.

Young's Schema Questionnaire requires particular attention with regards methodological limitations. As has been explained, there is little published research concerning the psychometric properties of this questionnaire. Furthermore, there are no guidelines available for the use of the questionnaire for research purposes, although personal communication from Young (1998) recommended it as appropriate. Perhaps the overriding difficulty with this questionnaire is its length. With 205 items, it is a time consuming and tiring measure to complete. In addition, the questions are of a very direct yet sensitive nature and, for some, may have been potentially distressing. Careful lengths were taken to discuss the requirements of the Schema Questionnaire with participants and to assure them that the researcher would be available to talk to them should they experience distress. Indeed, it was found on many occasions that individuals used this questionnaire as a 'stepping stone' from which to verbally share personal and difficult experiences with the researcher. One could see how this relates to the use of the measure clinically, where it is employed both for assessment and to instigate discussion around those areas requiring therapeutic work.

Despite being assured of confidentiality, it was felt that the sensitivity and intimacy of the questionnaire might have had some impact on the 'honesty' of responses. This was perhaps particularly pertinent for the chronic pain sample who knew that they would see the researcher again. It was suspected that the range of the scale may not

have been being used. It is perhaps somewhat exposing to admit to an item 'describing you perfectly' when not in a therapeutic situation. Thus, it may be that the levels of EMSs reported in this study were an underestimate.

The nature and length of the questionnaire was strongly felt to limit the sample size, particularly with regards the comparative acute pain sample. There is most certainly a good argument for employing the shorter version of the questionnaire for research purposes. Indeed, the extremely high internal consistency among items revealed in this study could be seen as excessive (Barker, Pistrang and Elliott, 1994) and provides further support for the shorter version.

It is also important to recognise that the measures employed within this study require cautious interpretation, as somatic or situational items may be likely to measure normal reactions to pain and associated physical limitations (Gamsa, 1994*b*). An attempt was made to address this, both through the choice of the HADS as the measure of mood and the attention paid to the possible confounding effects of pain to responses on the Schema Questionnaire. One further limitation regarding measures arose with the MOS assessment of health functioning, which showed signs of a floor effect. Given this, a more sensitive measure of health functioning would have been beneficial.

Samples / generalisability

The chronic pain sample in the present study was characteristically and clinically similar to other chronic pain research populations. However, this does not mean that

it was equally similar to the wider, heterogeneous chronic pain population. A particular criticism of previous research, highlighted within the introduction, must also be applied to the present study. That is, the difficulty in generalising findings based on specialist pain clinical samples to the wider population of pain sufferers (Crombie and Davies, 1998). Firstly, pain clinic samples include only those who are significantly disabled by their pain rather than all those who suffer. Those attending pain clinics have also been considered to have a greater tendency to both neuroticism and emotional disturbance (Merskey et al, 1985; Crook and Tunks, 1985 respectively) and are a highly selected group. They self-select to seek treatment in the first instance, but then are also subject to selection by the primary care physician to whom they will first present and subsequently by the specialists to whom they will be referred. A host of factors might influence this selection procedure including age, gender, other health problems, eloquence and determination (Crombie and Davies, 1998).

Furthermore, at the point of selection for inclusion to a multidisciplinary treatment programme there is likely to be a tendency to 'screen out' those individuals whom it is felt, for whatever reason, will not improve (Gamsa, 1994b). Thus, there may be many individuals suffering from chronic pain holding more extreme EMSs who have not been accessed in the present study.

Comparison group

The choice of comparison group was difficult, as outlined in the methodology. An acute pain sample was chosen, as opposed to a chronic illness group for example, as it seemed appropriate to make the comparison with a group who had also had the

experience of pain but in whom the time factor was excluded. A decision was made to enrol an acute dental pain comparison group for several reasons. These included the relative brevity and simplicity of dental surgery, accessibility of the population and the fact that similar comparison groups have been used in previous research (Ackerman and Stevens, 1989). They did differ from the chronic pain group in age, pain intensity and distress, but are likely to have been as comparable as any alternative comparison group. Other acute pain groups would have been particularly problematic given, for example, that acute pain is often associated with trauma that may trigger EMSs, and that post-operative pain in planned surgery is often associated with pre-operative pain.

The Schema Questionnaire is still relatively new, but it is hoped that norms from the general population will soon be available. It would then be possible to compare various groups such as chronic pain, acute pain and chronic illnesses such as diabetes, asthma and chronic fatigue.

Treatment outcome and clinical significance

One difficulty inherent with outcome research is that criteria for improvement tend to differ across studies (Turk, Rudy and Sorkin, 1993). More explicit and standardised outcome criteria are required to enable comparisons. A further difficulty, which applies to the present study, is the reliance on multiple outcome measures. This raises the question of whether treatment can be considered successful if an individual has changed on one measure but not on others. This use of multiple outcome measures is also problematic statistically, as it increases the risk of Type I errors. An attempt was

made in the present study to partially remedy this with the adoption of composite scores. However, it was impossible to obtain a single outcome variable without losing valuable and interesting information regarding the differential treatment effects. Suffice to say, the results should be interpreted with caution.

No objective measures of improvement were employed within this study, nor were individuals asked to subjectively rate their improvement following treatment. This might have been interesting to include, as it has been suggested that the way an individual rates the efficacy of their treatment program may influence post-treatment compliance with self-help strategies and impact upon subsequent relapse rates (Turk and Rudy, 1991). This also highlights the question of whether post-treatment change was clinically significant and, furthermore, significant to whom (Turk, Rudy and Sorkin, 1993).

In an attempt to address the variability of responses to treatment within the sample, an effort was made to establish the clinical significance of individual outcome. It was only possible to calculate Jacobson and Truax's reliable change index (1991) for the HADS measure of anxiety and depression. This revealed a disappointing number of individuals who could be considered to have improved according to clinical significance criteria. However, as the formula requires an estimate of the standard deviation of group data, the extent of the difference in scores pre-to-post treatment required to be considered clinically significant, depends in part on the heterogeneity of the group (Turk, Rudy and Sorkin, 1993). The greater the heterogeneity of the sample, the higher the change in score an individual needs to be considered

'improved'. Given that chronic pain samples are well known for their heterogeneity, this is a serious limitation of the index and the disappointing finding should be considered within this context.

Care also needs to be applied to the interpretation of the changes in EMSs found following treatment. Although statistically significant, they were not necessarily clinically significant. More research is needed to establish, firstly, whether EMSs can change in this population and, secondly, whether associations between general belief change and treatment outcome would be stronger if belief changes were greater. Furthermore, although it was helpful that the data could be transformed to meet the assumptions of normal distribution, the small size and heterogeneous nature of the chronic and acute pain samples limit interpretation. For example, it may be that some of the differences found between the chronic and acute groups which reached statistical significance, were actually insignificant in more 'real' terms.

Design

The limitations inherent in the correlational design of the study should also be highlighted (Barker, Pistrang and Elliott, 1994; Jensen, Turner, Romano and Lawler, 1994). The findings provide no support for causal relationships between general and specific beliefs and adjustment to chronic pain. However, they have indicated particular beliefs, chiefly 'other-directedness' and 'impaired autonomy', that deserve further attention.

Higher-order schema domain scores were employed for the inferential statistical analyses in order to minimise the extent of Type I errors. However, this runs the risk of missing information regarding more specific variables. The initial descriptive analyses did examine the more specific EMSs, but it might be interesting to extend this and, with a larger sample, closely scrutinise the role of each schema in treatment outcome and maintenance.

Clinical implications

Group multidisciplinary treatment for chronic pain has been shown to be both efficacious and cost-effective (Flor, Fydrich and Turk, 1992). However, close examination of relapse rates can prove disheartening (Turk and Rudy, 1991). Furthermore, it is difficult to adapt group treatment to particular individual needs (Pearce and Erskine, 1989). Information regarding specific individual variables that enhance response to treatment, and allow some to cope better with their pain than others, is crucial. Identification of the schemas particularly pertinent to chronic pain samples would highlight specific areas that need to be addressed within group multidisciplinary treatment programmes.

