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An Investigation of Personality, Coping and Emotion in Patients with Persistent Pain

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This Thesis is Submitted in Fulfilment of the Degree of Doctor of
Philosophy within the Faculty of Medicine
University of Glasgow

May 1997

By:
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In The name of God

... Dedicated to my parents, my wife, and children
and
In memory of my beloved brother, Hossein

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SUMMARY

This thesis reports a study of the role of personality, emotion and coping in patients suffering persistent pain. The matter of personality is of particular interest because although the factor has been shown important in determining the response to acute pain, its role in chronic pain states is less well established. Review of the literature leads to the hypothesis that the personality factor of neuroticism may predict pain and emotional responses in the chronic pain state. The thesis is also concerned with the extent to which chronic pain patients benefit from attending a Pain Relief Clinic, and the factors that predict benefit.

The literature review begins in Chapter 1 by briefly setting the scene of the problem that persistent pain creates for sufferers. In Chapter 2, attention turns to theories that have attempted to explain the experience of pain in physiological and psychological terms. Chapter 3 describes psychological factors in the patient's response to pain, including coping strategies and the importance of support from family and other significant individuals. In Chapter 4, there is discussion of the role of personality in the experience of pain, and this leads to the rationale for the present experimental work and the research hypotheses to be developed in Chapter 5.

The Methods section of Chapter 5 states the research hypotheses and describes the method to be used to test them. Three studies assess the role of personality, coping and social support in the chronic pain state, the response to

the pain clinic and the clinician's rating of the outcome. The following psychometric assessments are applied: the Eysenck Personality Questionnaire (EPQ), the Ways of Coping Checklist (WCCL), the McGill Pain Questionnaire (MPQ), the Hospital Anxiety and Depression Scale (HADS), the Pain Beliefs Questionnaire (PBQ), the Beliefs in Pain Control Questionnaire (BCPQ) and the Multi-Dimensional Pain Questionnaire (MDQ) which was devised by the author. Patients were recruited from those awaiting treatment at the Gartnavel Pain Relief Clinic in Glasgow. All patients gave their informed consent to participate. The principal research hypotheses are stated in Chapter 5: (1) that neuroticism will predict higher pain scores and increased distress, (2) that active coping strategies may exert beneficial effects upon pain and distress, and (3) that social support may also exert a beneficial effect reflected in lower pain and distress scores.

The Results are described in Chapters 6 to 8 inclusive. Chapter 6 considers the extent to which the main predictor variables above predict pain and distress prior to treatment at the clinic. Neuroticism is shown to be a significant predictor of pain and distress, and to interact with the perception of lack of social support (itself a significant predictor) to increase the intensity of those emotions. Extroversion is a significant predictor of lower pain scores. The diagnostic category is also seen to be predictive: those whose pain derived from prior surgical interventions report more pain. The results also describe the characteristics of the patient sample and shows them to be considerably more neurotic than age-matched norms. They also show high levels of anxiety, depression and distress on the HADS and the GHQ.

Chapter 7 describes factors that predict changes in pain and distress after attending the clinic. The comparison is made between one group of patients who attend the pain relief clinic and a wait-limited control group who do not. Although personality does not exert any predictive effect, neuroticism is shown to be significantly associated with higher pain scores and greater distress in both groups. In contrast, individuals with extroverted traits cope relatively well with the persistent pain condition. The diagnostic category is found to be predictive but this time it is low back pain that predicts smaller improvement in pain scores. In contrast, prior surgery is predictive of some improvement in pain. Active coping is found to be predictive of a reduction in pain, while a belief in the importance of professional support actually predicts less improvement in pain state.

Chapter 8 considers various factors associated with the clinicians' rating of outcome. Personality itself was not shown to have any strong association with outcome, but an active coping strategy was a powerful predictor. Patients who were diagnosed as suffering a degenerative condition (primarily arthritic) were found to be those for whom ratings of outcome were highest, and the factor was the only other variable to predict outcome.

In Chapter 9, the General Discussion considers the results in light of studies discussed in the literature review and concludes that the present results are both consistent with those earlier findings and provide new insight concerning the effects of personality. There is also discussion of the implications of the results for theory and practice in the pain relief clinic. It is concluded that it would be helpful for the clinician to have knowledge of the way in which certain personality factors, social support and coping styles may predict those who benefit from treatment in the pain relief clinic. The chapter also describes the psychological interventions available to help patients in persistent pain, and considers some avenues for future research.

A substantial section of the chapter is devoted to discussion of methodological issues in the present work that would be revised if such a research programme were to be repeated.

The final section of the chapter considers briefly the role of unconscious processes as a neglected facet of the psychological approach to understanding persistent pain.

Part One

Introduction and Literature Review

Chapter 1:

The Problem of Chronic Pain

CHAPTER 1

1.1 The Thesis Topic: The Problem of Chronic Pain

This thesis is concerned with two factors that may influence patients' experience of chronic pain. The study will focus upon the role played by personality in patients' perception of chronic or persistent pain, and the coping strategies that patients may adopt in order to live with their pain.

The issue is of importance because it will be shown that there is evidence to support the hypothesis that the experience of persistent pain may be made worse when the patient has certain personality characteristics. Moreover, different coping behaviours are known to influence the extent to which pain affects patients in their daily activities, emotional state and family relationships. While these two factors have, to a certain degree, been examined in previous research, it will be shown below that some uncertainties remain as to their influence. It is intended that the present thesis may provide a further degree of understanding. If it is possible to define reliably those personality and coping characteristics that influence the chronic pain state then there may be implications for the way in which patients are treated in pain relief clinics.

First, however, the function of this general introduction to the thesis is to attempt to provide orientation for the reader. It will start by considering the definition of pain, and the chronic pain condition, and describe briefly why the issue is of relevance in the context of personality and coping (these issues will be discussed in much greater detail in later chapters). Discussion will then turn to theoretical stances that can be taken in attempting to subject the effects and experience of pain to empirical examination.

1.2 The Definition of Pain and Chronic Pain

Consider first the definition of pain. The experience of pain is known to virtually all mankind apart from those unfortunate individuals who have congenital insensitivity to pain. The experience combines sensory qualities, indicating the exact location of damage, an unpleasant emotional state, and related "pain behaviour" such as avoidance (Mathews et al., 1988). Pain is an unpleasant sensation caused by noxious stimulation of the sensory nerve endings. It is cardinal symptom of inflammation and is valuable in the diagnosis of many disorders and conditions, Glanze et al. (1990).

As indicated above, pain is not only a physiological event. Lipchik et al. (1993) and Merskey (1986) refer to the earlier work of the International Association for the Study of Pain (1979) and point out that pain is also a psychological state associated with unpleasant sensory and emotional experience resulting from actual or potential tissue damage. "Pain is primarily a signal that body tissues have been damaged, and serves to promote the avoidance of further damage by avoidance of the situation or agent causing pain" (Mathews et al. 1988).

The description above indicates that pain serves an adaptive function, but this may only be true of acute pain conditions. In chronic pain states - for instance in the case of terminal cancer pain - the pain has ceased to serve a useful function: it has become maladaptive. Miller (1990) notes the definition of chronic pain: "Formally chronic pain is defined as pain that persists for more than six months and results in the need for long-term treatment. Chronic pain is more complex and difficult to treat than acute pain." Perlman (1996) observes further that "It (chronic pain) may be a metaphor for many underlying conflicts, both conscious and unconscious".

From the patient's point of view, chronic pain is certainly maladaptive and serves little function other than to cause discomfort and distress. Many chronic pain patients have endured numerous treatments, both pharmacological and surgical, which have proven ineffective so that they are fearful that they will have pain for the rest of their lives (McGrath, 1994). Wolff et al. (1991) have pointed out that this fear that pain will continue and that little can be done to relieve it, conflicts with the fact that, while some health care professionals concede that improvement is likely to be limited, they still expect positive changes similar to those achieved in patients suffering acute pain conditions. Where treatments fail, patients may also construe it as a 'personal failure' which may further compound any adverse emotional effects that pain has upon their mood. These issues will be discussed in detail in later chapters.

1.3 Chronic Pain and Psychological Reactions

It may not be surprising that the experience of chronic pain will lead to psychological difficulties and that these might be far more marked than in the case of acute pain states. Tyrer (1992) confirms that acute pain, although not without psychological or psychiatric problems, is not usually associated with serious mental health difficulties. Christoph et al. (1994), however, point out that when the prospect of pain is life-long in nature it is associated with significant psychological problems and imposes "severe emotional, physical, economic and sociologic stresses on the patient, the family and society" (Bond 1984). These issues will be discussed in detail in later chapters.

Thus the modern medical emphasis on injections, electrical, acupuncture and drug treatment of pain should not obscure the important role that psychological factors can play in the experience and management of patients with chronic pain. Although recent advances in medicine have brought substantial relief to the majority of chronic pain patients, these patients continue to exhibit significant and persistent dysfunction such as psychological distress, depression, and avoidance of activity for fear of pain (Weisenberg, 1977; Beckham et al., 1994).

Indeed, nowadays, notions of pain as a psychophysiological construct are well acknowledged (Miller, 1990). It is widely recognised that emphasis on change of medication is often less than optimally effective, and that psychological and social variables play a powerful role in the perception and control of pain. Investigation of pain coping in chronic patients has been shown to be a promising avenue of research because of the evidence that maladaptive pain coping can be modified in chronic pain patients, (e.g. Beckham et al., 1994).

The interest of the present thesis concerns the way in which patients cope with chronic pain, and those psychological and social factors that may influence their coping behaviour and its effectiveness. The thesis will concentrate particularly on the role of personality and its interaction with other significant variables in determining patients' reactions to persistent pain.

1.4 Approaches to the Study of Pain

Before turning to review the literature on these issues, it is worth concluding this introductory section by describing briefly four analytical stances, or models, that may be applied in attempting to understand the experience of chronic pain. One of these will form the basis for the empirical work to be reported later. Note that the intention here is to provide a brief description purely to help orientate the reader: issues concerning three of these models will be discussed in much greater detail in later chapters. The models are termed psychodynamic, behavioural, attentional and psychometric.

1.4.1 Psychodynamic Approach to Pain

It was noted above that Perlman (1996) has taken a psychodynamic stance to suggest that a patient's reaction to chronic pain may reflect underlying psychological conflicts and problems that may be both conscious and unconscious in nature. He believes that unconscious phenomena have been largely ignored in this research area, probably because such processes are difficult to examine empirically although few would doubt the reality of their existence and influence. Perlman points out that the psychodynamic approach makes the interesting assumption that patients communicate their pain at multiple levels: both consciously and unconsciously through their verbal descriptions of their state, the metaphors they use to describe their pain and its effects, and their behavioural activity.

While one might agree with such assumptions, acceptance becomes more difficult of Perlman's further suggestion that, through their pain, patients may also be projecting a need for help with other central conflicts within their psychic experience. This may be so, but it would be extremely difficult to examine empirically and therefore encounters the familiar problem in evaluating models based upon psychodynamic theory. This issue will be discussed in greater detail in a later chapter.

1.4.2 Behavioural Approaches to Pain

Behavioural approaches to pain are, largely, the antithesis of the psychodynamic approach. The work of Skinner is, of course, associated with the operant model of human behaviour whereby our actions are governed by different processes of reinforcement. In the strict Skinnerian model 'the 'mind' as such is not seen as relevant, or even amenable to analysis because it is not observable.

Fordyce (1976) has been particularly associated with this approach to understanding patients' behaviour in pain. A later chapter will describe how a patient's family may exert subtle reinforcements that may affect pain behaviour in both positive and negative ways. The model is helpful in providing a means of explaining why particular pain behaviours are adopted and maintained. It also has implications for behavioural interventions which reinforce more positive behaviours that may result in pain exerting a less disruptive influence on the patient's life.

However, by the very nature of the model, it does not provide insight to the patient's pain experience nor to those characteristics of the individual that may determine that experience. Some may argue pragmatically that such experience is immaterial if a behavioural intervention can reduce the impact of pain on the patient's ability to maintain a more active life. This is a reasonable stance but unsatisfying from the point of view of the present author. The fact that patients may, despite their pain, be made more active by a behavioural intervention does not necessarily mean that they suffer less or indeed experience any improvement in emotional state. In following chapters, evidence will be reviewed and the case made that by understanding more about 'inner' determinants of the pain experience (i.e. personality, coping beliefs and emotional states) equal insight may be gained for other psychological therapies that may be of help.

1.4.3 An Information-Processing Approach to Pain

An 'information-processing' or attentional approach has been described by Eccleston (1994). This approach bears very strong similarities to the early theoretical stance of those such as Kahneman (1973) and Moray (1967) who were early proponents of the view that intellectual processes are demanding of attentional resources in proportion to the difficulty of the processing task. Stressors and other emotional factors could, by their demands on the attentional resource, result in impaired processing ability and hence reduction in the capacity to cope with the on-going demands upon the person. Eccleston suggests that pain demands attentional resources from other tasks and hence has an "unparalleled influence in its ability to interupt other processing. Pain is the ultimate in controlled attention tasks."

Unlike the psychodynamic model applied to pain, the processing capacity model is amenable to empirical test through, for example, tests of divided attention or dual task performance studies (Millar, 1975). To the present author's knowledge, however, this approach has not actually been applied despite Eccleston's plausible theorising.

The information processing approach might provide a means of objectifying the extent to which pain does distract the patient (due to the noxious qualities of the stimulation which are difficult to ignore). One might then be able to define, for example those times of day, situations and mood states that were associated with relative reduction in the adverse effects of pain on processing. Moreover, it might provide a useful means of assessing the extent to which various therapies (pharmacological, surgical and psychological) were effective in reducing pain as reflected in a relative increase in the patient's attentional capacity resource.

The practical difficulty that would arise with this information processing approach, however, is the fact that the many other effects of pain upon emotion and mood are also known to affect processing capacity (M.W. Eysenck, 1984). The effects of pain would therefore be confounded with the influence of those other variables and it would be extremely difficult to disentangle their relative contribution to an overall effect upon processing capacity. This may explain why no empirical study has attempted to test Eccleston's very interesting proposal. It is certainly the reason why the model will not be used as the theoretical base in the present thesis.

1.4.4 A Psychometric Approach to Pain

The fourth analytical stance is termed psychometric for the reason that it involves the use of validated psychometric instruments of personality, coping and mood in order to gain insight to the pain experience. These are many and varied but the most familiar will be such as the McGill Pain Questionnaire, inventories to assess anxiety and depression, personality questionnaires etc.

Such instruments are known from research in other areas of health and clinical psychology to be sensitive to changes in state which may reflect the effect of treatment interventions. They also have normative data against which a pain patient's state may be compared in order to determine the extent of distress or the extreme nature of a personality characteristic. It will be seen in the review of the pain literature in following chapters that the psychometric approach has been a feature of the vast majority of contemporary studies. It will form the basis of the empirical work to be reported in this thesis.

The discussion above has indicated that chronic pain is plausibly associated with psychological reactions. In the literature review that follows it will be seen that there is good reason to assume that factors of personality and coping may be significant determinants of those reactions. The review will begin by considering theories of pain perception, will then turn to factors that affect that perception and in particular the factor of personality.

Chapter 2:

Theories of the Experience of Pain

CHAPTER 2

2.1 Theories of the Experience of Pain

"Theories of chronic pain have made enormous progress since Descartes' conceptualisation of pain as a straight-through sensory projection system" (Novy et al., 1995b). Over the past few decades progress in theoretical perspectives has revolutionised understanding of the cognitive and behavioural principles underlying chronic pain. The cognitive study of pain requires that any viable theory must include a psychological mechanism. Some of this psychological evidence is reviewed briefly below.

There is no doubt that psychological issues do need to be addressed. Eccleston (1994) states that the proliferation of research concerned directly with clinical issues at the expense of any wider theory or application has led to a confused and complicated picture of pain research. This is unfortunate because while the physiological point of view of pain may help us understand the physical properties and causes of pain, the psychological aspect often provides a different view of the causes and nature of pain.

A comprehensive theory would explain the interrelations among facets of chronic pain and lead to empirical testing of models leading to better understanding of the chronic pain experience. Therefore, it seems that emphasis on basic theory is needed. This might have implications for assessment, treatment and research. It would also provide a basis for comparing various types of pain and understanding differences among patient sub populations (Novy et al. 1995a). "This basis would serve then, essentially, to test the tentative hypothesis of homogeneity of the chronic pain experience across those who suffer from pain" (Gamsa 1994b).

2.1.1 Specificity Theory

Specificity and pattern theories of pain derive from earlier concepts proposed by Von Frey and Goldscheider in 1948, and historically they are held to be mutually exclusive, (Melzack et al. 1994). In 1895 Von Frey presented a specificity model to explain all sensations. He proposed that the quality of skin sensation (touch, cold, warmth, pain) depends, initially, on the type of sensory receptor that is stimulated (Bakal 1979). Although the facts of some theories like the "specificity theory", are of physiological specialisation, Melzack et al. (1994) state that its lack of psychological assumptions is its weakness. Specificity theories assume a rigid, fixed relationship between a neural structure and a psychological experience (Melzack et al., 1982). The theory refers to a pain system based upon a specific set of peripheral nerve fibres that are nociceptive in function (Weisenberg, 1977). Bakal (1979) states that the relationship between the sensation of pain and activation of free nerve endings is not so simple.

Physiological models also fail when the cause of the pain is unknown and cannot be causally related to any organic process, or where the pain is more intense than expected and/or when it lasts longer than expected (Gibson, 1994). Physiological theories also fail to account for the fact that pain has an individual subjective experience and is accompanied by personal perception, cognitive-motivational and emotional reactions that lead to behaviour designed to control or avoid the pain stimulus. The source of these processes may be unconscious in nature. For example, Gibson (1994) refers to the work of Rossi and Cheek (1990) who suggested that in a hypnotic state the patient turns off all pain at an "unconscious level", and gives a conscious verbal report to confirm this has been done. There is also an acknowledgement that patients have conscious and unconscious solutions to their problems (Gibson, 1994).

Thus Melzack et al. (1994) have concluded that the psychological evidence fails to support the assumption of a one-to-one relationship between pain perception and intensity of the stimulus. Instead, the evidence suggests that the amount and quality of perceived pain are determined by many psychological variables in addition to the sensory input. The definition, meaning, or interpretation of pain varies according to the theoretical point of view of the person who describes the concept. Even when psychologists do agree, the terminology used for the same condition can vary between specialities and also between countries, (e.g. Gibson, 1994). For example, the psychoanalytic view would be that various repressed feelings or impulses of which the individual is unaware (i.e. unconscious) may serve to threaten the patient (Gibson, 1994).

2.1.2 Pattern Theory

Melzack et al. (1994) propose that as a reaction against the psychological assumption in specificity theory, new theories have been proposed which can be grouped under the general heading of 'Pattern Theory'. Pattern theories superseded specificity theory. Their supporters proposed that excessive stimulation of the skin receptors created particular patterns of nerve impulses that were summated in the dorsal horns of the spinal cord and caused pain. It holds that the intensity of a stimulus evokes a specific pattern, which is interpreted by the brain as pain. This perception is the result of the intensity and frequency of stimulation of a non-specific end organ (Glanze et al. 1990).

Two kinds of theories have emerged from Von Frey and Goldscheider's (1894) concept. Both recognise the concept of patterning of the input as essential for any adequate theory of pain, but one kind ignores the physiological specialisation, while the other utilises them in proposing mechanisms of central summation (Melzack et al., 1994). One of the biggest problems in pain research is that the actual cause of pain originating at the peripheral level is poorly understood (Glanze et al. ,1990).

Although, more complex types of specificity and pattern theories have been proposed, the well known Gate Theory remains a major theory in understanding pain.

2.1.3 Gate Control Theory

The Gate Control Theory of pain was developed by Melzack and Wall (1965). It is a type of pattern theory because it proposes that the balance of the input between large and small fibres is important in pain sensation (Skevington, 1995). The theory is concerned with the balance between impulses from the large, fast conductors and those from the small, slow conducting afferents, and with the interpretation of these impulses at the spinal cord level and later during transmission to the brain (Melzack et al., 1982). Pain signals reaching the nervous system excite a group of small neurones that form a "pain pool". When the total activity of these neurones reaches a minimum level, a theoretical gate opens to allow pain signals to proceed to higher brain centres. The areas in which the gates operate are considered to be in the spinal cord dorsal horn and the brainstem (Glanze et al., 1990).

The Gate Theory is an attempt to explain the higher degree of physiological specialisation of receptors, nerves, and spinal tracts in the central nervous system, the influence of psychological processes on pain perception and response, and the persistence of pain after healing (Bakal, 1979).

The theory provides a conceptual framework which allows testable hypotheses about factors influencing the experience of pain. Although, the theory has answered many requirements in past decades, "it is claimed that some of the evidence cited in support of theory has neither been reliably substantiated nor is it consistent with a gating mechanism

(Skevington, 1995). Therefore the theory has not been accepted without criticism (Mathews et al., 1988).

Melzack and Wall believe that it is possible for central nervous system activities subserving attention, emotion, and memories of prior experience to exert control over the sensory input. They also suggest that these central influences are mediated through the Gate Control System.

Although the Gate Theory is an attempt to explain the complexity of pain sensation, it is not clear how it explains the modifying influence of psycho-social factors on perception of pain, and whether there is an involvement of the conscious and unconscious processes. These shortcomings have been acknowledged by Melzack (1993) who notes the need for the Gate Control Theory to be further developed to take account of new empirical finding. Melzack (1993) points out that "it is evident that the Gate Control Theory has taken us a long way. Yet, as historians of science have pointed out, good theories are instrumental in producing facts that eventually require a new theory to incorporate them. And this is what has happened. No single theory so far proposed is capable of integrating the diverse theoretical mechanisms" (Melzack et al., 1994). More importantly, these mechanisms still leave a great many unknowns (Weisenberg, 1977).

As additional evidence has been gathered since the original theory of Melzack and Wall (1965), some mechanisms have been disputed and have required revision and reformulation (Novy et al., 1995a).

The manner in which the central activities are triggered into action presents a problem. While some central activities, such as anxiety or excitement, may open or close the gate for all inputs at any site on the body, others obviously involve selective, localised gate activity (Melzack et al., 1994). Weisenberg (1977) points out that it is possible that even in the healthy person, the gating mechanism itself is mostly determined by these central processes, rather than by peripheral mechanisms. "Similarly, diseases that destroy large fibres do not always produce chronic pain, contrary to the predictions of Gate Theory" (Mathews et al., 1988).

As observed above, Melzack (1993) has acknowledged the short comings of the Gate Theory and has pointed out that it is an inevitable part of theory-building that modifications must be made in light of new evidence and discrepant findings. He suggests that further understanding of the mechanisms of pain will grow as more is understood about the functioning of the brain in general. This may well involve greater understanding of brain functions underlying both conscious and unconscious intellectual processes. Charman (1989) states that, for instance, pain tolerance depends upon physiological factors but also upon psychological factors including the patient's beliefs about pain. "Beliefs" may well correspond to certain brain states but neuroscience would seem a long way from beginning to establish what these might be.

Part of the difficulty lies in the difficulty of subjecting some of the more philosophical approaches to 'the mind' to empirical test. For example, many might agree in theory with the plausibility of the statement by Burbiel et al. (194) that "the central unconscious personality structure fulfils an integrating and co-ordinating function for the whole personality." This may have implications for understanding reactions to pain, and indeed to many other noxious and neutral events in life. However, it is unclear how the hypothesis might ever be tested.

However, to return specifically to the Gate Theory, whatever its present shortcomings the theory demonstrates that psychological factors very strongly affect pain perception. Skevington (1995), however, states that "Nevertheless, there is still room in the literature for a more comprehensive social psychological view within which studies of chronic pain might be developed."

It seems relevant at this point then to turn to describe the way in which other psychological variables have been considered in the context of pain. The first to be considered will be the means of assessing an individual's experience of pain.

Chapter 3

Assessing the Experience of Pain

CHAPTER 3

3.1 Assessing the Experience of Pain

Bond (1984) states that "Although much new information has been acquired during the past half century since the scientific study of pain began, much of this has not been as beneficial to patients as one might anticipate or as many people believe." Furthermore, it is known that a relatively large group of patients with chronic pain do not respond satisfactorily to medical treatment, and there has been much discussion as to whether this may be relevant to the different subjective experience of individuals or their coping behaviour.

There is certainly ample evidence that a change in pain perception occurs according to the patient's experience of the stimulation, and that this influences responses in the clinical assessment of pain. For example, a number of studies of pain relief clinics mention the attention given to the effects of the person's subjective experience (Gibson, 1994; Lipchik et al., 1993; Skevington, 1993; Lautenbacher et al., 1994; Bates et al., 1993; Merskey, 1979, 1994b; Anderson et al., 1984; Lazarus, 1991; Charman ,1989; Poussa, 1993; French 1989). Implications of this observation include the more general hypothesis that an individual's reaction to pain is a subjective perceptual experience that is influenced by many factors, including past experience, anxiety, cultural and social factors, ability to cope, and cognitive variables (Weisenberg, 1977).

Interest in the importance of subjective attitudes to pain perception has been stimulated by advancements in the empirical assessment of psychological reactions to pain. For instance Skevington (1993) points out that because pain assessments are notoriously susceptible to subjective bias a great deal of work on pain measurement has concentrated on seeking reliable instruments to give insight to the patient's perception.

The visual analogue scale (VAS), or linear analogue scale as it is sometimes know, is a popular means of assessing pain experience. Patients are presented with a 100-mm line, the ends of which have been labelled to reflect extreme states of pain (i.e. the left-hand end may be labelled "no pain at all", while the right-hand end may be labelled "worst pain I can imagine"). Patients are asked to mark the line in a position that best describes their current experience of pain.

Although very simple, Poulton (1989) has pointed out that this is a not a familiar way for people to describe or rate their experiences. More commonly, people use words to describe pain and suffering, but the VAS requires them to describe their subjective state in quasi-spatial terms (Millar et al., 1995). Other investigators have also reported very variable response distributions associated with the VAS in pain research, and problems of reliability and validity (Chaput de Saintogne and Vere, 1982; Hunt et al., 1975; Maxwell, 1978). Its value as a research instrument might therefore be in doubt.

The McGill Pain Questionnaire is perhaps the best known of the reliable instruments to assess pain. It allows the patient to choose from lists of descriptor words to define principally the sensory, affective and evaluative aspects of their pain experience. This marks a considerable improvement upon the use of simpler visual analogue scales where only one dimension of pain experience (usually intensity) is recorded and where, as noted above, the pain is recorded in an unfamiliar way.

Lewis (1993) has recently discussed the outcome of a major factor analytic study of the MPQ (Holyroyd et al., 1992). It appears that a four-factor structure which splits the sensory dimension may be more appropriate.

Pain beliefs are also important. The Pain Beliefs Questionnaire (Edwards et al., 1992) permits definition of the extent to which patients believe their pain to have an organic or psychological basis. Patients use a rating scale to indicate their degree of belief in the extent to which certain factors affect their pain experience. Similarly, the Beliefs about Pain Control Questionnaire (Skevington, 1990) includes assessment of the extent to which patients believe control of their pain is in their hands or those of health professionals.

Environmental factors are also relevant to patients reporting of pain. Lewis (1993) notes that some report a variation in their symptoms according to weather changes in humidity and temperature. The "Weather and Pain Questionnaire" has been an enterprising development in the assessment of pain experience (Shutty et al., 1992).

It is very valuable to be able to make such assessments of the subjective aspects of the pain experience, but these assessments are not without problems. It is known from Poulton's work that supposedly objective measures are not free from bias, instead they create new biases of their own (Poulton, 1989). For instance, rating scales such as those used in the Pain Beliefs Questionnaire or Beliefs about Pain Questionnaire are associated with the so-called "central tendency bias" when patients choose the rating descriptor to describe their pain: it is common for patients to choose central categories on the scale rather than those at the extremes. Millar et al. (1995) have shown this tendency in ratings made by breast cancer patients. Also, Britton (1995) asserts that subjective beliefs precede objective evaluation.

Further difficulties arise because measures of pain are often poorly correlated. Clinical researchers have attempted to define a linear relationship between the sensory and affective components of subjective experience of pain, but the results have not been able to demonstrate such an actual relationship convincingly. For example, the result of a study by Fernandez et al. (1994) shows that rating of overall pain was not a simple summation of the sensory and affective ratings. Such a finding might be expected given the well established fact that pain thresholds vary widely between individuals to the same objective stimuli (Kent, 1984).

The suggestion that measures of pain experience may be strictly accurate or reliable then becomes weak. However, O'Shaughnessy (1994) asserts in defence of subjective measures that their virtue is that "they extend the domain of psychology to the area of the mind's interiority, with its human experiences of subjective meaning, conscious, and especially the unconscious." Skevington (1995) also suggests that emotional distress about pain is not dependent on the conscious experience of sensory pain. It implies that much of the processing of pain is preconscious. These are important points and it is true that such aspects of experience are often neglected. However, while they may give a richer and deeper dimension to the concept of pain, it remains unclear how preconscious elements might be assessed.

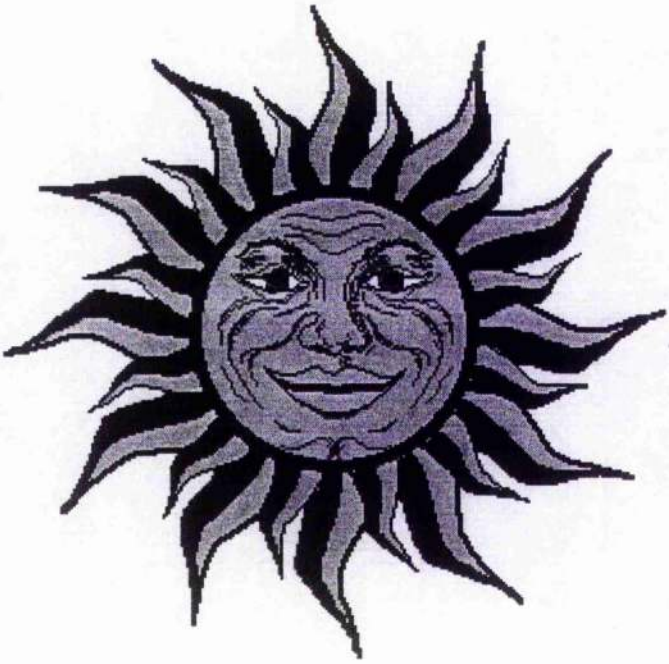
A possible route to access such inner experience might be via the personality. As noted above, this will be the main focus for this thesis and a later section will develop the case for such an approach. It is relevant to note here that Gibson (1994) contends that "pain, like anxiety, is an actual emotion. If it is emotion, then one would suppose that one would respond to the pain stimulus in many ways." In other words, it would seem important in any subsequent research to consider not only the differences between people in their responses to pain, but also whether it might be possible to explain these differences in terms of variable characteristics such as personality, social support and past experience in coping with stress, all of which may have emotional connotations.

3.2 Psychological Reactions to Pain

3.2.1 Cultural Effects and Religious Beliefs

Mention of issues of individual difference makes it relevant to turn to consider further factors that influence the experience of pain. It is perhaps best to begin by taking a broader cultural or societal perspective.

The subjective intensity of pain relates to different perceptions, meanings, attitudes, beliefs and emotional responses in different groups with different cultures and ideologies. Individual response to pain is influenced by a typical cultural pattern of beliefs about pain and how one should react to it. For example, in Eastern philosophy it is believed that those who suffer from pain and other difficult life events will derive spiritual value from the experience:



به جهان خرم از آنم که جهان خرم از اوست
عاشم بر همه عالم که همه عالم از اوست
به حلاوت بخورم زهر که شاهد ساقی است
به ارادت بکشم درد که درمانم از اوست
زخم خونینم اگر به نشود به باشد
خنک آن درد که هر لحظه مرا مرهم از اوست
غم و شادی بر عارف چه تفاوت دارد
ساقیا باده بده کین غم از اوست
سعدیا سیل عدم گر بزند خانه دوست
دل قویدار که این غم وشادی هم از اوست

I am happy in the world because the world is fresh and pleasant due to Him.
Beloved is the whole universe, because it belongs to Him.
I drink poison with sweet satisfaction because the beautiful cupgiver is witness.
I bear pain with devotion because my healing is only from Him.
If my bloody wound gets not cured, that is fine.
Fine be that pain because my every treatment is from Him.