Particular early maladaptive schemas were present in the chronic pain sample to a certain extent, and they appeared to fit with a pain presentation. Furthermore, there was some indication that those who had improved following treatment had a greater schema change over treatment. This lends some support to the argument that, for some, assessment of EMSs may be beneficial and appropriate adaptation of treatment necessary to allow improvement and prevent relapse. Certainly, if EMSs were found

to be present in higher levels, the selective use of schema-focused therapy would be implied for those with intractable pain. However, further evidence is needed to suggest that changes in beliefs are associated with positive treatment outcome before concluding that they should be tackled directly within treatment programmes. Larger studies that could differentiate subgroups of chronic pain patients according to their EMSs and compare treatment outcome and adjustment would be welcomed.

A further note should be made with regards the high incidence of depression found among those suffering from long-term pain (Banks and Kerns, 1996). The relationship between depression and chronic pain is complex and remains unclear. However, it is considered that depression can serve as an exacerbating and maintaining factor to pain (Williams and Erskine, 1995) and, as such, it is important to treat effectively. Cognitive-behavioural components addressing mood are an integral part of multidisciplinary treatment programmes. The cognitive model proposed in the present study, suggests that pain may trigger EMSs which impact upon an individual's adjustment to that pain. EMSs are strongly associated with negative affect (McGinn and Young, 1996), and may underlie depression comorbid with pain. Thus, it may be that for those suffering from pain and associated depression there is a particular need to address underlying schemas. Indeed, as Hanson and Gerber (1990) suggested, there may be a substantial number of individuals with chronic pain who require longer-term therapy. Although schema-focused therapy has yet to be scientifically evaluated in controlled clinical trials, clinical evidence suggests that it can be beneficial for those with chronic pain (McGinn, Young and Sanderson, 1995).

Research is needed to examine whether the addition of schema-focused components to treatment can enhance benefits found with traditional CBT and prevent relapse.

Future implications and concluding remarks

The present study served as a tentative first step into the use of the Schema Questionnaire as a way of operationalising the view that early experiences are important in an individual's adjustment to chronic pain. Further replication is required in order to establish those EMSs of particular relevance. Continued research using different samples of individuals with chronic pain is necessary to assess the consistency and generalisability of results. Validation of the shorter-form questionnaire would be welcomed and is likely to encourage greater participation.

Still little is known about the specific factors that influence the transition from acute to chronic pain. It was hypothesised in the present study that pre-existing, but perhaps dormant, EMSs are triggered by the experience of pain, which then serve to maintain that pain. Therefore, a logical progression from this would be to conduct a prospective study of the role of EMSs in the development of chronic pain. This would involve the assessment of EMSs in individuals at the onset of acute pain, for example when they are referred to the physiotherapist for treatment of acute back pain. Those who go on to develop chronic pain could then be compared with those who do not, in order to elucidate whether there was a significant difference in EMSs between them. It may be hypothesised that certain EMSs could present as a 'risk-factor' to the development of chronic pain and thus provide implications for preventative work.

In summary, the present study provides an insight and beginning into the exploration of the role of early maladaptive schemas in adjustment to chronic pain. Particular EMSs were shown to be evident within the chronic pain sample to some degree. This would seem to support the idea, suggested by Engel (1959), that there is a role for an emotional element, such as suppressed anger, in chronic pain. The model employed within this study appears to be an appropriate and useful way of operationalising this view. Given certain methodological limitations, findings need to be approached with caution and, indeed, are only considered applicable to those who are not coping with their pain and who are attending a pain clinic as a consequence. Despite this, the study raised several important issues that warrant further investigation, including the role of self-sacrifice, subjugation and associated anger in the experience of chronic pain.

The conceptualisation of pain has certainly progressed from an unhelpful dualistic model to a multidimensional perspective which incorporates the physiological, social and psychological. However, questions remain regarding individual differences in adjustment to chronic pain. It is argued that the collaboration of cognitive and psychoanalytic perspectives is a welcome advance in the approach to pain and that EMSs, thought to reflect negative early experiences, should be included within the multidimensional perspective to enrich our understanding of this enduring problem.

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Appendix 1. Early maladaptive schema definitions (Young, 1994)

Abandonment / instability

The perceived instability or unreliability of those available for support and connection. The abandonment schema involves the sense that significant others will not be able to continue providing emotional support, connection, strength, or practical protection because they are emotionally unstable and unpredictable (e.g. angry outbursts), unreliable or erratically present; because they will die imminently; or because they will abandon the patient in favour of someone better.

Mistrust/abuse

The expectation that others will hurt, abuse, humiliate, cheat, lie, manipulate or take advantage. This usually involves the perception that the harm is intentional or the result of unjustified and extreme negligence. It may include the sense that one always ends up being cheated relative to others.

Emotional deprivation

The expectation that one's desire for a normal degree of emotional support will not be adequately met by others. The three major forms of deprivation are:

1. Deprivation of nurturance: absence of attention, affection, warmth or companionship.
2. Deprivation of empathy: absence of understanding, listening, self-disclosure, or mutual sharing of feelings from others.
3. Deprivation of protection: Absence of strength, direction or guidance from others.

Defectiveness/shame

The feeling that one is defective, bad, unwanted, inferior or invalid in important respects; or that one would be unlovable to significant others if exposed. May involve hypersensitivity to criticism, rejection and blame; self-consciousness, comparisons and insecurity around others; or a sense of shame regarding one's perceived flaws. These flaws may be private (e.g. selfishness, angry impulses,

unacceptable sexual desires) or public (e.g. undesirable physical appearance, social awkwardness).

Social isolation / alienation

The feeling that one is isolated from the rest of the world, different from other people, and/or not part of any group or community.

Dependence/incompetence

The belief that one is unable to handle one's everyday responsibilities in a competent manner, without considerable help from others(e.g. take care of oneself, tackle new tasks, make good decisions). Often presents as helplessness.

Vulnerability to harm or illness

An exaggerated fear that 'random' catastrophe could strike at any time and that one will be unable to prevent it. Fears focus on one or more of the following: (a) medical (e.g. heart attack, AIDS); (b) emotional (e.g. go crazy); (c) natural /phobic (e.g. crime, earthquakes, aeroplanes).

Enmeshment / undeveloped self

Excessive emotional involvement and closeness with one or more significant others (often parents), at the expense of full individuation or normal social development. Often involves the belief that at least one of the enmeshed individuals cannot survive or be happy without the constant support of the other. May also include feelings of being smothered by, or fused with, others or insufficient individual identity. Often experienced as a feeling of emptiness and floundering, having no direction, or in extreme cases questioning one's existence.

Failure

The belief that one has failed, will inevitably fail, or is fundamentally inadequate relative to one's peers, in areas of achievement. Often involves beliefs that one is stupid, inept, untalented, ignorant, lower in status, less successful than others etc.

Entitlement / grandiosity

The belief that one is superior to other people, entitled to special rights and privileges, or not bound by the rules of reciprocity that guide normal social interaction. Often involves insistence that one should be able to do or have whatever one wants, regardless of what is realistic, what others consider reasonable, or the cost to others. Or an exaggerated focus on superiority (e.g. being among the most successful) in order to achieve power or control (not primarily for attention or approval). Sometimes includes excessive competitiveness toward, or domination of, others – asserting one's power, forcing one's point of view, or controlling the behaviour of others in line with one's own desires, without empathy or concern for others' needs or feelings.

Insufficient self-control / self-discipline

Pervasive difficulty or refusal to exercise sufficient self-control and frustration tolerance to achieve one's personal goals, or to restrain the excessive expression of one's emotions and impulses.

Subjugation

An excessive surrendering of control to others because one feels coerced – usually to avoid anger, retaliation or abandonment. The two major forms of subjugation are:

- (a) subjugation of needs: suppression of one's preferences, decisions and desires
- (b) suppression of emotional expression, especially anger

This schema usually involves the perception that one's own desires, opinions and feelings are not valid or important to others. Frequently presents as excessive compliance, combined with hypersensitivity to feeling trapped. Generally leads to a build up of anger, manifested in maladaptive symptoms (e.g. passive-aggressive behaviour, uncontrolled outbursts of temper, psychosomatic symptoms, substance abuse).

Self-sacrifice

An excessive focus on voluntarily meeting the needs of others in daily situations, at the expense of one's own gratification. The most common reasons are – to prevent

causing pain to others, to avoid guilt from feeling selfish, or to maintain the connection with others perceived as needy. Often results from an acute sensitivity to the pain of others. Sometimes leads to a sense that one's own needs are not adequately met and to the resentment of those who are taken care of.

Emotional inhibition

Excessive inhibition of spontaneous action, or communication, usually to create a sense of security and predictability, or to avoid making mistakes, disapproval from others, catastrophe and chaos, or losing control of one's impulses. The most common areas of excessive control involve: (a) inhibition of anger and aggression; (b) compulsive order and planning; (c) inhibition of positive impulses (e.g. joy, affection, sexual excitement); (d) excessive adherence to routine or ritual; (e) difficulty expressing vulnerability or communicating freely about one's feelings and needs; (f) excessive emphasis on rationality while disregarding emotional needs.

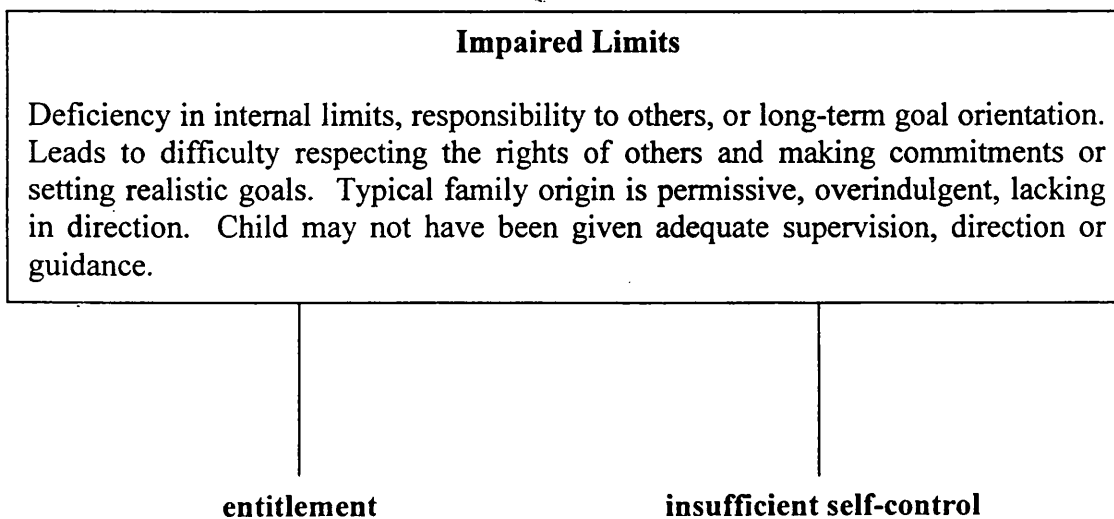
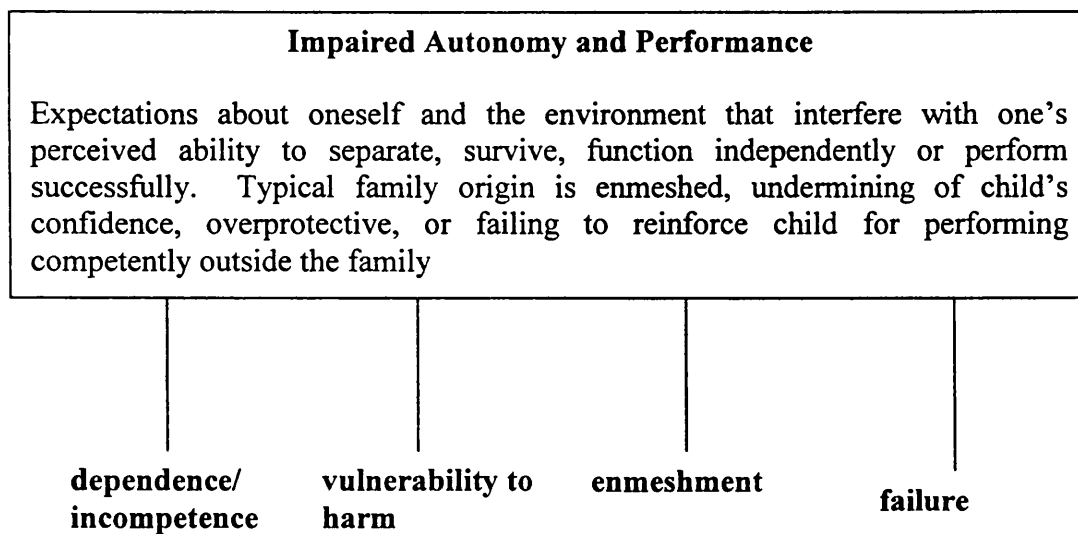
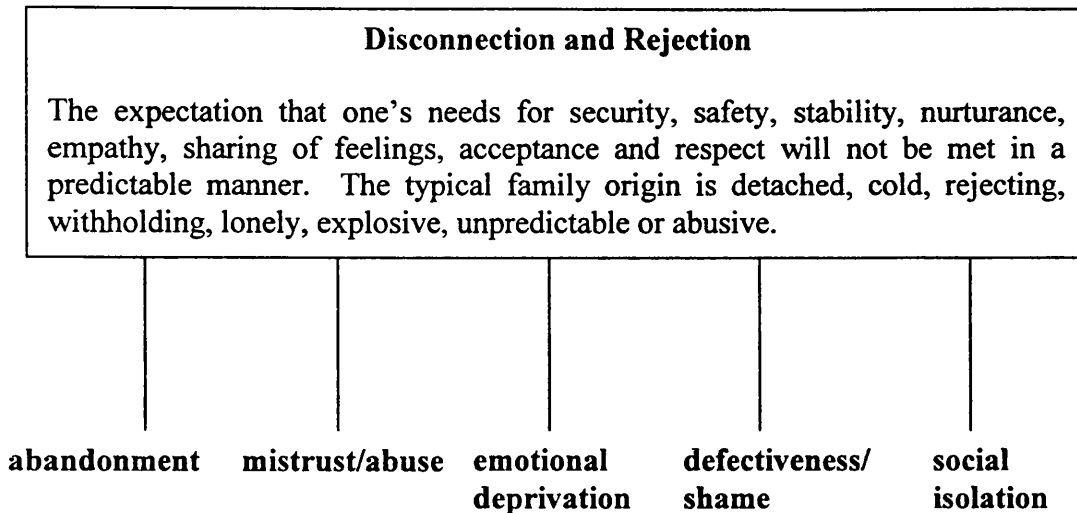
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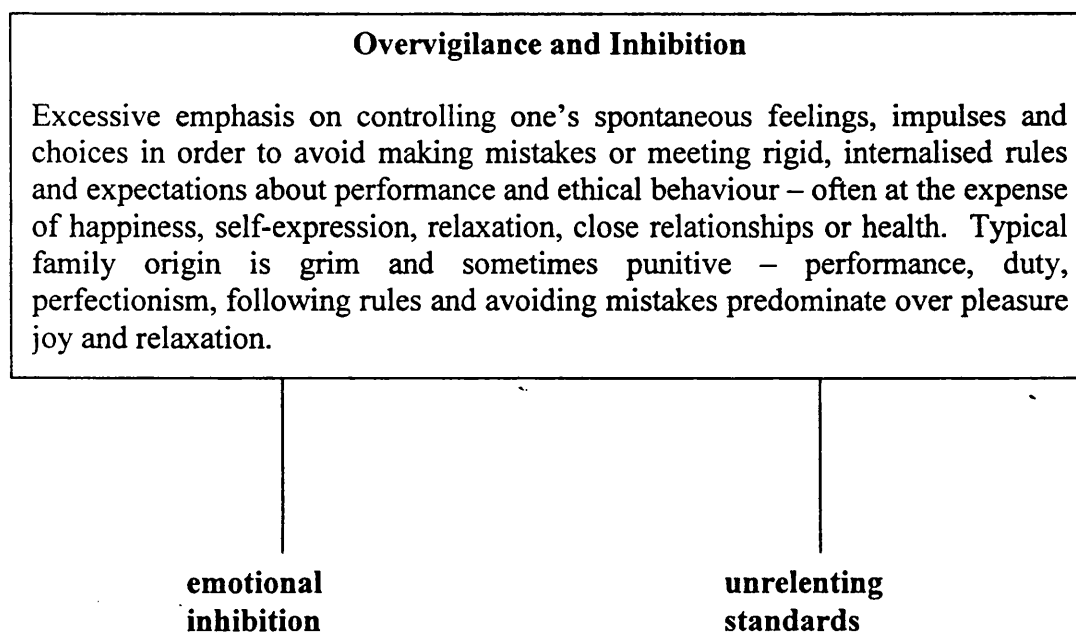
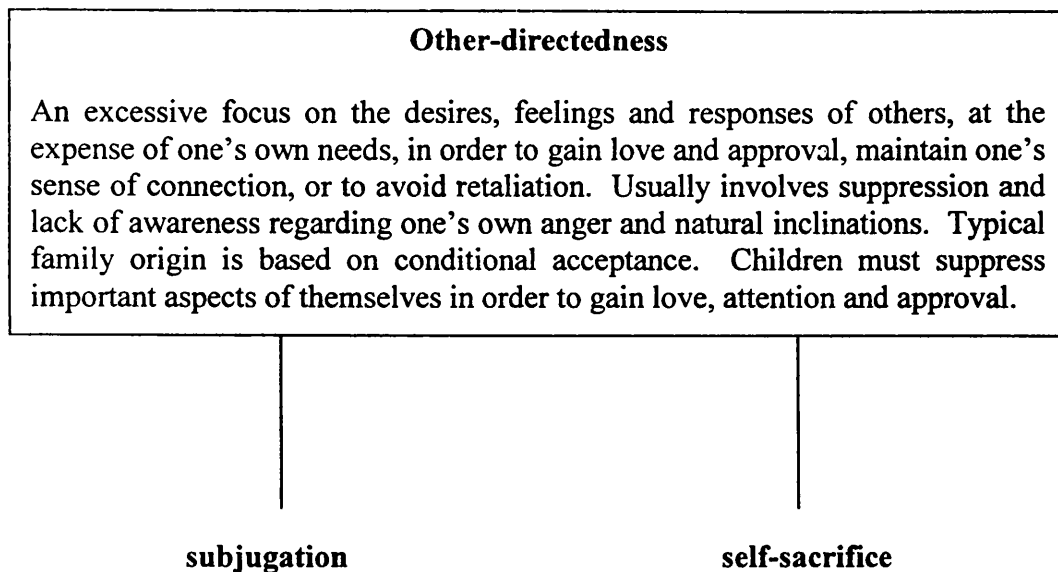
The underlying belief that one must strive to meet very high internalised standards of behaviour and performance, usually to avoid criticism. Typically results in feelings of pressure or difficulty slowing down, and in hypercriticalness toward oneself and others. Must involve significant impairment in pleasure, relaxation, health, self-esteem, sense of accomplishment or satisfying relationships.