Sadi (1194-1291; Persian poet)

In other words, for some religious devotees, the experience of pain is to be borne as a recognition of devotion and acceptance.

Recognition of the spiritual dimension and its function as a vital component of human well being has led to an increased interest in its effects upon perception of health and illness, yet very little progress has been made in identifying possible intervention methods for enhancing spirituality. Edwards (1984) distinguishes 'bodily' pain from 'spiritual' pain, believing that the latter has been "seriously neglected in medical practice." It is a matter which has not been considered in any depth.

The religious beliefs which patients have regarding their pain problem, and the consequences of the implications of pain may have a direct influence on negative and positive thoughts in their impact on coping efforts.

The factors of diverting attention, praying and hope often comprise the spiritual coping strategies (Rosenstiel et al., 1983). Skevington (1990) also suggests that beliefs about self control may be important in controlling pain. Jensen et al. (1991) proposed that a strong belief in control over pain leads people to initiate and persist in the use of adaptive coping strategies. The 118 patients in their sample comprised 46% suffering low back pain, but the remainder of the sample was unspecified as to their diagnosis. The authors employed regression analysis to determine those factors influencing adaptation to pain. Improvement in psychological functioning was related to coping strategies involving ignoring pain, using positive self-statements and incraesing activity. Such strategies also helped improve general activity levels but only in those patients reporting relatively low levels of pain severity. More generally, one might conclude that the positive effects of such strategies enhance the patient's perception that they have some degree of control over their pain.

The presence of apparently maladaptive religious beliefs in pain perception is also concerned with the world view of individuals in which they may represent the significant inner and spiritual effects in their lives. For example, the study by Thomas (1992a) shows the ideological conflict between religious world-view and medical usage. Respondents differed markedly in their attitudes toward pain and their rationale for utilising medical treatment depending upon their religious views

Thomas (*op. cit.*) have suggested that such findings emphasise the importance of research into the religious factor in health care and treatment effects. However, such research may not be welcomed by some religious bodies. McGarry (1996) has also addressed this issue of the inter-relationship of medicine, spirituality and prayer and it is interesting that he identifies a surprising unwillingness on the part of some organised religions to acknowledge the place of the mind and spirituality in relation to health and well being. The reluctance is, according to McGarry, most marked in terms of acknowledgement that unconscious forces may influence the patient's actions and attitudes.

Nonetheless, research studies are conducted to confirm the importance of spiritual beliefs and values in relation to pain. Hunt Raleigh (1992) reports that patients who have a religious belief or philosophy may cope better with their illness. The study of 90 patients was concerned with the role of hope in coping with chronic illness. Those with greater hope had more positive attitudes and specific cognitive and behavioural strategies for maintaining hope. These effects were not explained by differences in disease state. Of particular interest was the fact that although 45 of the patients had cancer whilst the others had a variety of non-malignant chronic illnesses, there were no statistical differences between the two groups in terms of their psychological state and coping. This result is interesting given that the diagnosis of cancer might be expected to have greater affective impact and perhaps cause more problems in coping.

Just as cancer may add a traumatic component to the patient's affective response to pain, so may cultural beliefs and rituals serve to reduce the apparent perception of pain. Dramatic cultural differences in the perception of pain are seen in the hook hanging ritual performed in India. A villager allows a hook to be inserted under the muscles of his back. He is then hung from a rope attached to the hook while showing joy rather than pain. A similar absence of pain has been described in other religious rituals (Mathews et al., 1988). In the case of such rituals, much time is spent in preparing the individual psychologically by prayer and positive statements about the function of the ceremony and 'meaning' of the sensory perceptions. This influences the individual's reaction to the stimulation, just as giving information about sensory qualities of a medical procedure helps patients cope with less distress.

Further evidence of the important effects of the 'meaning' or implications of pain were often reported during the Second World War, some soldiers who had received severe wounds had no complaint of pain and received no analgesia. Their ability to tolerate this pain was attributed to the fact that, far from being stoical, they were so "overjoyed" at leaving the battlefield by any means that they did not perceive any pain (Greer et al., 1990). Moreover, the clearly verifiable nature of their wound gave them a 'respectable' reason for being withdrawn from the conflict.

Kodiath and Kodiath (1995) asserted that there are significant differences in comparing philosophies and spiritualities between white American and native North American Indian patients. Indian patients are able to find significant meaning in life, suffering, and death, which they relate to a higher source of good. Indians, no matter what religion they profess, believe firmly in the concept of "life after death". Similarly, patients in some Eastern cultures would say that they have spiritual values that bring them ultimate fulfilment by guiding them through life and death. "Western culture has a tendency to view the open expression of emotion with some distaste and is of the opinion that this has resulted in the overuse of drugs in hospital" (French, 1989).

More generally, Tyrer (1992) confirms that social, economic, cultural, past history and personality characteristics predispose some individuals to develop a chronic painful state. Moreover, Charman (1989) asserts that, both as individuals and as representatives from different cultures, people vary widely as to when sensation becomes pain. The example of vociferous complaints about pain by Latin races is a well known, if perhaps stereotyped, example.

Overall, the influence of religious beliefs and the cultural environment appear relevant to the difficulties encountered by chronic pain patients. Hunt Raleigh (1992) referred to the earlier work of Highfield (1983) who reported that many patients found their religion or their philosophy to be helpful in coping with their illness and pain. Such beliefs can provide a 'purpose' or 'reason' for suffering in that the individual may become a better or stronger person as a consequence. Some religious beliefs also provide confidence that the pain will be rewarded and relieved in the afterlife. Such findings lend credence to the importance of the spiritual dimension of the individual with chronic illness. Future research should take account of patients' perception of religious beliefs, and that will be done in the present thesis.

3.2.2 Locus of Control

In clinical settings the patient's successful passage from a passive (external) to an active (internal) role in responsibility for health or management of illness has been referred to as "reconceptualization" (Tyrer, 1992). Early research into beliefs about controlling events (unconnected with health) were measured initially using scales designed around the concept of "locus of control" (Rotter,1966). Individuals are designated as having an internal locus of control if they believe in their personal ability to control events, or an external locus of control if they believe that events are beyond their control either at the whim of fate or in the hands of others.

"In general internal control conviction tends to be more connected with active coping strategies and a great satisfaction with life, whereas the externalisation of responsibility tends to have a less favourable effect" (Strickland 1978). Miller (1993c) referred to earlier work of Kores et al. (1985) that a strong relationship is found between self efficacy (the belief in one's own effective coping abilities and better treatment outcome) in chronic pain patients, both in terms of patient self-ratings of pain and lower medication use. Individuals holding internal expectancies are more likely than externals to take responsibility for their actions (Davis, 1972).

Jensen et al. (1991) found that the more that chronic pain patients perceived that they controlled their pain, the better was their level of psychological functioning and this reflected greater satisfaction with life. Some research shows that strong beliefs in the internal control of health are the best predictors of a good outcome (e.g. Skevington,1995). Benefit may arise for two reasons. Patients who believe that they can control their pain may feel better because the sense of control affects general well being. On the other hand, strong beliefs in self control of pain may encourage those patients to persevere with adaptive startegies. Implicit here are concepts inherent in the model of self-efficacy in human behaviour.

In a review of past research, Crisson and Keefe (1988) reflect upon evidence that an individual's locus of control relates to coping and adjustment (Calhoun, 1974; Lefcourt, 1972; Levenson, 1974; Rotter, 1966; Skevington, 1983; Smith, 1970; Walston et al., 1978; Watson, 1967). Individuals who have an internal locus of control believe that a positive cause/effect relationship exists between their own behaviour and the outcomes they experience. They then tend to adopt more active coping strategies than those with external control (Strickland, 1978). This fact has had implications for therapeutic interventions such that psychologists encourage many individuals to develop an 'internal' sense of control rather than attributing pain control to factors 'external' to them (Tyrer, 1992).

The goal of therapy is often seen as the encouragement of an internal locus of control signifying mastery over the environment and competence (Levenson, 1973). "In chronic pain the person has to take on an active role in their own pain management because the health service does not have all the answers." (Tyrer 1992).

Skevington (1995) concluded that new interventions that enable people in pain to take more appropriate control over what is happening to them could have widespread benefits in the treatment of chronic pain patients. This need not necessarily mean increasing personal or internal control, but perhaps a combination of more than one style of control or a sequence of different styles depending upon the way in which the illness progresses.

3.2.3 Family and Social Support

Even when a patient has spiritual or internal resources to cope with pain, there is no doubt that support from family and other significant people can help. Hunt Raleigh (1992) reported the family as a chief source of support with religion and friends being the next common responses. The process is a two-way interaction in that Koller (1991) used the "Critical Care Family Need Inventory" to show that the degree to which families are successful in managing the crisis of critical illness depends largely on how the situation is perceived by the patient.

Kohler's descriptive study of 22 patients and their families found that optimism and a willingness to confront the reality of the diagnosis was identified as the best coping method. Hope was found to be a commonly-used strategy, and one may note the similar finding in the study by Hunt Raleigh (1992). generally, these seem to be active coping strategies that are proving most helpful to the patient. Unfortunately, in common with many studies in this area, Kohler does not describe her patient sample in detail.

The family situation of the patient has been shown to play an important role in coping with pain (Turk et al., 1987; Benjamin, 1989; Miller, 1990; Miller, 1994b; Lundqvist et al., 1994). Chronic pain affects others beyond the patient and the clinician, especially the family and others within the immediate social sphere. Persistent pain may render the patient both unable to work and housebound, thus placing extra burdens on other family members. Clearly that can have adverse effects where families do not have the psychological or financial resources to cope. However, in many cases the family is an important source of support to the patient in coping with chronic illness and pain. Families respond to the patient's dependency in different ways and these may have particular effects upon the patient. For instance Flor et al. (1987) found that patients who perceive their spouses as solicitous have higher levels of pain and lower levels of activity. Thus, showing solicitous care alone may not always be in the patient's best interest.

Gil et al. (1987) suggested that it is likely that the spouse is a powerful social reinforcer, and that future research should attempt to examine the relative contribution of social support from the spouse versus the social support from other significant people in the patient's social network. There is certainly a strong relationship between pain behaviour and perceived quality of social support (Miller, 1993c).

Gil and her colleagues (1987) found in their heterogeneous sample of 51 chronic pain patients that those who reported a high level of satisfaction with their social support exhibited a higher total level of pain behaviour and higher levels of individual pain behaviour such as guarding and rubbing of the painful area. They hypothesised that subtle operant conditioning was occurring whereby patients were "rewarded" for their behaviour by increased attention, sympathy and supportive behaviour from their spouse and family. Interestingly, there was no significant difference in total pain behaviour between those patients having high versus low availability of support.

The result of the study by Gil et al. may suggest that it is not social support *per se* that is deleterious in chronic pain patients, but it is evident that such support can, ironically, enhance pain behaviour while improving the patient's psychological state. A possible criticism of the study is the fact that the patients were divided into high and low support groups on the basis of a median split of the data. This would result in very little difference between those members of the two groups whose data lay around the median. Perhaps a split at the upper and lower quartile would have been more appropriate.

Swimmer et al. (1992) suggest that additional studies are needed to understand how and when individuals in the patient's social support network respond to pain behaviour. For instance, it would be particularly useful to know which patient behaviours are attended to by individuals in the patient's support network. There is probably a reciprocal effect in that the patient's coping ability and character may influence his or her social support situation.

As noted above, the presence of a persistent pain patient within the home may place a strain upon the other family members, and particularly on the spouse or partner.

Even when relationships go seriously wrong, marital disharmony may actually have positive therapeutic implications because it may result from the spouse failing to endorse the patient's invalidism (Benjamin, 1989). In the long term, this may be beneficial to the patient's perception of their state and abilities. Paulsen (1995) indicated that pain behaviours varied as a function of spouse presence and the nature of support given. Her 110 chronic pain patients were selected to exclude cancer-related pain. The results were consistent with the operant behaviour model noted above in the study by Gil et al. (1987). Paulsen suggested that additional research is warranted to better understand the impact of support on the rehabilitation of patients with chronic pain.

Further research would certainly seem important in view of more general social influences upon pain. People are guided in their interpretation and influenced in their behaviour by the interpretation and attitude of others. For example Shorben et al. (1954) made an early observation that children's dental phobias were directly influenced by the attitudes of their families toward dental care. McGrath (1994) proposed that children also learn to evaluate the significance or relevance of pain from their parents' reaction. They learn from parents how to express pain through behaviours and language.

There is also evidence that how a person defines his or her pain symptoms is largely based upon consultation with family members. Anderson and Rehm (1984) found that the intensity of pain was related significantly to solicitous behaviours of family members, and the reverse was also true. The 60 patients in that study were black Americans suffering non-cancer pain. The effects described above were most pronounced in patients suffering lower back pain when compared to arthritic and sickle cell patients. The differences were not explained by differences in the experience of pain: all three groups had similar MPQ scores. The authors relied exclusively upon multiple correlation analysis in an attempt to understand the relationship between coping, suppport and pain when, in fact, a regression analysis might have provided better insight.

McGrath (1994) has added the interesting observation that "Studies suggest that both heredity and family and culture not only modify pain expressions, but also predisposition to certain painful conditions that develop in the absence of organic disease".

Bates et al. (1993) suggest that culture has an important influence on perception of, and response to, experimental and acute pain. "The source of social comparison is home and family, where adults transmit to children the values and attitudes of their cultural or ethnic group" (Bates et al., 1993).

Social life has important roles in enabling people to cope with pain problems. People learn in social communities, where conventional ways of interpreting, expressing and responding to pain are acquired. People who have similar learning experiences are likely to show similar pain perception, expression and response pattern (Bates et al., 1993).

Weisenberg (1977) proposed a "theoretical framework for ethnocultural variations in pain expression." Pain is characterised as a private, ambiguous experience that requires definition and structure. The sufferer turns toward others in the social environment to determine how to react appropriately and how to communicate suffering. Is it permissible to cry, or must one grin and bear it? When is it permissible to seek assistance? What type of assistance is appropriate? People learn to express their reactions by observing the reaction of others. The models chosen are learned from family and culture. The effect can be seen when "modelling" is used to provide children with a model for appropriate behaviour during uncomfortable dental procedures (Kent and Blinkhorn, 1991).

3.2.4 Patients' Beliefs About their Pain

Just as the nature and degree of support may have an important effect upon a patient's perception of their pain, so may their beliefs about the origins and nature of pain. The publication of a number of pain belief questionnaires (already mentioned above in the section on assessment of pain) are helpful in this regard. Such scales include the Pain Beliefs and Perceptions Inventory (PBAPI; Williams and Thorn, 1989), the Survey of Pain attitudes (SOPA; Jensen et al., 1987), Beliefs about Pain Control Questionnaire (BPCQ; Skevington, 1990) and the Pain Beliefs Questionnaire (PBQ; Edwards et al., 1992).

The study by Jensen et al. (1991) has already been mentioned and it is important to restate their conclusion that beliefs about pain play a central role in the coping process by influencing both the initiation of coping efforts and one's overall sense of well-being (Bandura, 1977; Lazarus et al., 1984).

Some other studies in this area have examined whether the fact that patient's beliefs about their pain were consistent with the treatment they were being offered might have an effect on outcome. For example, Williams et al. (1994) had 79 chronic pain patients of heterogeneous diagnosis (some undefined) view an educational videotape providing information on treatment rationale and interventions. Those patients who rated the information as applicable to their pain condition had much better treatment outcomes.

Bowers (1968) found that during the presentation of aversive events in the laboratory, pain was attenuated for those given the facilities to control their pain, irrespective of whether they elected to use that control, and these results suggest that belief about potential control may be as important to controlling of pain as actual control (Skevington, 1990).