Social undesirability

The expectation that one is different from others and undesirable in terms of physical attractiveness, social skills or personality. More specifically, the belief that one is isolated from others due to some outwardly undesirable feature (e.g. ugly, dull). Currently not included in the higher-order schema domain structure.

Appendix 2. Higher-order schema domains (Young, 1994)





Appendix 3. Young's Schema Questionnaire (1990, revised 1994)

YSQ

Confidential

INSTRUCTIONS: Listed below are statements that a person might use to describe himself or herself. Please read each statement and decide how well it describes you. When you are not sure, base your answer on what you emotionally **feel**, not on what you **think** to be true. Choose the **highest rating from 1 to 6** that describes you and write the number in the space provided beside each statement.

RATING SCALE:

1 = Completely untrue of me

2 = Mostly untrue of me

3 = Slightly more true than untrue

4 = Moderately true of me

5 = Mostly true of me

6 = Describes me perfectly

1. People have not been there to meet my emotional needs.

2. I haven't had love and attention.

3. For the most part, I haven't had someone to depend on for advice and emotional support.

4. Most of the time, I haven't had someone to nurture me, share him/herself with me, or care deeply about everything that happens to me.
5. For much of my life, I haven't had someone who wanted to get close to me and spend a lot of time with me.
6. In general, people have not been there to give me warmth, holding and affection.
7. For much of my life, I haven't felt that I am special to someone.
8. For the most part, I have not had someone who really listens to me, understands me, or is tuned into my true needs and feelings.
9. I have rarely had a strong person to give me sound advice or direction when I'm not sure what to do.
10. I worry that the people I love will die soon, even though there is little medical reason to support my concern.
11. I find myself clinging to people I'm close to because I'm afraid they'll leave me.
12. I worry that people I feel close to will leave me or abandon me.
13. I feel that I lack a stable base of emotional support.
14. I don't feel that important relationships will last; I expect them to end.
15. I feel addicted to partners who can't be there for me in a committed way.
16. In the end, I will be alone.
17. When I feel someone I care for pulling away from me, I get desperate.
18. Sometimes I am so worried about people leaving me that I drive them away.
19. I become upset when someone leaves me alone, even for a short period of time.
20. I can't count on people who support me to be there on a regular basis.

- 21. I can't let myself get really close to other people because I can't be sure they'll always be there.
- 22. It seems that the important people in my life are always coming and going.
- 23. I worry a lot that the people I love will find someone else they prefer and leave me.
- 24. The people close to me have been very unpredictable; one moment they're available and nice to me, the next, they're angry, upset, self-absorbed, fighting, etc.
- 25. I need other people so much that I worry about losing them.
- 26. I feel so defenseless if I don't have people to protect me that I worry a lot about losing them.
- 27. I can't be myself or express what I really feel, or people will leave me .
- 28. I feel that people will take advantage of me .
- 29. I often feel that I have to protect myself from other people .
- 30. I feel that I cannot let my guard down in the presence of other people, or else they will intentionally hurt me.
- 31. If someone acts nicely towards me, I assume that he/she must be after something.
- 32. It is only a matter of time before someone betrays me .
- 33. Most people only think about themselves.
- 34. I have a great deal of difficulty trusting people.
- 35. I am quite suspicious of other people's motives.
- 36. Other people are rarely honest; they are usually not what they appear.
- 37. I'm usually on the lookout for people's ulterior motives.
- 38. If I think someone is out to hurt me, I try to hurt them first.

- 39. People usually have to prove themselves to me before I can trust them .
- 40. I set up 'tests' for other people to see if they are telling me the truth and are well-intentioned.
- 41. I subscribe to the belief: "Control or be controlled. "
- 42. I get angry when I think about the ways I have been mistreated by other people throughout my life.
- 43. Throughout my life, those close to me have taken advantage of me or used me for their own purposes.
- 44. I have been physically, emotionally, or sexually abused by important people in my life .
- 45. I don't fit in .
- 46. I'm fundamentally different from other people .
- 47. I don't belong; I'm a loner .
- 48. I feel alienated from other people .
- 49. I feel isolated and alone .
- 50. I always feel on the outside of groups .
- 51. No one really understands me .
- 52. My family was always different from the families around us .
- 53. I sometimes feel as if I am an alien .
- 54. If I disappeared tomorrow, no one would notice .
- 55. No man/woman I desire could love me once he/she saw my defects .
- 56. No one I desire would want to stay close to me if he/she knew the real me .

- 57. I am inherently flawed and defective .
- 58. No matter how hard I try, I feel that I won't be able to get a significant man/woman to respect me or feel that I am worthwhile .
- 59. I am unworthy of the love, attention, and respect of others .
- 60. I feel that I'm not lovable .
- 61. I am too unacceptable in very basic ways to reveal myself to other people.
- 62. If others found out about my basic defects, I could not face them .
- 63. When people like me, I feel I am fooling them .
- 64. I often find myself drawn to people who are very critical or reject me .
- 65. I have inner secrets that I don't want people close to me to find out .
- 66. It is my fault that my parent(s) could not love me enough .
- 67. I don't let people know the real me .
- 68. One of my greatest fears is that my defects will be exposed .
- 69. I cannot understand how anyone could love me .
- 70. I'm not sexually attractive .
- 71. I'm too fat .
- 72. I'm ugly .
- 73. I can't carry on a decent conversation .
- 74. I'm dull and boring in social situations .
- 75. People I value wouldn't associate with me because of my social status (e.g. income, educational level, career).
- 76. I never know what to say socially .

- 77. People don't want to include me in their groups .
- 78. I am very self-conscious around other people .
- 79. Almost nothing I do at work (or school) is as good as other people can do .
- 80. I'm incompetent when it comes to achievement .
- 81. Most other people are more capable than I am in areas of work and achievement .
- 82. I'm a failure.
- 83. I'm not as talented as most people are at their work.
- 84. I'm not as intelligent as most people when it comes to work (or school) .
- 85. I am humiliated by my failures and inadequacies in the work sphere .
- 86. I often feel embarrassed around other people because I don't measure up to them in terms of my accomplishments .
- 87. I often compare my accomplishments with others and feel that they are more much more successful.
- 88. I do not feel capable of getting by on my own in everyday life .
- 89. I need other people to help me get by .
- 90. I do not feel I can cope well by myself .
- 91. I believe that other people can take better care of me than I can take care of myself .
- 92. I have trouble tackling new tasks outside of work unless I have someone to guide me .
- 93. I think of myself as a dependent person, when it comes to everyday functioning .
- 94. I screw up everything I try, even outside of work (or school) .
- 95. I'm inept in most areas of life .

96. If I trust my own judgment in everyday situations, I'll make the wrong decision .
97. I lack common sense .
98. My judgment cannot be relied upon in everyday situations .
99. I don't feel confident about my ability to solve everyday problems that come up .
100. I feel I need someone I can rely on to give me advice about practical issues .
101. I feel more like a child than an adult when it comes to handling everyday responsibilities .
102. I find the responsibilities of everyday life overwhelming.
103. I can't seem to escape the feeling that something bad is about to happen .
104. I feel that a disaster (natural, criminal, financial, or medical) could strike at any moment .
105. I worry about becoming a street person or vagrant .
106. I worry about being attacked .
107. I feel that I must be very careful about money or else I might end up with nothing .
108. I take great precautions to avoid getting sick or hurt .
109. I worry that I'll lose all my money and become destitute .
110. I worry that I'm developing a serious illness, even though nothing serious has been diagnosed by a physician.
111. I am a fearful person.
112. I worry a lot about the bad things happening in the world: crime, pollution etc .
113. I often feel that I might go crazy .
114. I often feel that I am going to have an anxiety attack .

115. I often worry that I might have a heart attack, even though there is little medical reason to be concerned.
116. I feel that the world is a dangerous place .
117. I have not been able to separate myself from my parent(s), the way other people my age seem to.
118. My parent(s) and I tend to be overinvolved in each other's lives and problems .
119. It is very difficult for my parent(s) and me to keep intimate details from each other, without feeling betrayed or guilty .
120. My parent(s) and I have to speak to each other almost every day or else one of us feels guilty, hurt, disappointed, or alone .
121. I often feel that I do not have a separate identity from my parents or partner .
122. I often feel as if my parent(s) are living through me - I don't have a life of my own .
123. It is very difficult for me to maintain my distance from the people that I am intimate with; I have trouble keeping any separate sense of myself .
124. I am so involved with my partner or parents that I do not really know who I am or what I want.
125. I have trouble separating my point of view or opinion from that of my parents or partner .
126. I often feel that I have no privacy when it comes to my parents or partner .
127. I feel that my parents are, or would be, very hurt about my living on my own, away from them.
128. I let other people have their way because I fear the consequences .
129. I think if I do what I want, I'm only asking for trouble .

130. I feel that I have no choice but to give in to other peoples' wishes, or else they will retaliate or reject me in some way.
131. In relationships, I let the other person have the upper hand .
132. I've always let others make choices for me, so I really don't know what I want for myself .
133. I feel the major decisions in my life were not really my own .
134. I worry a lot about pleasing other people so they won't reject me .
135. I have a lot of trouble demanding that my rights be respected and that my feelings be taken into account .
136. I get back at people in little ways instead of showing my anger.
137. I will go to much greater lengths than most people to avoid confrontation .
138. I put others' needs before my own or else I feel guilty .
139. I feel guilty when I let people down or disappoint them .
140. I give more to other people than I get back in return .
141. I'm the one who usually ends up taking care of the people I'm close to .
142. There is almost nothing I couldn't put up with if I loved someone .
143. I am a good person because I think of others more than of myself .
144. At work, I'm usually the one to volunteer to do extra tasks or to put in extra time .
145. No matter how busy I am, I can always find time for others .
146. I can get by on very little because my needs are minimal .
147. I'm only happy when those around me are happy .

148. I'm so busy doing for the people that I care about that I have little time for myself .
149. I've always been the one who listens to everyone else's problems .
150. I'm more comfortable giving a present than receiving one .
151. Other people see me as doing too much for others and not enough for myself .
152. No matter how much I give, it is never enough .
153. If I do what I want, I feel very uncomfortable .
154. It's very difficult for me to ask others to take care of my needs .
155. I worry about losing control of my actions .
156. I worry that I might seriously harm someone physically or emotionally if my anger gets out of control .
157. I feel that I must control my emotions and impulses or something bad is likely to happen.
158. A lot of anger and resentment builds up inside me that I don't express .
159. I am too self-conscious to show positive feelings to others (e.g. affection, showing I care) .
160. I find it embarrassing to express my feelings to others .
161. I find it hard to be warm and spontaneous .
162. I control myself so much that people think I am unemotional .
163. People see me as uptight emotionally.
164. I must be the best at most of what I do; I can't accept second best .
165. I strive to keep almost everything in perfect order .
166. I must look my best most of the time .

- 167. I try to do my best; I can't settle for "good enough" .
- 168. I have so much to accomplish that there is almost no time to really relax .
- 169. Almost nothing I do is quite good enough; I can always do better .
- 170. I must meet all my responsibilities .
- 171. I feel there is constant pressure for me to achieve and get things done .
- 172. My relationships suffer because I push myself so hard .
- 173. My health is suffering because I put myself under so much pressure to do well.
- 174. I often sacrifice pleasure and happiness to meet my own standards .
- 175. When I make a mistake, I deserve strong criticism .
- 176. I can't let myself off the hook easily or make excuses for my mistakes .
- 177. I'm a very competitive person .
- 178. I put a good deal of emphasis on money or status .
- 179. I always have to be Number One, in terms of my performance.
- 180. I have a lot of trouble accepting "no" for an answer when I want something from other people.
- 181. I often get angry or irritable if I can't get what I want .
- 182. I'm special and shouldn't have to accept many of the restrictions placed on other people .
- 183. I hate to be constrained or kept from doing what I want .
- 184. I feel that I shouldn't have to follow the normal rules and conventions that other people do .
- 185. I feel that what I have to offer is of greater value than the contributions of others .