Such findings as these have led some authors to conclude that the beliefs of chronic pain patients about the nature of the pain and about their own capabilities are predictive of their coping efforts and their efficacy (Jensen et al., 1991; Williams et al., 1991; Elton et al., 1994).

3.3 Implications

It is evident from the discussion above that there is considerable variation in response to pain. Some of that variation can be explained physiologically by inevitable differences between patients' sensory systems. Other variation is due to the cultural environment where one learns the 'acceptable' ways to respond to pain and its meaning in religious terms. Yet further variation is explained by differences in individuals' beliefs about pain and their past history of suffering and coping, or failure to cope.

One might also hypothesise that a significant determinant of response to pain might be the individual characteristic of personality. The term 'personality' itself conveys the concept of individual difference or variation. The relationship between personality and pain is considered in the next chapter.

Chapter 4

Personality

CHAPTER 4

4.1 Personality

Previous chapters have established a range of issues regarding patients' reactions to the state of persistent pain. Factors such as pain beliefs, culture and family support have been seen important in determining such reactions. Attention now turns to the focus of main interest in this thesis, namely the possible influence of personality in the experience of persistent pain and the inter-relationship with coping strategies.

In considering 'personality', discussion will include measures of emotionality such as anxiety and depression because these are elements of personality and are seen as common reactions in states of persistent pain. Issues of 'coping' will also be considered because, as already shown in previous sections, coping may vary according to many factors.

The review will not be concerned with pathological states of personality (although an interesting example will be mentioned as a way of introducing this discussion). It is, however, notable that some 50% of patients referred to pain clinics are estimated to have some kind of mental disorder (Benjamin, 1988). Once again the issue of cause and effect arises: did pain precede the mental disorder and cause it, or was the disorder pre-existing (Wolff et al., 1991)?

4.1.1 An Unusual Study: Within-Patient Effects of Different Personalities

When conducting studies of the influence of different types of personality upon the experience of pain, one would normally make comparisons between groups having different personality types. However, in an imaginative study, McFadden and Woitalla (1993) examined the pain coping strategies of a patient suffering multiple personality disorder. Three personalities were identified, although not closely specified, in addition to the normal "host" personality. Quite different coping strategies (e.g. active *versus* passive) were adopted depending upon the particular personality type taken on by the patient.

Marked differences were also seen on the various dimensions of the McGill Pain Questionniare. Interestingly, the multiple personality disorder was thought to mask a history of sexual abuse of the patient in childhood.

This is an enterprising study because it employs the patient as his own control; something that would be impossible with patients who do not suffer from this disorder. Equally, however, the responses of a patient suffering from multiple personality disorder may be 'unusual' and different from those of others so that it would be hazardous to draw conclusions from this otherwise ingenious study.

4.1.2 Psychodynamic Approaches

The psychodynamic approach to personality is well known and personified in the theorising of Freud and his colleagues. It is important for completion to mention this approach in the context of pain and to note that there are few published studies dealing with the psychodynamic treatment of chronic pain. Recent reviews suggest that, while psychoanalytic approaches may be helpful in understanding the process of psychogenic pain development, patients with these disorders are regarded as unsuitable for psychoanalytic treatment and techniques are usually limited to information, explanation, reassurance, support and theory (e.g. Miller, 1993c; Benjamin,1989). It is interesting that the treatment approach itself is not psychodynamic but rather more of a cognitive-behavioural model. Nonetheless, Weiss and Sampson (1986) have proposed that the patient's unconscious mind should take a central role in analytic approaches to the treatment of pain.

Some analytical psychologists have also commented on the connection between personality and various pain reactions. Bromberg (1993) suggests that one aspect of human personality structure is usefully understood as a balance "between dissociation and conflict and argues that psychoanalysis must continue to broaden its concepts of psychic structure, unconscious phenomena, and therapeutic action beyond the model provided by conflict theory".

4.1.3 Modern Approaches: the Minnesota Multiphasic Personality Inventory (MMPI) and Eysenck Personality Questionnaire (EPQ).

A common criticism of psychodynamic theory is that its concepts, while interesting and apparently illuminative, are difficult to subject to empirical examination. In contrast, biologically-based theories of personality have gained particular ground because they rely on well validated and reliable questionnaire assessments which are free of much of the subjectivity of the psychodynamic approach. Two of these assessments have been applied in pain research and will be described now. One of them will be used as the main research instrument in the present thesis.

4.1.4 The MMPI

Lousberg et al. (1996) have stated that an "almost incalculable" number of research investigations have employed the Minnesota Multi-Phasic Personality Inventory (MMPI) to examine the potential role of personality. At first sight, the use of such an instrument might seem of value: the MMPI has had wide use in psychiatric research and there are well-established norms by which to classify particular personality types, particularly in their relationship to psychiatric diagnosis.

A number of investigators have suggested that the MMPI classification system might be used to group chronic pain patients into homogeneous groups (Sternbach, 1974; Prokop et al., 1980; Guck et al., 1988; Swimmer et al., 1992; Kleinke, 1994). Unfortunately, the outcome of such studies has not been consistent; for instance Guck et al. (1988) concluded that chronic pain patients did consist of a group having a particular personality profile while Sternbach (1974) had concluded quite the opposite.

The MMPI profile or grouping defined as the "neurotic triad" has been considered an important determinant of response to pain and its treatment. The triad is composed of the components of hysteria, hypochondriasis and depression.

Reactivity to stress and avoidance of personal responsibility by developing physical symptoms are commonly reported as characteristics of this profile (Lousberg et al., 1996). Recently, Riley et al. (1995) have applied the MMPI to a sample of 77 patients undergoing spinal fusion for chronic lower back pain. They found that patients whose scores on the neurotic triad were characterised by low scores on depression tended to report more satisfaction with their post-surgical condition despite high scores on the other two components of the triad. They suggested that their results were consistent with those of Long (1981) who showed that scores on the depression component of the triad seemed critical: patients reported little improvement in their state, despite enhanced scores on hysteria and hypochondriasis, unless their score on depression also showed improvement. These results might raise the question as whether one would gain sufficient insight about patients' conditions and reaction to pain by simply assessing their depression by one of the many specific inventories (e.g. Hospital Anxiety and Depression Scale; Beck Depression Inventory etc.) rather than subjecting them to the lengthy task of completing the MMPI.

Nonetheless, the neurotic triad has also been concluded to be important in the very recent work of Lousberg et al. (1996). Their study involved a sample of 86 chronic patients of widely varying diagnoses none of which, however, were defined. Their grouping of patients showing the neurotic triad (elevated scores on hysteria, hypochondriasis and depression) were classified as "dysfunctional" in their response to pain. The patients were seen to be using denial and repression excessively, and had little insight to their needs, conflicts and symptoms. This group contrasted with that defined by Lousberg et al. as being "active copers" and who were less impaired by their pain, and who showed low scores on the triad components.

An obvious criticism of the study by Lousberg et al. is their use of a very heterogeneous sample of chronic pain patients. In fact it is remarkable that they provide no details whatsover about their sample. With so much between-patient variability seeming to be inevitable, one must wonder whether their overall conclusion about the relevance of the neurotic triad must mask some significant differences between sub-groups of patients. For instance, had they defined a group of low back pain patients, it is conceivable that they may have found a similar effect to that of Riley et al. described above whereby depression was the critical factor in the triad. In their discussion, Lousberg et al. (1996) did, however, note that the psychometric properties of the MMPI have been criticised (e.g. Turk, 1990) and that this may reduce confidence in its application.

Further difficulties for the MMPI have arisen from Fordyce's (1976) observation that it does not distinguish reliably between the personalities of patients suffering from organic versus psychogenic pain. Given the marked levels of anxiety seen in patients with psychogenic pain, one might have anticipated some indication of specific neurotic traits in those patients that distinguished them from the organic pain group. Carruthers (1991) has observed that such problems create difficulties for the clinical interpretation of the validity of the MMPI scales in respect of pain.

Moreover, a recent study by Hansen et al. (1995) has shown that a patient's MMPI profile does not determine their response to pain, but rather that the pain experience determines the MMPI profile. The investigators conducted an interesting study over several decades where they assessed MMPI profiles in patients suffering chronic low back pain. MMPI profiles at age 50 were not different between those patients with or without (matched control) back pain when they reached their 60th or 70th decade, provided they had not experienced low back pain during the 10 years between 50 and 60 years of age. Thus the MMPI profile did not precede, or predict, low back pain; rather the experience of low back pain appeared to change the MMPI profile.

The latter finding is interesting in the context of emotional responses to pain. It was noted earlier in this chapter that Adams et al. (1994) concluded that it was difficult to establish cause and effect with respect to emotion and chronic pain. The study by Hansen et al. (1995) would seem to provide evidence to answer at least part of the uncertainty, namely that pain itself can be a precursor to change in some personality characteristics.

The finding of Hansen et al. might also seem consistent with the contention of Main and his colleagues that there is little evidence of a so-called "pain personality": in other words that having a particular personality profile does not make one more vulnerable to become a victim of persistent pain. Furthermore, Main et al. (1995) have recently argued that the use of the MMPI in regard to pain is no longer justifiable, not least for the reason that it incorporates out-dated views of psychopathology.

Despite these criticisms of the MMPI, the questionnaire continues to be used by some investigators (e.g. Bachiocco et al., 1993a, 1993b; Mongini et al., 1994). It is notable that the outcomes of some of such studies have supported those who have questioned the value of the MMPI. For instance, Bachiocco et al. (1993a) found that the MMPI provided no insight in their attempt to understand the effectiveness of analgesic drugs. The best predictors were duration and intensity of the pain suffered by the patients. Their 126 patients were having thoracic surgery for both malignant and benign conditions. The authors did not provide details of whether the results varied as a function of the diagnostic state of the patient. One might have anticipated that a diagnosis of malignant disease would have emotional effects that might influence pain.

In their further study with the same patient group, Bachiocco et al. (1993b) did report some relationships between personality and perception of pain control. Patients who perceived themselves to have weak control scored relatively higher on MMPI traits of depression and introversion. Interestingly, they also scored highly on the EPI measure of neuroticism. These results were established using regression analysis, but again the authors did not take account of their patients' diagnostic state.

A study by Kleinke (1994) also used regression analysis to examine the relationship between MMPI factors and coping with chronic pain. The diagnostic categories of the 300 patients were, again, not specified in detail but social support was shown to relate to low levels of neuroticism and good adjustment to pain. Helplessness, on the other hand, was associated with higher levels of neuroticism.

It would be wrong to dismiss the MMPI entirely out of hand. One might note Hart's (1984) observation that MMPI profiles may be more relevant to the investigation of personality disorders such as hypochondriasis and hysteria (which may, of course, be features of the chronic pain condition).

4.1.5 The EPQ - Neuroticism and Extroversion

Given the uncertainties attached to use of the MMPI, it seemed important in the present study to employ a less contentious but valid and reliable measure of personality. In the United Kingdom, perhaps the best known assessment of personality is the Eysenck Personality Questionnaire (EPQ; Eysenck and Eysenck, 1991). The EPQ assesses the personality dimensions of extroversion-introversion, neuroticism and psychoticism. Other variants of the test include such traits as impulsivity and venturesomeness, but they have not been employed in pain research and will not be considered further here.

The EPQ personality traits are known to have long-term stability (Eysenck and Eysenck, 1991). In other words they assess enduring personality characteristics that are unlikely to change over time in response to changes in the individual's physical condition or circumstances. One might therefore expect that traits present prior to the onset of a chronic pain condition might remain largely stable over time (although this proposal would require experimental verification).

It is important to provide a brief description of the theoretical background to the EPQ. Eysenck proposes that the two main dimensions of personality, extroversion-introversion and neuroticism-stability, have their basis respectively in levels of tonic and reactive activity within the central nervous system (CNS). Very simply, extroverted behaviour patterns are hypothesised to reflect levels of low tonic activity within the CNS such that the individual develops stimulus-seeking behaviour patterns in order to increase that activity (or "arousal") to a more optimal level. This is seen in characteristic extroverted behaviour such as sociability and out-goingness. Introversion, on the other hand, is characterised by high tonic CNS activity. The classic introvert is reserved and tends to avoid social situations in an attempt to reduce stimulation.

Evidence to support Eysenck's hypothesis has been found in sedation studies conducted by Claridge et al. (1981). It was shown that introverts required a significantly greater dose of a sedative drug to induce sedation than did a group of extroverts matched for body weight.

Neuroticism is hypothesised to be a function of the lability or reactivity of the CNS to stimulation. The classic neurotic is someone who tends to over-react emotionally to events that others would not find disturbing. Their behaviour is characterised by anxiousness and worrying, and with pessimistic or catastrophic views of the future. It is interesting that Eysenck regards anxiety as being composed of elements from both neuroticism and extroversion and that anxiety might be considered a prime personality trait (Frazer et al., 1988).

One reason that neuroticism (and anxiety) may be relevant to the experience of pain is that such traits seem to act as a 'volume control' to the experience of noxious physical or emotional stimulation. In other words, neurotic traits may lead an individual to over-react to stimulation so that the experience is made worse for them.

This may be seen in the period prior to a potentially uncomfortable or painful procedure. Millar et al. (1995) note that individuals with high levels of introversion and neuroticism suffer from a greater anxiety prior to painful procedures. Anxiety about pain may create an expectation that becomes a self-fulfilling prophecy.

The difficulties for the anxious and neurotic patient are compounded by the fact that such people are known to have objectively lower pain thresholds. Early confirmation of this fact was provided by Lautch (1971) in his study of 33 patients suffering extreme fear and phobia about dental treatment. Lautch's subjective measures were supported by Klepec's (1975) more objective analysis examining the pain threshold to electrical stimulation of an incisor. Thresholds (measured in milliamps) were shown to be significantly lower in neurotic patients. The latter finding may be due to the association between neuroticism and anxiety: high levels of anxiety are themselves known to dispose an individual to experience relatively greater levels of pain (Thorp et al., 1993).

Thorp et al. (1993) have alluded to this fact in a wider surgical context. Neuroticism is associated with postoperative pain, impairment of vital capacity and postoperative chest complications. Moreover, postoperative pain scores correlate with both anxiety and neuroticism scores. Thus, individuals having high neuroticism (and a tendency towards introversion) are more prone to anxiety regarding pain than other personality types (also Boyle,1977; Thomas, 1990).

The studies by Anderson and Rehm (1984) and Williams et al. (1994), which have been described above in another context, are also relevant here. Anderson and Rehm report using the "Maudsley Personality Inventory" although this is not described in detail in their method section: one can only assume that it relates to the EPI. In their results, the authors claimed that neither neuroticism nor extraversion showed any relationship with coping variables. However, in the absence of any data to describe the distribution of scores on extroversion and neuroticism, and the equivalence of the sample to age-matched 'norms for the factors, it is difficult to evaluate their result.

In contrast, Williams et al. (1994; study 3) employed the "NEO-Personality Inventory" which assess neurotic, extroverted and "openness" traits to show that neurotic traits were significantly and positively associated with beliefs in the "mystery" of pain, pain permanence and self blame for the pain condition. In contrast, extroverted traits showed no such correlation. The authors also used the Beck depression Inventory and found that higher scores on depression were associated with self-blame. Unfortunately, the authors did not conduct any analysis between pain, personality and depression. Interestingly, however, French (1989) observes that it has frequently been shown that extroverts express pain more freely than introverts, even though they appear to be less sensitive to painful stimuli.

It is therefore evident that there may be grounds to hypothesise that neuroticism may be an important determinant of how a patient responds to pain. Those with high levels of neuroticism appear to suffer more emotionally in anticipation of a painful procedure and in its aftermath. Extroverted types, while perhaps more likely to be vociferous when in pain, seem less disturbed by the experience.

The examples above concern the experience of acute pain where the potential duration of the unpleasant stimulus is likely to be brief. It remains uncertain, however, how these personality factors might determine responses in chronic pain conditions. Moreover, the effects of personality do not exert their influence in isolation but may interact with other aspects of the individual's response to pain. A highly salient interacting variable may be that of coping behaviour: Spinhoven et al. (1991) have observed that few investigations of pain coping behaviour have included personality factors. Those studies that have considered personality and coping will be considered now.