186. I usually put my needs ahead of the needs of others .
187. I often find that I am so involved in my own priorities that I don't have time to give to friends or family.
188. People often tell me that I am very controlling about the ways things are done .
189. I get very irritated when people won't do what I ask of them .
190. I can't tolerate other people telling me what to do .
191. I have great difficulty getting myself to stop drinking, smoking, overeating, or other problem behaviours .
192. I can't seem to discipline myself to complete routine or boring tasks .
193. Often I allow myself to carry through on impulses and express emotions that get me into trouble or hurt other people .
194. If I can't reach a goal, I become easily frustrated and give up .
195. I have a very difficult time sacrificing immediate gratification to achieve a long-range goal .
196. It often happens that, once I start to feel angry, I just can't control it .
197. I tend to overdo things, even though I know they are bad for me.
198. I get bored very easily .
199. When tasks become difficult, I usually cannot persevere and complete them.
200. I can't concentrate on anything for too long.
201. I can't force myself to do things I don't enjoy, even when I know it's for my own good.
202. I lose my temper at the slightest offence.
203. I have rarely been able to stick to my resolutions.

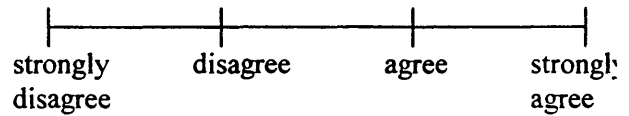
204. I can almost never hold back from showing people how I really feel, no matter what the cost may be.

205. I often do things impulsively that I later regret.

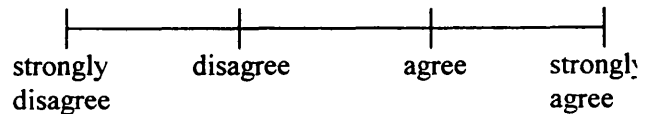
Appendix 4. Pain Beliefs and Perceptions Inventory (Williams and Thorn, 1989)

Please read each of the following items and rate them according to how much you agree or disagree.

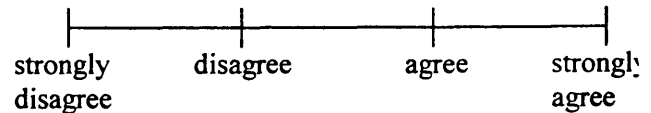
1. No one's been able to tell me exactly why I'm in pain.



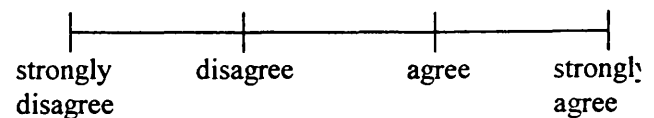
2. I used to think my pain was curable but now I'm not so sure.



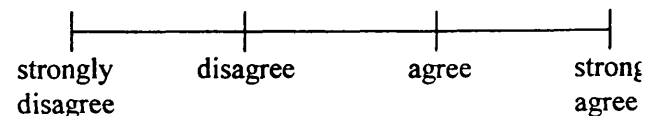
3. There are times when I am pain-free.



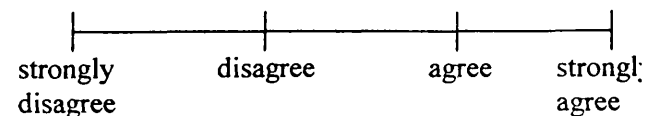
4. My pain is confusing to me.



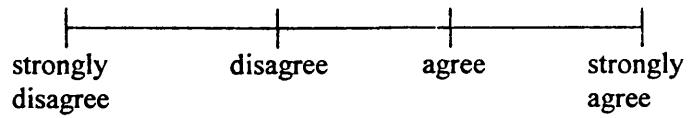
5. My pain is here to stay.



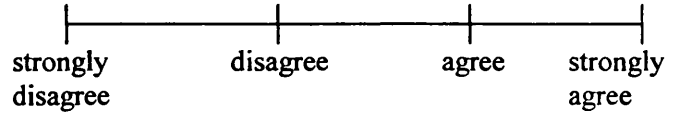
6. I am continuously in pain.



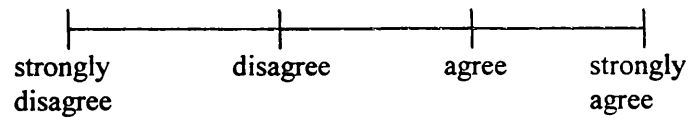
7. If I am in pain it is my own fault.



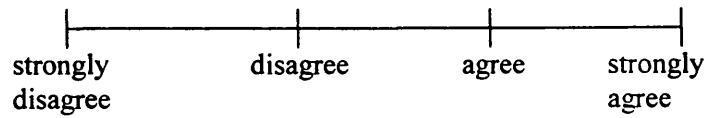
8. I don't know enough about my pain.



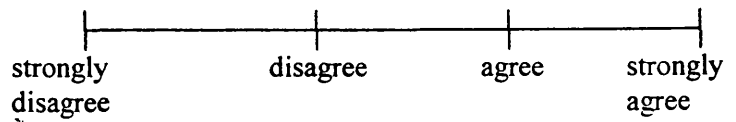
9. My pain is a temporary problem in my life.



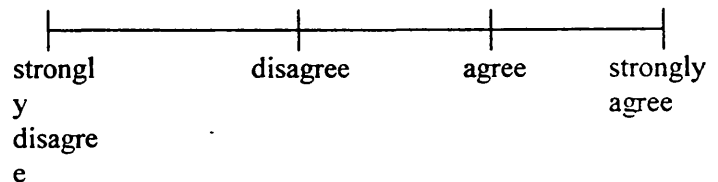
10. It seems like I wake up with pain and I go to sleep with pain.



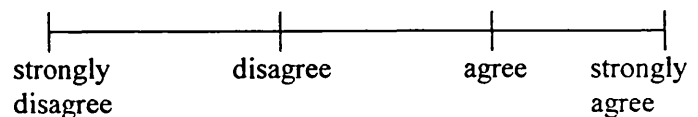
11. I am the cause of my pain.



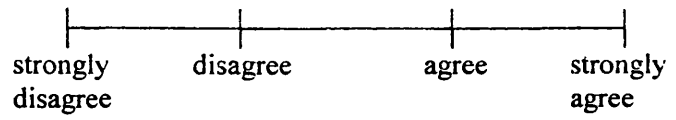
12. There is a cure for my pain.



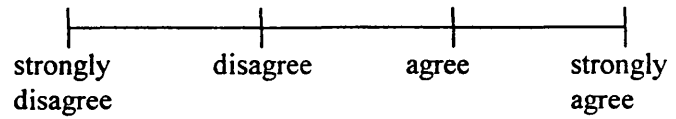
13. I blame myself if I am in pain.



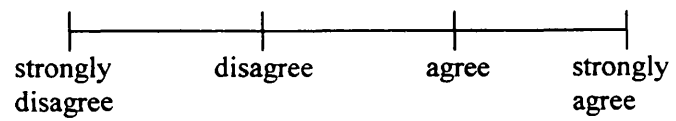
14. I can't figure out why I'm in pain.



15. Someday I'll be 100% pain free again.



16. My pain varies in intensity but is always with me.



Appendix 5. Hospital Anxiety and Depression Scale (Zigmond and Snaith, 1983)

Instructions: Please read each item and place a tick on the line alongside the reply that comes closest to how you have been feeling in the past few weeks. Don't take too long over your replies: your immediate reaction to each item will probably be a more accurate response.

I feel tense or 'wound up'

Most of the time
A lot of the time
Occasionally
Not at all

I still enjoy the things I used to enjoy

Definitely as much
Not quite as much
Only a little
Hardly at all

I get a sort of frightened feeling as if something awful is about to happen

Very definitely and quite badly
Yes, but not too badly
A little, but it doesn't worry me
Not at all

I can laugh and see the funny side of things

As much as I always could
Not quite so much now
Definitely not so much now
Not at all

Worrying thoughts go through my mind

A great deal of the time
A lot of the time
From time to time but not too often
Only occasionally

I feel cheerful

Not at all
Not often
Sometimes
Most of the time

I can sit at ease and feel relaxed

Definitely
Usually
Not often
Not at all

I feel as if I am slowed down

Nearly all the time
Very often
Sometimes
Not at all

I get a frightened feeling like 'butterflies' in my stomach

Not at all
Occasionally
Quite often
Very often

I have lost interest in my appearance

Definitely
I don't take as much care as I should
I may not take quite as much care
I take as much care as ever

I feel restless as if I have to be on the move

Very much indeed
Quite a lot
Not very much
Not at all

I look forward to enjoyment with things

As much as I ever did
Rather less than I used to
Definitely less than I used to
Hardly at all

I get sudden feelings of panic

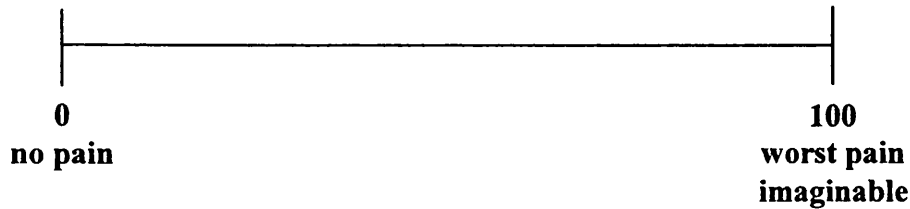
Very often indeed
Quite often
Not very often
Not at all

I can enjoy a good book or radio or TV programme

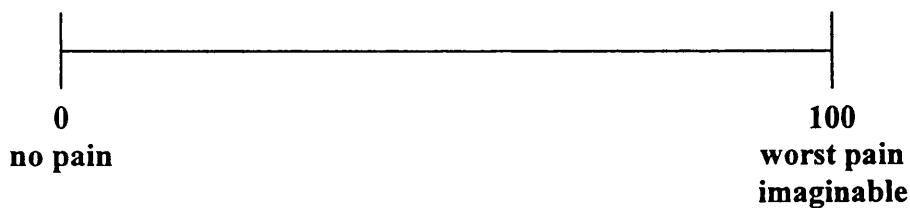
Often
Sometimes
Not often
Very seldom

Appendix 6. Visual Analogue Scale (VAS; Scott and Huskisson, 1976)

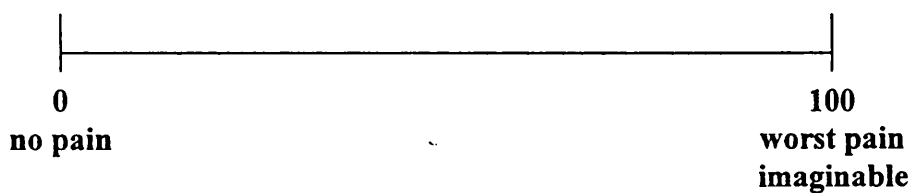
On a scale of 0 – 100, where 0 = ‘no pain’ and 100 = ‘worst pain imaginable’, please rate how **intense** your pain is **AT THE MOMENT**:



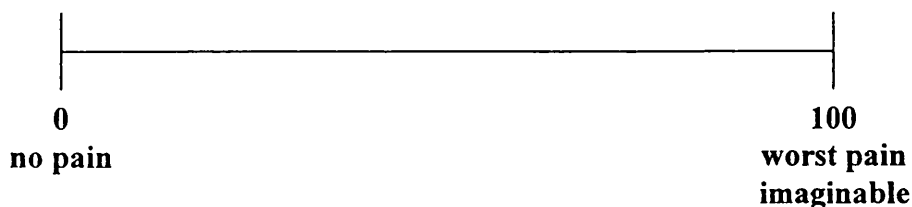
On a scale of 0 – 100, where 0 = ‘no pain’ and 100 = ‘worst pain imaginable’, please rate how **intense** your pain has been, on average, **OVER THE PAST WEEK**:



On a scale of 0 – 100, where 0 = ‘no pain’ and 100 = ‘worst pain imaginable’, please rate how **distressing** your pain is **AT THE MOMENT**:



On a scale of 0 – 100, where 0 = ‘no pain’ and 100 = ‘worst pain imaginable’, please rate how **distressing** your pain has been, on average, **OVER THE PAST WEEK**:



Appendix 7. Coping Strategies Questionnaire (Rosensteil and Keefe, 1981)

Individuals who experience pain have developed a number of ways to cope or deal with their pain. These include saying things to themselves when they experience pain, or engaging in different activities. Below are a list of things that people have reported doing when they feel pain. For each activity, I would like you to indicate, using the scale below, how much you engage in that activity when you feel pain. An 0 indicates that you never do that activity when you are experiencing pain, a 3 indicates that you sometimes do it when you are experiencing pain, and a 6 indicates that you always do it when you are experiencing pain. Remember, you can use any point along the scale. Write the appropriate number on the line alongside each question.

0	1	2	3	4	5	6
Never do			Sometimes do that			Always do that
1. I try to feel distant from the pain, almost as if the pain was in somebody else's body						_____
2. I leave the house and do something, such as going to the cinema or shopping						_____
3. I try to think of something pleasant						_____
4. I don't think of it as pain but rather as a dull or warm feeling						_____
5. It is terrible and I feel it is never going to get any better						_____
6. I tell myself to be brave and carry on despite the pain						_____
7. I read						_____
8. I tell myself that I can overcome the pain						_____
9. I count numbers in my head or run a song through my mind						_____
10. I just think of it as some other sensation, such as numbness						_____
11. It is awful and I feel that it overwhelms me						_____
12. I play mental games with myself to keep my mind off the pain						_____
13. I feel my life isn't worth living						_____
14. I know someday someone will be here to help me and it will go away for a while						_____
15. I pray to God it won't last long						_____

- 16. I try not to think of it as my body, but rather as something
separate from me _____
- 17. I don't think about the pain _____
- 18. I try to think years ahead, what everything will be like after
I've got rid of the pain _____
- 19. I tell myself it doesn't hurt _____
- 20. I tell myself I can't let the pain stand in the way of what I have
to do _____
- 21. I don't pay any attention to it _____
- 22. I have faith in the doctors that someday there will be a cure for
my pain _____
- 23. No matter how bad it gets, I know I can handle it _____
- 24. I pretend it is not there _____
- 25. I worry all the time about whether it will end _____
- 26. I replay in my mind pleasant experiences in the past _____
- 27. I think of people I enjoy doing things with _____
- 28. I pray for the pain to stop _____
- 29. I imagine that the pain is outside of my body _____
- 30. I just go on as if nothing happened _____
- 31. I see it as a challenge and don't let it bother me _____
- 32. Although it hurts, I just keep going _____
- 33. I feel I can't stand it anymore _____
- 34. I try to be around other people _____
- 35. I ignore it _____
- 36. I rely on my faith in God _____
- 37. I feel like I can't go on _____
- 38. I think of things I enjoy doing _____
- 39. I do anything to get my mind off the pain _____
- 40. I do something I enjoy, such as watching television or listening
to music _____
- 41. I pretend it is not part of me _____
- 42. I do something active, like household chores or projects _____

Based on all the things you do to cope or deal with your pain, on an average day, how much control do you feel you have over it? Please circle the appropriate number. Remember, you can circle any number along the scale.

0	1	2	3	4	5	6
No control			Some control			Complete control

Based on all the things you do to cope or deal with your pain, on an average day, how much are you able to decrease it? Please circle the appropriate number. Remember, you can circle any number along the scale.

0	1	2	3	4	5	6
Can't decrease it at all			Can't decrease it somewhat			Can decrease it completely

**Appendix 8. The MOS 36-item Short-form Health Survey
(Ware and Sherbourne, 1992)**

INSTRUCTIONS: This survey asks for your views about your health. This information will help keep track of how you feel and how well you are able to do your usual activities. Answer every question by marking the answer as indicated. If you are unsure about how to answer a question, please give the best answer you can.