4.1.6 Coping Strategies and Personality

Factors relating to individual differences may be important in determining the ability to cope. As noted above with regard to personality, Spinhoven et al. (1991) have observed the neglect of any interaction of that factor with coping although it was also noted that Kleinke (1994) has recently shown some relationship between MMPI factors and coping.

Spinhoven and his colleagues have attempted to explore the relationship between personality and coping in a study of 111 patients suffering chronic tension headache. They administered the Coping Strategy Questionnaire and the Dutch version of the California Personality Inventory which provides a measure of neuroticism. The analysis employed multiple correlations (without correction for type 1 error) to show only that neuroticism and helplessness were positively correlated. In subsequent regression analysis, neuroticism was found to predict generally higher levels of psychological distress. The latter finding might have been predicted in the case of many medical situations, and would not seem exclusive to pain. The study provided no evidence of a relationship between personality and the nature of the pain experience, nor between coping behaviour and pain.

Spinhoven et al. acknowledged the rather uncertain nature of their findings and concluded that more research was required to explore the relationship between personality and coping with pain.

One might also note that while the study by Spinhoven et al. had the virtue of a very homogeneous sample, that homogeneity may itself have restricted the generality of conclusions to be drawn from the study. For example, the fact that neuroticism seemed to predict higher levels of distress can be concluded only to be true for these patients suffering tension headache.

One would agree that given that personality variables have been shown important in the experience and reporting of pain, and in recovery from painful operations and procedures, it would seem to be clinically useful to examine the relationship between personality types and the use of coping strategies among chronic pain patients.

The relevance of personality to coping may be evident in the fact that, when in pain, some patients become distressed or unstable, whereas others remain resilient. "Coping theorists assume that these outcomes result from people's coping efforts to alter the stressful situation or to regulate their emotional reactions" (Folkman, 1984). Personality may explain why some patients can control their pain (or endure it) while others cannot.

There is some evidence from previous research that different types of psychological characteristics may relate to coping strategies with pain. For example, those who believe that they have a high internal locus of control show good adjustment. Sternbach (1986) asserted that patients having a more external locus of control report a higher incidence and severity of pain than those with a more internal locus of control. Those with high internal health locus of control are more likely to have healthy behaviour. This finding confirms that it is important to be aware of the potential influence of individual differences of coping. The finding seems relevant to the observation by Ridgeway et al. (1982) that there would be some value to clinicians if it were possible to identify those patients who might benefit from psychological interventions to develop or enhance coping skills.

Individual variation in the conceptualisation of illness may also be relevant here. Miller (1993c) suggested that patients' beliefs about chronic pain strongly influence the nature of the syndrome. Patients who believe that their pain is an unexplained mystery show poorer treatment compliance and outcome. Keefe and Williams (1989) also observe that patients who blame themselves for their pain tend to have lower pain levels.

Lazarus and Folkman (1984) classify hopefulness as a coping strategy related to one's beliefs as faith in God, fate, or the natural order of the universe which help people to create meaning out of their lives and offer an explanation for their particular situation. Specific beliefs in the competence of the physician, treatment or family member also can generate hope (Hunt Raleigh, 1992).

4.1.7 Fear, Anxiety and Depression with Pain

As noted above, it seems plausible to propose that personality characteristics do not interact with pain in isolation. Neurotic individuals suffer high levels of anxiety (Thorp et al., 1993), and depression may also be a feature.

Both of these emotions, and that of fear, are relevant as factors that vary between individuals in their response to pain.

Patients often describe having fear of pain. This may be fear of the pain itself, avoidance of activity for fear of pain, fear of being alone, fear of the unknown and fear related to procedures and equipment (Copp, 1974); Evely, 1967; Fernandez et al., 1994; Beckham et al., 1994). The interaction between pain and anxiety in the setting of somatic illness is widely recognised and it was noted above that people who are anxious are more sensitive to pain than calm people (French, 1989). Moreover, memory of fear and anxiety carries over from one pain experience to the next. Thus the anticipation of pain and memory for actual pain and discomfort create considerable difficulties for helping patients to manage their anxiety (Millar et al., 1991). Uncertainty about the ability to cope and the uncertain effect of treatment may arouse anxiety. Perception of self-efficacy and the presence or absence of support from others may also be important factors.

The findings of Arntz et al. (1991, 1993) suggest that the main effect of anxiety is that it either attracts one's attention to pain or distracts one from it. From this viewpoint the effect of anxiety on pain perception may depend more on the resulting focus of attention rather than anxiety *per se*.

More accurate knowledge about the association between anxiety and pain, and also about the means of assessing anxiety in a clinical setting would be of use to the clinician. Unfortunately, research can be hampered by poor definition of the term and the use of assessments of anxiety which fail to distinguish between the emotional disorder and possible physical symptoms (Velikova et al., 1995). Jelicic et al. (1993) reported that anxiety is often inadequately assessed by questionnaires because some intense emotions remain unconscious and the possibility of denial is not addressed. Patients who deny their feelings typically do not acknowledge feeling apprehensive, but their emotions remain active at an unconscious level. Thus assessments of preoperative anxiety may not always be reliable when they tap only consciously experienced emotions.

Similarly, pain may be accompanied by many psychological experiences such as distress, "hassles" and stress which relate to the impact of pain upon domestic and social life. It may not be the pain itself which causes the distress but rather the impact upon the person's lifestyle. Thus high ratings of anxiety and stress may be mistakenly ascribed to the pain condition alone. Sternbach (1986) reported that greater stress and more hassles are associated with more frequent and more severe pain.

Similar problems of interpretation apply to studies of depression in relation to somatic illness and pain. For example Tope et al. (1993) point out that a diagnosis of major depression may be an artefact of the somatic symptoms of the physical illness. They conclude that there is therefore a growing awareness of the need to recognise emotional factors in somatic illness especially chronic pain.

Certainly, it does appear that chronic pain is closely related to depression. Indeed, more attention has been paid to the association between pain and depression than anxiety. A recent study by Kuch et al. (1993) concluded that depression was a more significant emotional disorder in the context of pain. The authors studied 61 patients suffering persistent pain caused by road traffic accidents. The location and severity of the pain varied widely across the group of patients and was acknowledged by the authors to lend heterogeneity to the sample. The results showed that depression was associetd with the frequency of the pain symptoms, but not the severity of the pain. Kuch et al. proposed that the results might reflect the fact that the patients found it more difficult to cope with frequently recurring symptoms because they had no respite from the pain. They concluded that their results reinforced the importance of considering the affective or emotional nature of "suffering" as part of the experience of persistent pain.

Lautenbacher et al. (1994) confirmed the view of Kuch et al. by conducting a meta analysis and reported that depression constitutes a state of increased vulnerability to pain problems and changes the way one deals with such problems. They noted that chronic pain is frequently accompanied by depressive symptoms and sometimes leads to a full-blown depressive disorder. Interestingly, although these authors concentrated on psychopathological factors, they made no analysis to account for differences in the physical causes of the pain state.

The study by Beckham et al. (1994) concludes that "the worst possible outcome when experiencing pain was associated with decreased functional status, increased psychological distress, depression, and avoidance of activity for fear of pain. Reinterpreting pain sensations in a positive way was associated with decreased depression." Merskey (1993a) suggests that chronic muscular pain has to be understood as an organic disorder made worse by psychological phenomena. He concludes that psychological reactions which occur as a consequence of muscle pain needs appropriate psychiatric treatment. It is significant that these common psychological reactions are depression and anxiety.

The emotional reactions of chronic pain patients need to be viewed in context. According to Skevington (1993), the type of psychological disorder expressed by those with organic diseases with painful symptoms is arguably different from the qualities of the same disorder found in a psychiatric population. Moreover, they "may comprise the largest group of disabled persons of all the psychophysiological disorders, and perhaps of all the psychiatric classifications" (Sternbach et al., 1973b).

The emotional reactions are also more complex than may be conveyed by the concepts of 'anxiety' and 'depression' alone. Miller (1990) asserts that "feelings of hopelessness, helplessness, and despair are common, as are multiple visits to various physicians and clinics. With each new treatment, the patient "experiences a resurgence of hope, which is followed by disappointment and eventually increasing resentment and bitterness toward the treating physician."

These findings suggest that psychological factors associated with, or contributing to, emotional disturbance should be accounted for when considering chronic pain patients. Adams et al. (1996) observe that one should note that "While a substantial body of literature does show that pain patients tend to be depressed, mechanisms linking pain to depression are not well understood." It is interesting, however, to note that both pain and depression may be linked independently with inactivity and pasivity. The chronic pain patient may believe that by reducing activity they can avoid painful sensations. The depressed patient may be so 'low' as to have no interest other than inactive rumination about their misfortune and suffering. In the case of the latter patient, psychological interventions often advocate simple activity schedules to break the circle of depressed thoughts. Given that inactive pain patients may be prone to pessimistic brooding, a similar schedule may be helpful by stopping the thoughts and providing distraction. Indeed, just such simple behavioural techniques have been shown effective in increasing positive activity and thoughts about pain (Adams et al., 1994).

4.1.8 Overview and Rationale for the Present Study

It is evident from the preceding review that there has been a considerable focus of research upon the role of psychological factors in the experience of acute and chronic pain. These factors have included coping behaviour, emotional responses and the role of personality. In the case of personality, while there is considerable evidence to relate the factor of neuroticism to responses to acute pain, the relationship to behaviour in chronic pain is less clear. Although some investigations have attempted to clarify the latter position, their use of the MMPI has not added to our understanding for reasons described above.

It is proposed here that an investigation of the relationship between personality and chronic pain may be better served by use of the EPQ. The EPQ has already been shown to explain individual variation in responses to acute pain experiences, and it would therefore seem logical to extend that analysis to chronic pain conditions. Given that the factor of neuroticism has been shown important in explaining responses to acute pain, one might anticipate that the factor would have salience in chronic pain conditions.

Personality is, however, unlikely to act in isolation to influence the experience of, and response to, chronic pain. It was shown above that in the case of chronic tension headache, neuroticism and helplessness were correlated, and that neuroticism was also associated with higher levels of psychological distress (Spinhoven et al., 1991). The restricted nature of of the latter patient sample made it impossible to generalise from the result but it might imply that factors of coping and emotional distress should also be included with personality in a study of chronic pain. This conclusion would seem confirmed by evidence reviewed above that depression is a common emotional concomitant of pain and is associated with increased vulnerability to pain (Kuch et al., 1993; Lautenbacher et al., 1994). Similarly, coping behaviour in pain is influenced by many factors internal and external to the patient and these should also be included in a study of personality and chronic pain (e.g. Gil et al., 1987; Jensen et al., 1991).

An obvious factor that should also be included as a potential independent variable relevant to pain and distress is that of social support. The factor was shown in the literature review above to have a significant influence upon the response to chronic pain and might interact with the factors of personality and coping.

The fact that several variables, in addition to that of personality, may influence chronic pain has implications for the analysis of data from a multi-factorial study. It was noted above that some previous studies have employed simple pair-wise comparisons between factors (e.g. correlations) in order to attempt to understand their impact upon pain. A more satisfactory approach is that of regression which permits one to assess the relative impact of factors when they act together to affect pain.

The following chapter describes the hypotheses and methodology for the present study which arises from the issues considered in the preceding chapters.

Part Two

Method

Chapter 5

The Present Research Study: Research Plan, Hypotheses and Method

CHAPTER 5

5.1 The Present Research Study: Research Plan, Hypotheses and Method

5.1.1 Research Plan and Hypotheses

The final section of Chapter 4 described the rationale for the present study. The primary aim of the present thesis is to subject the role of personality in persistent pain to empirical examination. It has been seen that the Eysenck Personality Questionnaire (EPQ) provides a reliable and valid measure of personality and it has been shown useful in understanding different reactions to acute pain. The present thesis will therefore use the EPQ as the instrument for assessment in preference to the MMPI which, as shown above, may not be reliable for this purpose.

Interest will attach to whether certain personality factors are characteristic of the persistent pain state. Given that the factor of neuroticism has been shown to influence responses to acute pain it seems reasonable to hypothesise that it may also predict responses in chronic pain.

Coping behaviour was also seen to vary between individuals and to result in different responses to the chronic pain state. It would seem important to consider the extent to which coping might interact with personality in determining the reaction to chronic pain.

Chronic pain is associated with psychological distress. As neuroticism is correlated with measures of depression and anxiety, it is important to consider the extent to which the latter emotional factors might interact with that of personality.

The following hypotheses are proposed regarding the relationship between the factors of personality and coping, and the patient's experience of, and response to, chronic pain. These hypotheses follow logically upon the evidence reviewed in previous chapters.

1) Patients having high levels of neuroticism would be predicted to have a more adverse experience of chronic pain. It is hypothesised that this will be reflected by:

(a) high scoring on the McGill Pain Questionnaire

(b) high scoring on measures of emotionality and distress (assessed by inventories described below) and where chronic pain patients will be predicted to score above the criterion denoting 'significant' or 'clinical' levels of psychological distress ("caseness") when compared to population norms.

(c) It is also hypothesised that the personality characteristics of extroverted individuals will be associated with a less adverse experience of pain when compared with their neurotic counterparts.

2) Coping strategies would be predicted to influence the experience of chronic pain as inferred from pain and distress scores. The Ways of Coping Checklist (WCCL, described in detail below) will assess the individual's coping strategy. The hypothesis must be non-directional because prior research has shown that both active and passive strategies may be effective in the chronic pain state

3) Social support has been seen to be important in determining the response to pain. It is hypothesised that

"support" variables will predict pain and distress in the present study. The presence of support may be expected to 'buffer' the effects of pain, while its absence may be associated with greater levels of pain and distress.

5.1.2 Methods, Materials and Procedure and Ethical Approval

The study received approval from the Ethical Committee of the Western Infirmary, Glasgow (see correspondence in **Appendix I**). All new attenders to the Pain Relief Clinic at Gartnavel Hospital were invited to participate on the basis of informed consent. Their general practitioners were also informed of their involvement in the study.

5.1.3 Sample Size

Determination of the sample size was based upon the requirement to be able to distinguish the effects of attending the Pain Relief Clinic on well-being and other outcome measures. This would entail two groups, one being the "study group" which would be assessed before and after visiting the clinic, and the other being the "control group" which would be assessed over a similar period of time but without the clinic visit. (This is the second part of the empirical investigation to be reported in this thesis and described above. The rationale for the investigation was described in Chapter 4 above. Full details of the specific methodology are given below.)

The required sample size was computed after the procedure advocated by Weiner (1971) using representative data from the HADS scale to estimate the parameter ø'. With ø' = 0.43, calculations show that to detect a change from borderline / clinical anxiety and depression to the 'normal' range, then for alpha = 0.01 and power of 0.90, a sample size of 41 is required in the study and control groups. The proposed sample sizes will be seen to meet this requirement.

5.1.4 Recruitment

The recruitment of patients was undertaken to serve the requirements of the main and secondary aims of the study as described above. It should be pointed out here, however, that the present thesis is a re-submission of an earlier version. The very helpful and constructive criticism of the external and internal examiners has led to re-analysis that necessitated merging data from what were, initially, two separate groups of patients recruited at slightly different times. If the study were to be run again, clearly it would be methodologically more sound to recruit all the patients as one group and then divide them randomly later for the purposes of the second study (i.e. the evaluation of the Pain Clinic as described above). It seemed appropriate to describe here how the patients were recruited in the original methodology, to acknowledge the short-comings of that approach as just done above, and to proceed with the new analysis to be reported in the Results section in due course. Issues of methodology will also be considered in detail in the main Discussion in Chapter 9.

The original recruitment of patients therefore proceeded as follows. Initial discussion between the author of the thesis, his supervisor and consultants at the Pain Relief

Clinic confirmed that the study group would be recruited from patients awaiting their first appointment at the Clinic. The matter of the control group was, however, more contentious. Although a wait-limited control group was the first preferred option, advice from the Pain Relief Clinic was that it might be unlikely that patients would be willing to participate on that basis. Accordingly, it was agreed that patients suffering persistent pain who were being monitored and cared for by their general practitioner would be recruited as controls.

Recruitment of the study group and collection of data from the study group patients therefore began. Although it was anticipated that recruitment and collection of data from the general practice control group would begin at the same time this did not prove to be the case. It eventually became obvious that, for administrative and other reasons, such a control group would be difficult to recruit. It was therefore decided to revert to the original plan of attempting to recruit Pain Relief Clinic patients to a wait-limited control condition.

It transpired that wait-limited patients were in fact identified quite readily and recruitment and data collection began, but it should be noted that the collection of data from the latter group did not proceed in parallel in time with that of the study group. While hardly ideal, it is, however, thought unlikely that this aspect of the methodology had an adverse effect upon the data form.

Demographic characteristics, confirming that the study and control groups did not differ significantly will be presented in due course in the Results section.

It should be emphasised again here that in this re-submission of the thesis, the first and main analysis consists of merging the study and control groups which were recruited separately. However, it is important to provide detail on how those two groups were initially recruited and this will be done now.

5.1.5 Study Group

All new patients holding appointments for their first visit to the Pain Relief Clinic were sent a personal letter explaining the purpose of the study and inviting them to participate. The letter included a consent form and the questionnaires to be described below (see **Appendix II and III**). The letters and questionnaires were sent out 2 weeks prior to the patient's appointment at the Clinic. If they wished to participate, they were requested to complete the questionnaires and consent forms and return them to the author on their first visit to the clinic for assessment.

In the second phase of the study (to be described in detail later), patients were sent further questionnaires 6 months later (and after they had attended the pain relief clinic for treatment) in order to determine any change in their perceptions and emotions that might have occurred in the intervening period. A further questionnaire was enclosed to assess the patients' perception of the benefit from having attended the Pain Relief Clinic in terms of pain reduction, acceptability of medical treatment and their view of staff attitudes. All of these questionnaires were returned to the author by post.

5.1.6 Control Group

Patients for the control group were recruited from the same population of patients awaiting their first appointment at the Pain Relief Clinic. The function of the control group was to establish whether time alone might exert an influence upon the patients' perception of their pain and their emotional state. Therefore, the patients were sent the first questionnaire and consent forms, and then the second batch of questionnaires at equivalent times to the study group but before attending the clinic. Thus the time interval between the questionnaires was the same as for the study group, but the crucial difference between the groups was that the study group had attended the Pain Relief Clinic before completing the second batch of questionnaires.

5.1.7 Comments on Sample Characteristics and Completion of the Questionnaires.

The Pain Relief Clinic at Gartnavel Hospital provides a service for a very heterogeneous population of chronic pain patients. It was noted in the literature review that there may be methodological advantages to ensuring that samples are homogeneous in nature (i.e. that they comprise patients suffering from the same persistent pain condition: e.g. lower back pain) because it is likely that this will reduce variability which may obscure the effects of independent variables of interest.

The literature review observed, however, that many studies have used markedly heterogeneous samples. While this can be a point of criticism which will be discussed in much more detail in Chapter 9, it should be acknowledged that researchers must often be pragmatic and adapt their research to local circumstances. It may, for instance, be impractical due to limits on the time available for sampling to recruit patients purely within one diagnostic category. Moreover, even if a sample is heterogeneous in nature, it will often be possible to analyse the data as a function of the different diagnostic categories in order to determine whether they are associated with different values of the dependent variables. Thus the variation of a heterogeneous sample can be partialled out in an analysis in order to gain deeper insight.

It should also be borne in mind that the second aim of the research is to examine the extent to which patients benefit from attending the Pain Relief Clinic at Gartnavel: it would seem logical on that basis that the sample should be representative of the range of chronic pain conditions treated at the clinic. The final pragmatic point is that given the time-limited nature of the research and uncertainty as to how easy it would be to recruit patients, it seemed important to ensure the gathering of a valid sample size by recruiting all potential patients. As will be seen later in the results, it was as well that this approach was adopted because recruitment proved difficult in that only some 50% of patients approached agreed to participate. The implications of this will be discussed later.

Some criticism might also be directed to the methodology that permitted patients to complete the questionnaires at home over a period of time. In this circumstance, patients may have sought the opinion of family members and friends in deciding how to respond to some questions, hence failing to reflect their own views. This problem must be acknowledged. However, given the number of questionnaires to be administered, it seemed that the only feasible way to have them completed was to allow patients to do so in their own time, and hence at home. The demands on the patients at the clinic were such that there was not enough time for them to complete the questionnaires in that environment (see also Chapter 9).

5.1.8 Questionnaires

As described in the final section of the introduction, questionnaires were administered to assess personality, emotional state, pain beliefs and coping behaviour. The questionnaires were chosen because they have been shown sensitive in previous investigations of pain and distress, and their psychometric properties have been subject to assessment of validity and reliability. A number also have 'normative' data against which the results of the present study can be compared. These include norms which permit definition of "caseness": i.e. an indication of whether a given patient is expressing levels of distress that may place him or her within a clinical category that might require psychological intervention. Moreover, given that one part of the thesis is concerned with whether attendance at the Pain relief Clinic is associate with a change in levels of pain and distress, it was important to use assessments that have been shown sensitive to change both in previous published investigations and in terms of their own reliability and validity data (e.g. Snaith and Zigmond, 1994): Goldberg, 1992).

5.1.8.1 Eysenck Personality Questionnaire

Eysenck Personality Questionnaire (Revised Short Scale: "EPQ-R") (Eysenck et al. 1991). The EPQ-R provides assessment of three dimensions of personality, Extroversion (E) , Neuroticism (N) and Psychoticism (P), and incorporates a so-called Lie Scale (L). The latter scale is useful in detecting those individuals who may seek to present themselves in an ideal or socially-acceptable light. High L scores may cast doubt upon how realistic patients are being in their responses to other questions in the EPQ-R.

5.1.8.2 Hospital Anxiety and Depression Scale (HADS),

The Hospital Anxiety and Depression Scale (HADS), (Snaith & Zigmond, 1994).

The HADS consists of 14 statements, half of which relate to symptoms of anxiety and half to depression. For each statement the patient records which one of four descriptors indicating increasing symptom strength (score 0-3) best describes their degree of emotion (minimum possible score on the dimension of anxiety or depression = 0, maximum = 21). Normative data for the HADS define a score of 7 or less as "normal", 8 -10 as "mild", 11 - 14 as "moderate", and 15 or more as "severe" anxiety or depression.

5.1.8.3 General Health Questionnaire (GHQ-28)

The GHQ-28 (Goldberg and Hillier, 1978) assesses the presence and degree of psychiatric morbidity and psychological distress. It comprises the following 4 subscales: somatic symptoms; anxiety/insomnia ; social dysfunction; severe depression. Scores on the four dimensions are usually summed to give a total score. Goldberg (1992) advocates use of the "GHQ scoring method" which reduces the tendency for individuals to bias their scores by avoiding selection of extreme response alternatives. The GHQ method is employed here.

5.1.8.4 Beliefs about Pain Control Questionnaire (B.P.C.Q.)

The Beliefs about Pain Control Questionnaire (B.P.C.Q.: Skevington 1990) is derived from the Multidimensional Health Locus of Control Questionnaire (Wallston, 1978). It was designed to evaluate beliefs about controlling pain and is divided into three subscales. An Internal Scale (IS) measures beliefs that pain is personally controlled by internal patient factors. Two external scales measure beliefs that pain is controlled by factors which are beyond or outside personal control. The Powerful Doctors Scale (PD) measure beliefs that pain control is in the hands of powerful others; in this case doctors are specified. The Chance Happenings scale (CH) measures beliefs that pain is controlled by chance happenings or misfortune .

5.1.8.5 Pain Beliefs Questionnaire

The Pain Beliefs Questionnaire (P.B.Q: Edwards et al. 1992) consists of two belief factors. Factor 1 consists of 10 items primarily concerning beliefs in the organic basis and implications of pain. The 4 items of factor 2 are related to beliefs in psychological influences upon the experience of pain.

5.1.8.6 McGill Pain Questionnaire

The McGill Pain Questionnaire (MPQ: Melzack, 1973) The MPQ provides several measures. The most commonly reported measure, the pain-rating index total (PRIT), provides an estimate of overall pain intensity. This measure, obtained by summing all the descriptors selected from the 20 subclasses, has a possible range of 0 -78. Separate scores for each of the sub categories of pain experience may be obtained by summing the values associated with the words selected from subclasses that comprise a given dimension. Scores on these dimensions vary in range from 0 to 42 for the "sensory" class (PRIS), 0 to 14 for the "affective" (PRIA) and 0 to 5 for the "evaluative" (PRIE). In addition, the "number of words chosen" (NWC), which can range in value from 0 to 20, provides an indicator of how many of the subclasses were chosen by any one subject. The latter measure is assumed to reflect more pain when more words are chosen from the subclasses by the patient.

5.1.8.7 Ways Of Coping Checklist

The Ways Of Coping Checklist (WCCL: Folkman and Lazarus, 1980). The WCCL is a checklist of 68 items describing a broad range of behavioural and cognitive coping strategies that an individual might use in coping with a stressful event or medical conditions. The authors do not provide specific details as how best to summarise an individual's responses on the questionnaire, but one approach is to subject the data to Factor Analysis in order to establish whether there is a particular style of coping that characterises the individual. However, responses on the WCCL can also be usefully categorised according to the following four coping dimensions: (1) active coping, (2) denial, (3) passive coping, and (4) reliance on external support.

5.1.8.8 Multidimensional Pain Questionnaire (MDQ)

The MDQ was devised by the author and uses a 5-point Likert scale to assess a patient's perceptions of the impact of pain upon daily life, emotion, work, support from or avoidance by family, friends and neighbours, and the value of religious beliefs. These issues were seen to be important in the research reviewed in previous chapters.

The initial questionnaire consisted of 58 questions. However following piloting of the questionnaire on a sub group of 20 patients, 36 questions were established to compose the final questionnaire. Questions were omitted where they were redundant because they overlapped with other questions and where the patients' consensus was that they were difficult to understand or irrelevant.

The final questionnaire is shown in **Appendix III**. The six explicit categories addressed by the questionnaire are: effects of pain on daily life (7 items), avoidance by family and friends (8 items), comfort from religion (7 items), support from health professionals (4 items), support by family and friends (7 items) and confidence about the future (3 items).

(a) Reliability

The reliability of the questionnaire was assessed in the following ways.

Test-retest reliability - The questionnaire was given on two occasions, 6 weeks apart, to a further sample of 20 pain patients. The correlation coefficient was then calculated to compare responses to the questionnaire on those two occasions. The correlation was 0.73 ($p<0.001$) which indicates that the questionnaire had good test-retest reliability.

Internal consistency reliability - This was applied to groups of items that were thought to measure different aspects of the same concepts. Internal consistency is an indicator of how well the different items measure the same issue. This is important because a group of items that purports to measure one variable should indeed be clearly focused on that variable. Internal consistency was measured by calculating the coefficient alpha. It measures internal consistency reliability among a group of items combined to form a single scale and it is a reflection of how well the different items complement each other in their measurement of different aspects of the same variable or quality.

The Cronbach coefficient alphas are shown in Table 5.1 for the seven categories of the questionnaire. It can be seen that with the exception of "Confidence in the Future" which has only 3 items and where the coefficient alpha was 0.69, the coefficient alphas are all >0.70 indicating good internal consistency.

(b) Validity

Validity concerns the extent to which a questionnaire really assesses the constructs which it purports to assess. In other words, the extent to which the present questionniare actually assesses the supposed effects of pain upon daily life etc., rather than some other constructs.

Face and content validity - This was based on a review of items by both untrained and trained judges, and pain patients. Before administering this new questionnaire, it was presented to 10 postgraduate students, 3 nurses, 2 psychologists, and 20 pain patients to review each of the items (all had English as their first language). In discussion with the author, these reviewers were required to rate each question and the questionnaire as a whole for appropriateness and relevance to the general issue of the effects of pain. In some ways, therefore, this was a similar but more formal process to the initial examination of the questionnaire items by the pain patients.

Criterion Validity (concurrent validity) - Concern here is with the extent to which the dimensions of psychological experience assessed by the questionnaire show a correlation with assessments on established questionnaires which may be assessing similar sorts of experience. For example, the concept of 'distress' may be inherent in a number of dimensions of the MDQ and thus may be expected to correlate with distress as measured by other standard questionnaires such as the HADS or GHQ.

Table 5.2 shows the correlations between the six dimensions of the MDQ and the HADS and GHQ in the 20 pain patients mentioned above. It is evident that the category "Confidence in the future" correlates negatively and significantly with HADS anxiety and depression, and with GHQ distress. The category of "Denial" also correlates positively and significantly with HADS anxiety and depression, and GHQ distress. Thus these two categories would seem to have some measure of emotional upset. The "Effects of pain on daily life" are also significantly correlated with HADS anxiety and depression, and again this would seem plausible given the likely emotional impact of pain upon daily life. "Religion" showed a significant negative correlation with depression indicating that stronger beliefs in religious belief were associated with lower levels of depression in response to pain. The category of "Perceived support" was not significantly related to scores on these assessments of emotional state, although negative correlations are evident in the case of HADS depression and GHQ.

MDQ		Min.	Max	Cronbach's Coefficient Alpha
(1) effects of pain on daily life	(7 Items)	10.00	35.00	0.78
(2) avoidance by family and friends	(8 Items)	8.00	38.00	0.73
(3) comfort from religious belief	(7 Items)	7.00	35.00	0.96
(4) support from health professionals	(4 Items)	4.00	20.00	0.79
(5) support by family and friends	(7 Items)	8.00	33.00	0.71
(6) confidence about the future	(3 Items)	3.00	15.00	0.69

Table 5.1. shows the Cronbach's coefficient alphas for the seven categories of the MDQ questionnaire. It can be seen that with the exception of "Confidence in the Future" which has only 3 items and where the coefficient alpha was 0.69, the Cronbach's coefficient alphas are all >0.70 indicating good internal consistency.

	PN	PP	PE	PL	GHQ	ANXIETY
(1) effects of pain on daily life	.3555	.0938	-.0469	.0984	.3329	.5538**
(2) avoidance by family and friends	.2853	.1813	-.0345	-.3194	.5341**	.4571*
(3) comfort from religious belief	-.1103	-.0004	.2527	.2888	-.1604	-.0813
(4) support from health professionals	.0540	-.2353	.0365	.1638	-.1481	.0489
(5) support by family and friends	.0211	-.0724	.1224	.4491*	-.2521	.0590
(6) confidence about the future	-.4534*	-.2619	.1137	.2324	-.6655**	-.5820**

Table 5.2 shows the correlations between the six dimensions of the MDQ and the HADS and GHQ in the 20 pain patients in the pilot study. *=p<0.05., **=p<0.01

5.1.9 Presentation of Questionnaires to Patients

The questionnaires were bound together in a 'pack'. As the bulky appearance of the pack might at first have seemed daunting for patients, they were instructed to complete them over a period of a few days and return them to the author. Possible criticisms of this approach are discussed in Chapter 9.

Part Three
Results

Chapter 6:

The Results Section One

CHAPTER 6: Results

Factors Predicting Pain and Distress in Patients Suffering Chronic Pain

6. An Introduction to the Results

The principal aim in the analysis of the results is to determine whether the hypotheses proposed in the previous chapter are supported. Therefore, the main concern will be the extent to which personality and coping are predictors of the patient's pain state. This part of the analysis will be composed of three main sections.

The first section describes the characteristics of the patients in terms of personality, emotional state and pain experience, and the extent to which they differ from published normative data. The analysis will also establish the coping styles adopted by the patients. The function of the first section is therefore largely descriptive in order to provide the reader with an overview of the characteristics of the patient sample.

The second section of the results is brief and serves as a prelude to the regression analysis. It will report correlations between variables in order to establish the occurrence of collinearity which can create problems for regression analysis. Much of the tabular outcome of the analysis of this part of the results will be found in the appendix.

The third section of the results will be the most important and will apply multiple regression analysis to establish whether personality and coping are predictors of the pain and distress experienced by these patients.

6.1 Characteristics of Patients in Persistent Pain

6.1.1 Demographic Variables

Table 6.1.1 shows the principal demographic variables of gender, age, social class and duration of persistent pain. The sample was, on average, middle-aged but with a relatively wide range.