1. In general, would you say your health is: (circle one)

- Excellent.....1
- Very good.....2
- Good.....3
- Fair.....4
- Poor.....5

2. Compared to one year ago, would you rate your health in general now? (circle one)

- Much better than one year ago.....1
- Somewhat better than one year ago.....2
- About the same as one year ago.....3
- Somewhat worse than one year ago.....4
- Much worse than one year ago.....5

3. The following questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

(circle one number on each line)

ACTIVITIES	Yes, limited a lot	Yes, limited a little	No, not limited at all
a. Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports	1	2	3
b. Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling or playing golf	1	2	3
c. Lifting or carrying groceries	1	2	3
d. Climbing several flights of stairs	1	2	3
e. Climbing one flight of stairs	1	2	3
f. Bending, kneeling or stooping	1	2	3
g. Walking more than one mile	1	2	3
h. Walking half a mile	1	2	3
i. Walking one hundred yards	1	2	3
j. Bathing or dressing yourself	1	2	3

4. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

	YES	NO
a. Cut down on the amount of time you spent on work or other activities	1	2
b. Accomplished less than you would like	1	2
c. Were limited in the kind of work or other activities	1	2
d. Had difficulty performing the work or other activities (for example, it took extra effort)	1	2

5. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

	YES	NO
a. Cut down on the amount of time you spent on work or other activities	1	2
b. Accomplished less than you would like	1	2
c. Didn't do work or other activities as carefully as usual	1	2

6. During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbours or groups?

- Not at all.....1
- Slightly.....2
- Moderately.....3
- Quite a bit.....4
- Extremely.....5

7. How much bodily pain have you had during the past 4 weeks?

- None.....1
- Very mild.....2
- Mild.....3
- Moderate.....4
- Severe.....5
- Very severe.....6

8. During the past 4 weeks, how much did your pain interfere with your normal work (including both work outside the home and housework) ?

- Not at all.....1
- A little bit.....2
- Moderately.....3
- Quite a bit.....4
- Extremely.....5

9. These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the past 4 weeks:

	All of the time	Most of the time	A good bit of the time	Some of the time	A little of the time	None of the time
a. Did you feel full of life?	1	2	3	4	5	6
b. Have you been a very nervous person?	1	2	3	4	5	6
c. Have you felt so down in the dumps that nothing could cheer you up?	1	2	3	4	5	6
d. Have you felt calm and peaceful?	1	2	3	4	5	6
e. Did you have a lot of energy?	1	2	3	4	5	6
f. Have you felt downhearted and low?	1	2	3	4	5	6
g. Did you feel worn out?	1	2	3	4	5	6
h. Have you been a happy person?	1	2	3	4	5	6
j. Did you feel tired?	1	2	3	4	5	6

10. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting friends, relatives etc.)?

- All of the time.....1
- Most of the time.....2
- Some of the time.....3
- A little of the time.....4
- None of the time.....5

11. How TRUE or FALSE is each of the following statements for you?

	Definitely true	Mostly true	Don't know	Mostly false	Definitely false
a. I seem to get ill a little easier than other people	1	2	3	4	5
b. I am as healthy as anybody I know	1	2	3	4	5
c. I expect my health to get worse	1	2	3	4	5
d. My health is excellent	1	2	3	4	5

Appendix 10. Participant information sheet – chronic pain sample

INFORMATION SHEET

You are being asked to participate in a research project. The statement below explains exactly what you are being asked to do and what we hope to learn as a result of your taking part.

PLEASE READ THE FOLLOWING

Brief Title of Project

An investigation of adjustment to chronic pain.

Explanation

We are currently carrying out a study into the experience of individuals who suffer from chronic pain and we would like to ask you to help us. It is known that the experience of chronic pain is extremely difficult and distressing. An individual will often be referred to a pain management programme to help them cope. We want to find out more about the factors that help people adjust to, and cope with, chronic pain. We also want to look at how well individuals manage once treatment is finished.

By doing this we hope to be able to improve our clinical service and help people make the most out of their individual coping strategies. It is very important that we gain as much information from as many people as possible in order to help us make these improvements.

If you agree to take part in this study one of the researchers, Deborah Plant, will meet with you. You will be asked to complete a couple of questionnaires in addition to those routinely used as part of the pain management programme. This will happen on 3 occasions - before you enter the pain management programme, on completion of it, and 3 months after this. Each occasion will take up to 1 hour for all questionnaires. You will not be asked to make any extra visits to the hospital.

All information gathered will be strictly confidential and will not be traced back to your hospital notes.

You do not have to take part in this study if you do not want to. If you decide to take part you may withdraw at any time without having to give a reason. Your decision whether to take part or not will not affect your care and management in any way.

If you wish to discuss the study further please contact Deborah Plant on 0171 504 5985 at the Sub-Department of Clinical Health Psychology, 1-19 Torrington Place, London.

Thank you very much for your help.

All proposals for research using human subjects are reviewed by an ethics committee before they can proceed. This proposal was reviewed by the Joint UCL/UCLH Committees on the Ethics of Human Research.

Appendix 11. Participant consent form – chronic pain sample

PARTICIPANT CONSENT FORM

Confidential

Title of Project

An investigation of adjustment to chronic pain.

PLEASE READ THE FOLLOWING STATEMENT. IF YOU AGREE WITH IT AND ARE WILLING TO TAKE PART IN THE STUDY, PLEASE SIGN BELOW.

I have spoken to Deborah Plant about the study, have read the Information Sheet for participants and have asked and received satisfactory answers to any questions I had. I understand that the study involves completing questionnaires on 3 occasions and that any information I give will not be traced back to my hospital notes. I understand that my treatment will not be affected in any way and that I am free to withdraw from the study at any time. I have received adequate information about the study and I agree to take part.

Signed.....

Date.....

NAME IN BLOCK LETTERS.....

Investigator

I have spoken to the participant explaining the study and have answered his or her questions regarding it.

Signed.....

Date.....

Appendix 12. Participant information sheet – acute pain sample

INFORMATION SHEET

You are being asked to participate in a research project. The statement below explains exactly what you are being asked to do and what we hope to learn as a result of your taking part.

PLEASE READ THE FOLLOWING

Brief Title of Project

An investigation of adjustment to chronic pain.

Explanation

We are currently carrying out a study into the experience of individuals who suffer from chronic pain and we would like to ask you to help us. It is known that the experience of chronic pain is extremely difficult and distressing. An individual will often be referred to a pain management programme to help them cope. We want to find out more about the factors that help people adjust to, and cope with, chronic pain. We also want to look at how well individuals manage once treatment is finished. By doing this we hope to be able to improve our clinical service and help people make the most out of their individual coping strategies.

In order to understand particular issues for pain that goes on a long time, we are also asking patients with acute pain for information. It is very important that we gain as much information from as many people as possible in order to gain a clear view of these issues.

If you agree to take part in this study, one of the researchers, Deborah Plant, will meet with you. You will be asked to complete a set of questionnaires which will take a maximum of 1 hour. You will not be asked to make any extra visits to the hospital.

All information gathered will be strictly confidential and will not be traced back to your hospital notes.

You do not have to take part in this study if you do not want to. If you decide to take part you may withdraw at any time without having to give a reason. Your decision whether to take part or not will not affect your care and management in any way.

If you wish to discuss the study further please contact Deborah Plant on 0171 504 5985 at the Sub-department of Clinical Health Psychology, 1-19 Torrington Place, London.

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Appendix 13. Participant consent form – acute pain sample

PARTICIPANT CONSENT FORM

Confidential

Title of Project

An investigation of adjustment to chronic pain.

PLEASE READ THE FOLLOWING STATEMENT. IF YOU AGREE WITH IT AND ARE WILLING TO TAKE PART IN THE STUDY, PLEASE SIGN BELOW.

I have spoken to Deborah Plant about the study, have read the Information Sheet for participants and have asked and received satisfactory answers to any questions I had. I understand that the study involves completing questionnaires on a single occasion and that any information I give will not be traced back to my hospital notes. I understand that my treatment will not be affected in any way and that I am free to withdraw from the study at any time. I have received adequate information about the study and I agree to take part.

Signed.....

Date.....

NAME IN BLOCK LETTERS.....

Investigator

I have spoken to the participant explaining the study and have answered his or her questions regarding it.

Signed.....

Date.....