The duration of pain showed an average of some 7 years, but again a wide range was evident from 1 to 37 years.

The distribution of social class showed that the majority of the sample was drawn from the lower socio-economic classes 4 to 7 (65%). This exactly parallels the proportion of such classes seen in the general population as reported in the Registrar General's statistics. Within the higher socio-economic groups 1 to 3 (35%), there was, however, more than would have been anticipated in the managerial and professional groups (28% in this sample vs. 23% in the Registrar General's statistics).

It should be noted that all the data reported in this thesis were analysed to include the factor of the patients' gender. Only three significant differences were found and these will be reported in the appropriate sections of the results. As the factor of gender had virtually no effect upon the results, it will not be considered in further detail other than reporting of the effects.

Table 6.1.1 Demographic characteristics of patients:

Sex	Male: female	44:62 (41% :59%)
Age	years	50.6 (range 21-82)
Duration of pain	years	7.7 (range 1 -37)
Social class		
	Social class-1	20 (19%)
	Social class-2	8 (7.5%)
	Social class-3	13 (12.3%)
	Social class-4	18 (17%)
	Social class-5	20 (18.9%)
	Social class-6	18 (17%)
	Social class-7	9 (8.5%)
Religion and cultural status	Catholic	31 (29.2%)
	Protestant	51 (48.1%)
	Islam	2 (1.9%)
	Unknown	22 (20.8%)
Marital Status		
	Married	70 (66.0%)
	Single	15 (14.2%)
	Divorced	11 (10.4%)
	Separated	4 (3.8%)
	Widowed	5 (4.7%)
	Unknown	1 (0.9%)

Demographic characteristics of patients showing sex, ratio, age, duration of pain, social class, religion and marital status.

6.1.2 Diagnostic Categories

The diagnostic classification is shown in Table 6.1.2 according to the diagnostic categories used at the Pain Relief Clinic. There are eight diagnostic categories, the most common diagnosis being that of chronic pain as a consequence of previous surgical intervention, and the second most common being due to general degeneration of joints symptomatic of arthritic conditions. Low back pain patients formed the third most common diagnosis. Only two patients were suffering chronic pain due to malignant conditions of the bone.

6.1.3. Patient Characteristics - Personality and Emotional State

The patients' scores on the EPQ, HADS and GHQ are shown in Table 6.1.3

6.1.3.1 Personality - Table 6.1.3 shows scores on the EPQ and includes the EPQ normative data (Eysenck and Eysenck, 1991) for the patients' age group (N = 212). It is evident that the groups' personality profiles are very similar to those of the norms with the exception of the factor of neuroticism where the present sample score higher than the norm. Analysis by t-test confirms that the average neuroticism score of the present sample is significantly higher than that of the population norms ($t = 3.67$, $df = 272$, $p < 0.01$).

The factor of gender was found to have a significant effect upon lie scale scores whereby female patients scored more highly than males (mean of 6.3 vs. 4.6: $t = 7.7$, $df=104$, $p<0.007$). Although not shown here, the same tendency is

Table 6.1.2 Diagnostic categories of patients.

Diagnostic Category	Number (percentage)
Cancer of Bone	2 (1.9%)
General Degeneration	26 (24.5%)
Infection	4 (3.8%)
General Illness	6 (5.7.5%)
Post Surgical	34 (32.1%)
C N S	4 (3.8%)
Back Pain	19 (17.9%)
Others	11 (10.3%)

Table 6.1.3 Scores on the E.P.Q, HADS and GHQ Questionnaires.

Variables	Mean (S.D.)	Norms Mean (S.D.)
Extraversion	6.74 (3.84)	6.35 (3.66)
Neuroticism	6.25 (3.62)	4.9 (3.57)
Psychoticism	2.07 (1.87)	2.0 (1.64)
Lie Scale	5.57 (3.11)	5.06 (2.76)
Anxiety	9.28 (4.32)	See text
Depression	7.39 (4.13)	See text
G.H.Q.	8.77 (7.22)	3.92 (0.17)

Scores on Extraversion, Neuroticism, Psychoticism and the Lie Scale from the Eysenck Personality Questionnaire. Scores on Anxiety and Depression from the Hospital Anxiety and Depression Scale. GHQ 'distress' scores from the General Health Questionnaire.

seen in the EPQ normative data published by Eysenck and Eysenck (1991).

6.1.3.2 Anxiety - Table 6.1.3 shows scores on the anxiety scale of the HADS. The average anxiety of the sample lies within the "mild" category according to the HADS norms (Zigmond and Snaith, 1983). However, reference to the individual patient data in Appendix IV shows that 81 patients (76%) score within the mild to severe anxiety classification.

6.1.3.3 Depression - Table 6.1.3 shows that mean depression scores are below the threshold for "mild" levels of depression according to the HADs norms. Again, however, the individual patient data (Appendix IV) shows that 46 patients (43%) score within the low to severe depression classification.

6.1.3.4 GHQ - Table 6.1.3 shows the GHQ mean scores. The average score is some 3 points above the threshold for caseness (scores greater than 5), hence indicating generally high emotional distress in this sample of patients. The mean score is also substantially higher than that of an age-matched UK normative sample (Goldberg and Williams, 1991, Table 8.2). Reference to the individual patient data in Appendix IV confirms that 73 patients (69%) score above the criterion for caseness. Again, this compares with 29% of the age-matched UK normative sample.

If one takes a more extreme level of caseness as denoted by scores >/= 10, then 41 patients (39%) fall in this category.

6.1.3.5 Diagnostic Categories and Personality, HADS and GHQ

In order to provide a comprehensive view of the characteristics of the sample, the mean personality and emotion scores of patients in the eight diagnostic categories are shown in Table 6.1.4. It must first be stated that the very small numbers in some of the diagnostic categories means that comparisons between categories must be made cautiously (e.g. there are only two patients suffering cancer of the bone; four in the "infection" category etc.). However, if one considers the three groups with relatively larger patient numbers ("degeneration", "surgery" and "back pain"), it is evident that the mean values are very similar. Analysis confirms that there are no significant differences between the groups on these measures.

6.1.3.6 Overview of the Patients' Characteristics - In summary, the patients in this sample have more neurotic traits than the population norm. They also report considerably greater degrees of emotional distress when compared to population norms. The most common source of their pain is prior surgical intervention. Arthritic conditions and lower back pain are the next most common conditions. In total, these three conditions account for 75% of the sample.

6.1.4 Pain Beliefs

6.1.4.1 Beliefs about Pain Control Questionnaire (BPCQ) and Pain Beliefs Questionnaire (PBQ)

Results for the BPCQ and PBQ are shown in Table 6.1.5.

The BPCQ shows that the present patients believe their pain to be more in the control of powerful others (i.e.

		E	N	P	GHQ	An.	De.
Cancer of Bone	(N= 2)	8.0 (4.2)	8.0 (0.0)	6.5 (2.1)	11.0 (8.5)	11.5 (3.5)	8.5 (2.1)
General Degeneration	(N=26)	7.2 (3.1)	6.1 (4.1)	1.9 (1.5)	8.5 (6.7)	9.1 (4.5)	7.6 (4.3)
Infection	(N= 4)	6.5 (4.8)	5.3 (3.5)	0.8 (1.5)	6.3 (9.5)	6.5 (7.3)	5.8 (3.1)
General Illness	(N= 6)	4.2 (3.8)	6.8 (3.9)	1.7 (2.0)	10.5 (6.3)	8.7 (4.1)	8.7 (2.8)
Post Surgical	(N=34)	7.2 (4.0)	6.7 (3.6)	2.6 (2.1)	9.3 (7.7)	10.5 (4.4)	7.7 (5.2)
C N S	(N= 4)	3.3 (4.0)	6.5 (4.1)	1.8 (2.1)	10.0 (8.5)	10.5 (3.3)	8.5 (3.0)
Back Pain	(N=14)	7.4 (3.5)	5.8 (3.4)	1.8 (1.7)	8.7 (6.3)	8.3 (2.8)	7.0 (3.0)
Others	(N= 8)	5.9 (3.9)	5.6 (3.6)	1.4 (1.3)	6.1 (9.3)	7.9 (5.5)	6.0 (4.3)

Table 6.1.4. The mean personality and emotion scores of patients in the eight diagnostic categories. E, N and P refer to Extraversion, Neuroticism and Psychoticism respectively on the Eysenck Personality Questionnaire. Anxiety and Depression scores are from the Hospital Anxiety and depression Scale. GHQ refers to the General Health Questionnaire.

Table 6.1.5 The Beliefs in Pain Control Questionnaire (BPCQ) and Pain Belief Questionnaire (PBQ).

B.P.C.Q	Mean (S.D.)	Skevington Data
Internal	9.90 (3.96)	12.1 (4.7)
Powerful others	19.35 (4.616)	16.8 (4.0)
Chance	19.16 (4.39)	14.6 (4.1)
P.B.Q.		
Organic	33.04 (5.23)	-
Psychological	14.50 (4.46)	-

The Beliefs in Pain Control Questionnaire (BPCQ) and Pain Belief Questionnaire (PBQ) results. For the BPCQ, "Internal" = belief in the patient's control of pain; "Powerful others" = belief in control by doctors and other health professionals; "Chance" = belief in control of pain by chance events or luck. Data from Skevington (1990) are shown for comparison but note that her sample size of chronic pain patients was only 29. For the PBQ, "Organic" = a belief that the cause of pain is largely organic or physical in nature; "Psychological" = a belief that much of the pain experience is psychological in nature. Figures in parentheses are standard deviations.

doctors), and to be controlled by chance, than by their own internal control.

There are no norms for the PBQ but data are available from Skevington (1990) for chronic pain patients (diagnosis not defined) and patients suffering from breast and ovarian cancer. It is evident that the present sample score slightly higher in their perception of an "internal" control of their pain when compared to those in Skevington's study, the data from which are also shown in the table for comparison. It is important to note, however, that her small sample size when compared to the present study may reduce the reliability of her data.

The present sample tend to score higher in beliefs about the role of powerful others in controlling pain, and in the role of chance factors. Note, however, that the relative balance of beliefs is the same as for Skevington's chronic pain sample in that stronger beliefs are held in the influence of powerful others than for chance or internal control.

An incidental finding is that male patients showed significantly stronger beliefs in the organic basis of pain ($t = 5.8$, $df = 99$, $p<0.02$).

On the PBQ, it is evident that patients have stronger beliefs in an organic, rather than a psychological, basis of pain. No normative data are available.

6.1.4.2 McGill Pain Scores (MPQ)

The mean scores on the six dimensions of the MPQ are shown in Table 6.1.6. The table also includes normative data from Melzack and Torgeson (1971) for patients suffering low back pain. The mean data from the present sample can be seen to be almost identical to that of Melzack and Torgeson's sample. (Note that the latter authors did not provide measures of variability around their means.)

6.1.5 Coping with Pain and Perceptions of Pain

6.1.5.1 Ways of Coping Checklist (WCCL)

An initial attempt was made to subject the data to Factor Analysis using varimax rotation after West (1991) in order to identify primary factors that might define particular coping styles. However, despite repeated iterations, the analysis would not converge. It therefore seemed more satisfactory to determine categories according to those initially described by Folkman and Lazarus (1980).

Coping responses on the WCCL were categorised according to the following four dimensions: (1) active coping, (2) denial, (3) passive and (4) external support. The higher the score on any dimension, the greater the use of that strategy by an individual patient.

Scores on the four dimensions are shown in Table 6.1.7. As there are no norms for scores on the dimensions, one can only note that the mean scores tend to fall within the middle of the potential score ranges. (The scores will be used in Section 3 as predictors of pain in the regression analyses).

Female patients were found to score significantly higher than males on the factor of 'relying on external support' ($t = 4.5$, df 100, $p<0.05$).

6.1.5.2 MDQ

Scores on the MDQ provided insight to the patients' perception of the effects of pain upon their social and psychological state and are shown in Table 6.1.8. As in the

Table 6.1.6 Mean scores of the McGill Pain.

McGill Pain Scores	Mean (S.D.)	Melzack and Torgeson data
Miscellaneous	5.66 (3.92)	6.1
Affective	3.46 (2.99)	4.4
Evaluative	3.45 (1.39)	3.0
Sensory	17.03 (9.51)	18.2
Total pain rating	52.72 (11.68)	-
No. of Words Chosen	10.80 (5.61)	-

Mean scores (and standard deviations) for the six dimensions of the McGill Pain Questionnaire. The table also shows data from Melzack and Torgeson (1971 for a sample of low back pain patients (N=81) for comparison. Note that Melzack and Torgeson provided no standard deviation measure.

Table 6.1.7 Mean scores of the Ways of Coping Checklist.

Ways of Coping C.	Mean (S.D.)
Active Coping	52.72 (11.68)
Denial	24.27 (5.39)
Passive Coping	17.89 (4.48)
External Support	15.20 (4.05)

Mean scores (and standard deviations) on the four dimensions of the Ways of Coping Checklist.

Table 6.1.8. Mean scores of the MDQ (Multidimensional Pain Questionnaire).

M.D.Q. Scores	Mean (S.D.)
(1) Effect of Pain on Daily Life	26.61 (5.78)
(2) Avoidance by Family & Friends	16.04 (5.35)
(3) Comfort from Religious Beliefs	15.91 (8.05)
(4) Professional Support	10.31 (3.90)
(5) Support from Family & Friends	18.93 (5.33)
(6) Confidence in the Future	9.70 (2.80)

Mean scores (and standard deviations) on the six dimensions of the MDQ (Multidimensional Pain Questionnaire).

case of the WCCL, factor analysis failed to converge and the criterion of ratio of cases to variables was not met (West, 1991). Therefore the categories that had been established when devising the original questionnaire (described in Chapter 5) were adhered to, namely: (1) effects of pain on daily life, (2) avoidance by family and friends, (3) comfort from religious belief, (4) support from health professionals, (5) support by family and friends, and (6) confidence about the future.

It should be recalled from the Method section that categories 2, 3, 4 and 5 can be interpreted as "support" variables (patients' perception of presence or absence of support and comfort) and will be used in the regression analysis of Section 3).

6.2 Relationships Between the Variables

While the extent to which personality and coping factors predict pain will be examined by use of regression analysis, before conducting that analysis it is important to gain initial insight to the relationships between the variables by examining their inter-correlations.

A similar two-stage approach has been used by Spinhoven et al. (1991) and Jensen et al. (1992) in order to help the reader understand the nature and relationship of the critical predictor and dependent variables. In the present thesis, such an approach will serve two purposes. First it provides an indication, prior to more rigorous regression analysis, of the extent to which the research hypotheses are borne out. Secondly, Armitage and Berry

(1994) state that it is important, prior to conducting a regression analysis, to establish whether any of the predictor variables are highly correlated because, if they are, it can then become difficult to interpret the meaning of the regression analysis. This problem is known as "collinearity". A solution advocated by Armitage and Berry (1994, p. 323) is to ensure that only one of a pair of correlated predictor variables is used at a time in the regression analysis.

In this section of the results, only the important outcomes of the correlation analyses will be reported in the this main text (i.e. those correlations that have implications for the research hypotheses and the regression analysis). However, all the results of the correlational analyses are given in the appendix to the thesis. It was considered unnecessary to provide such results in the main text where much of the detail would be redundant and would impede the 'flow' of the text.

6.2.1 Correlation Analysis

6.2.1.1 Personality and Emotion

Neuroticism is positively and significantly correlated with anxiety and depression on the HADS and with emotional distress on the GHQ. In contrast, Extraversion shows a negative relationship with the latter scores. In other words, neurotic patients experience higher levels of anxiety, depression and distress, while those extroverted individuals report lower levels of distress (see Table 6.2.1).

6.2.1.2 Personality, Emotion and McGill Pain Scores

Extraversion shows a negative association with scores on the various dimensions of pain experience of the MPQ. High

Table 6.2.1. Correlations between the EPQ, HADS and GHQ.

	Variables	Anxiety	Depression	Extraversion	Neuroticism	Psychoticism	Lie Scale
(H A D S)	Anxiety	1.0000					
	Depression	.6303**	1.0000				
(E P Q)	Extraversion	-.3328***	-.4582**	1.0000			
	Neuroticism	.7410***	.5286**	-.2646**	1.0000		
	Psychoticism	.2614**	.3729**	-.0714	.0708	1.0000	
	Lie Scale	-.1325	-.1411	.0174	-.1175	-.1106	1.0000
	G. H. Q.	.5818**	.5812**	-.2091*	.3648**	.2955**	-.1444

Correlations between scores on the Eysenck Personality Questionnaire (EPQ) dimensions of Extraversion, Neuroticism, Psychoticism and Lie, Anxiety and Depression on the Hospital Anxiety and Depression Scale (HADS) and the General Health Questionnaire (GHQ). * = p<0.05; ** = p<0.01.

degrees of extroversion are associated with a reduced experience of pain. In contrast, neuroticism shows positive correlations with all pain dimensions. Particularly strong correlations are seen between neuroticism and the affective component of pain. Psychoticism also shows significant associations with pain experience, and again the correlation with the affective dimension is notable (see Table 6.2.2). These correlations provide support for the hypothesised relationship between neuroticism, extroversion and pain given in the previous chapter. The regression analysis will test the hypotheses more rigorously.

6.2.1.3 Emotion

Anxiety and depression both show significant positive correlations with all pain dimensions. The greater the degree of anxiety or depression, the higher the reported pain. The same picture is found with the GHQ scores where higher levels of distress are associated with greater experience of pain on all dimensions.

6.2.1.4 Personality and Coping

Although not significant, it is worth noting that Extraversion is associated with lower levels of denial and passivity in coping. In contrast, high levels of neuroticism are associated with greater use of denial and passivity, but also active coping. This may indicate a tendency of neurotic individuals to attempt a range of strategies to cope with their problems.

Psychoticism is negatively associated with external support, as might be expected given the social withdrawal associated with psychoticism (see Table 6.2.3).

Table 6.2.2 Correlations between McGill Pain Scores EPQ, HADS and GHQ.

	(HADS)		(EPQ)				
McGill Pain S.	Anxiety	Depress.n	Extravert.n	Neuroticism	Psychoticism	Lie	GHQ
Affective	.3166**	.3957**	-.1479	.2823**	.2697**	.0895	.3753**
Evaluative	.1442	.1666	.0277	.1605	.0014	-.0138	.2645**
Sensory	.2741**	.3750**	-.2163*	.2050*	.0723	.0712	.3297**
Total Pain Rating	.3295**	.4162**	-.2011*	.2756**	.1794	.0679	.3833**
Number of Words Chosen	.3252**	.4322**	-.2158*	.2845**	.1334	.0773	.3829**
Miscellaneous	.3775**	.4264**	-.1991*	.3207**	.2506*	.1042	.3364**

Correlations between the six dimensions of McGill Pain Scores and the Eysenck Personality Questionnaire (EPQ) dimensions of Extraversion, Neuroticism, Psychoticism and Lie, Anxiety and depression on the Hospital Anxiety and Depressions Scale (HADS) and the General Health Questionnaire (GHQ). * = $p<0.05$; ** = $p<0.01$.

Table 6.2. 3 Correlations between the Ways of Coping Check, EPQ, HADS and G.H.Q.

		(HADS)		(EPQ)				
W. of Coping C.	Age	Anxiety	Depression	E	N	P	L	GHQ
Active	.0072	.1849	-.0671	.1258	.2554**	-.0333	-.0756	.0411
Denial	-.0170	.3559**	.1870	-.0757	.3335**	.1488	-.1329	.2378*
Passive	-.0672	.3749**	.2239*	-.0859	.4063**	.0457	-.2289*	.2636**
External Support	.0658	.1318	-.0639	.1455	.1522	-.1669	.0257	.2302*

Correlations between four coping strategies from the Ways of Coping Check List and the personality characteristics of Extraversion (E), Neuroticism (N), Psychoticism (P) and Lie (L) on the Eysenck Personality Questionnaire (EPQ), and Anxiety and Depressions from the Hospital Anxiety and Depression Questionnaire (HADS) and distress from the General Health Questionnaire (GHQ). * = $p<0.05$; ** = $p<0.01$.

6.2.1.5 Emotion and Coping

Anxiety and depression are both associated with increased scores on denial and passivity.

Higher distress as measured by the GHQ was also significantly associated with higher scores on the coping dimensions of denial, passive coping and use of external support (Table 6.2.3).

6.2.1.6 McGill Pain Scores and Coping

Interestingly, there were no significant correlations between pain scores and coping. Thus, whatever strategies were adopted by patients, these had no obvious influence upon their experience of pain (Table 6.2.4).

6.2.1.7 Correlations between the MDQ and Personality, Emotion, Pain Beliefs and Pain Scores

(i) Personality

As shown in Table 6.2.5, the factor of extroversion correlates positively and significantly with confidence in the future - an optimistic outlook. In contrast, neuroticism correlates negatively and significantly with confidence in the future and with the perception of support from family and friends. Indeed, the further significant positive correlation between neuroticism and avoidance by family and friends would seem to indicate a perception of isolation.

Neuroticism also scores positively and significantly with the perception of pain affecting one's daily life. This would seem to indicate a more pessimistic outlook and one where pain is perceived as having a negative effect on the individual's life. A similar perspective is seen in the case of those scoring highly on psychoticism in that they have lower confidence in the future

Table 6.2. 4 Correlations between the McGill Pain Scores and Ways of Coping Check List (W.C.C.L.).

	McGill Pain Scores					
W.C.C.L	Miscell.	No. Word	Affective	Evaluative	Sensory	Total
Active	.0167	.1470	.0221	-.0055	.0666	.0520
Denial	.1316	.1472	.0778	.1454	.1390	.1429
Passive	.0204	.1629	.0795	.0670	.1085	.0926
External Support	.0307	.1765	.1119	.0625	.1307	.1162

Correlations between the six dimensions of McGill Pain Scores and the four dimensions of coping on the Ways of Coping Check List (W.C.C.L.). * = $p<0.05$; ** = $p<0.01$.

Table 6.2.5. Correlations between the MDQ, EPQ, HADS and GHQ.

		(HADS)		EPQ				
M.D.Q.	Age	Anxiety	Depress.n	E	N	P	L	GHQ
(1)Effect of Pain on Daily Life	.0277	.4566**	.5210**	-.2217*	.3292**	.2092*	.0593	.3519**
(2)Avoidance by Family & Friends	-.1766	.3487**	.4754**	-.0991	.1994*	.2471*	-.1685	.4435**
(3) Comfort from Religious Beliefs	.3403**	-.0315	-.1637	.0264	-.0113	-.1879*	.1027	-.0930
(4) Professional Support	.0390	-.0194	-.1058	.0306	-.0671	-.0711	-.0047	.0414
(5) Support from Family & Friends	.3696**	-.1066	-.1312	.0398	-.1406	-.0513	.1315	-.0432
(6) Confidence in the Future	.0378	-.5426**	-.6597**	.2844**	-.4455**	-.2771**	.0443	-.5056**

Correlations between the six dimensions of perceptions of the effects of pain from the MDQ and the dimensions of Extraversion (E), Neuroticism (N), Psychoticism (P) and Lie (L) from the Eysenck Personality Questionnaire (EPQ), Anxiety and Depression from the Hospital Anxiety and Depression Scale (HADS) and distress from the General Health Questionnaire (GHQ). * = $p<0.05$; ** = $p<0.01$.

and the perception of avoidance by friends and family. Interestingly, such individuals also obtain significantly less comfort from religious beliefs.

(ii) Emotion

High scores on both anxiety and depression from the HAD scale show strong negative correlations with confidence in the future. The two factors also show strong positive correlations with the perceived impact of pain on daily life and the perception of avoidance by family and friends. Both factors also show weaker negative correlations with perceived comfort from religious beliefs and support from family and friends.

(iii) GHQ

Scores show a similar pattern to the HAD. Higher levels of GHQ distress show a significant negative correlation with confidence in the future and positive correlation with impact of pain on daily life and the perception of avoidance by family and friends.

(iv) McGill Pain scores and MDQ scores

As shown in Table 6.2.6, virtually all dimensions of pain experience show significant negative correlations with confidence in the future, and positive correlations with the impact of pain on daily life and the perception of avoidance by family and friends. The latter relationship is mirrored in the weaker negative correlations between pain scores and perception of support from family and friends. Overall, therefore, the actual experience of pain itself seems associated with significant effects upon daily life and the perception of lack of support from significant others.

It is interesting to observe that the factor of support from health professionals was not significantly associated with any of

Table 6.2.6 Correlations between the McGill Pain Scores and MDQ.

	McGill Pain Scores					
M.D.Q.	Miscellan.	No. Word	Affective	Evaluative	Sensory	Total
(1)Effect of Pain on Daily Life	.3058**	.3200**	.2133*	.2468*	.3292**	.3481**
(2)Avoidance by Family & Friends	.2190*	.2714**	.3087**	.1756	.3049**	.3350**
(3) Comfort from Religious Beliefs	.0657	.0843	.0004	.0593	.0918	.0795
(4) Professional Support	.0123	.1054	-.0472	.0074	.0885	.0397
(5) Support from Family & Friends	-.1467	-.1397	-.1606	-.0661	-.1107	-.1478
(6) Confidence in the Future	-.3166**	-.3531**	-.3347**	-.2334*	-.3177**	-.3468**

Correlations between the six dimensions of McGill Pain Scores and the six dimensions of the perceived impact of pain on the MDQ. * = $p<0.05$; ** = $p<0.01$.

the factors concerning the experience of pain or emotional distress.

6.3 Multiple Regression Analyses

The correlations reported above provide an overview of the relationships between the factors of personality, coping and pain, and lend some support to the hypotheses proposed in Chapter 5. However, a more powerful analysis involves the use of techniques of multiple regression in order to determine the extent to which the sets of personality and coping variables independently predict pain and distress, and their interaction.

Expert advice was obtained from Professor Ford and Ms. Robertson of the University of Glasgow Centre for Biostatistics as to the most appropriate way of applying regression analysis to the data. Further invaluable advice was provided by Dr. Currall of the University of Glasgow Computing Service as to the computation of interaction effects in the regression analysis.

An important general consideration was the fact that the correlational analysis in Section 2 had revealed highly significant correlations between personality and scores on the HADS anxiety and depression scales. A high correlation between variables is called "collinearity" and has important implications for regression analysis. Armitage and Berry (1994) state that when highly correlated independent variables are employed together in an analysis to predict scores on a dependent variable, the collinearity "may make nonsense of the analysis". In such cases, they state that the appropriate action is to use only one of the measures as an independent variable in the analysis. Choice of which variable is most appropriate is dictated by its apparent salience within the context of the investigation.

Given the collinearity noted between personality and emotion scores, and the fact that personality was the primary variable of interest in the present investigation, it was logical that analysis should concentrate upon the variable of personality. Thus, in the regression analyses that follow, the variables of personality and emotion will never be entered in the same analysis.

On the basis of expert advice, the procedure of stepwise multiple regression was chosen as most appropriate for the present analysis. The stepwise procedure has the virtue of incorporating critical features of both the forward-entry and backward-elimination procedures. The stepwise procedure is usefully described by Armitage and Berry (1994): "After each change in the set of variables included in the regression, the contribution of each variable is assessed and, if the least significant makes insufficient contribution, by some criterion, it is eliminated. It is thus possible for a variable introduced at some stage to be eliminated at a later stage because other variables, introduced since it was included, have made it unnecessary."

The procedure employed the standard default conditions for inclusion and exclusion of variables at each step in the regression: variables were included when their partial regression coefficients were significant at the 0.05

level, and were eliminated if they failed to be significant at the 0.1 level.

All the regression analyses were implemented by SPSS for Macintosh computers.

The first regression analysis concerned the prediction of pain as assessed by the McGill Pain Questionnaire. The five categories of McGill Pain Scores were entered as dependent variables, while variables of personality, coping, MDQ "support" categories, diagnostic categories and demographic characteristics were defined as independent or potential predictor variables. Where variables were nominal (categorical) in form (as in the case of, for example, the diagnostic categories and some demographic variables) they were transformed according to the procedures advocated in the SPSS manual to be entered as so-called "dummy" variables in order to permit the regression analysis to be computed correctly.

The second analysis concerned the prediction of distress suffered by the patients, and here the GHQ scores were entered as the dependent variable. The predictor variables were the same as those applied in the analysis of the pain scores above.

6.3.1 Prediction of McGill Pain Scores by Regression of Personality, Coping Strategy and Diagnosis as Predictor Variables

Separate regression analyses were performed on the five categories of pain scores from the MPQ in order to determine which, if any, of the independent variables in the hypotheses above were predictors of pain.

Pain Score	Step	Variable	R^2	F	df	Beta
Miscellaneous	1	N	0.097	11.19**	1.104	0.296
	2	Surgery	0.140	8.40**	2.103	0.208
NWC (No. of Words Chosen)	1	N	0.079	8.91**	1.104	0.239
	2	Avoidance	0.120	4.83***	2.103	0.207
	Interaction	N × Avoidance	0.080	9.77***	1.104	0.293
Affective	1	Avoidance	0.083	9.46***	1.104	0.240
	2	N	0.132	5.81**	2.103	0.226
	Interaction	N × Avoidance	0.104	12.90***	1.104	0.323
Sensory	1	Avoidance	0.820	9.31***	1.104	0.252
	2	Surgery	0.126	5.20**	2.103	0.213
	3	E	0.170	5.41**	3.102	-0.211
Total pain rating	1	Avoidance	0.098	11.32***	1.104	0.271
	2	N	0.142	5.27**	2.103	0.214
	3	Surgery	0.155	4.56**	3.102	0.194
	Interaction	N × Avoidance	0.102	11.82***	1.104	0.319

Table 6.3.1 The outcome of stepwise logical regression analysis to determine the prediction of pain scores in the sample of chronic pain patients.
***= $p< 0.001$; **=$p< 0.01$; *= $p< 0.05$.

The significant outcomes of the analysis are shown in Table 6.3.1 where F values, R square, Beta weights and significance are given. The presentation of the results follows that adopted by Jensen et al. (1992). Interactions were computed according to the procedure advocated by Cohen and Cohen (1983) where the interaction term is carried on the product of whichever predictor variables contribute to the interaction.

From inspection of Table 6.3.1, the salience of several predictor variables is immediately evident across the pain score categories.

(i) Support - The patients' perception of lack of support (assessed by the MDQ category of avoidance by friends and family) is a significant predictor of total pain, and the sub-categories of sensory pain and affective pain scores. It can be seen from the values of Beta given in the table, and the fact that the variable was selected first on three of the stepwise procedures, that this variable is an important predictor. It typically accounts for between 8 to 10% of variance on these pain measures. It also predicts the simple pain measure of "number of words chosen" (NWC) to describe pain. Overall, therefore, the more patients perceive avoidance by significant others, the greater will be their rated experience of pain.

(ii) Personality - Neuroticism predicts the patients' experience of pain on all five dimensions of the MPQ. It is the primary predictor of NWC and miscellaneous pain scores (accounting for 8 to 10% of variance), and second in order to "support" in predicting total, sensory and affective pain scores. The more neurotic the patient, the greater will be their rated experience of pain.

Extroversion was a significant predictor of sensory pain scores (although accounting for only 4.4% of variance), and it will be seen from the table that the prediction is negative. In other words, the more extroverted the patient, the lower will be their sensory pain score.

(iii) Diagnostic category - Where the cause of the patients' pain is due to prior surgical intervention, this is a significant predictor of total, sensory and miscellaneous pain scores. Typically, the variable accounts for around 4% of variance. No other diagnostic category was a significant predictor of pain.

(iv) Coping - None of the coping variables was a significant predictor of pain scores.

(v) Interactions - Regression analysis also affords the possibility of determining whether the predictor variables interact in their prediction of pain. Table 6.3.1 shows that the variables of neuroticism and MDQ perception of avoidance by family and friends interacted significantly in predicting total, affective and NWC pain scores. The effect was one whereby the co-occurrence of high neuroticism with strong perception of avoidance predicted particularly high pain scores.

6.3.2 Prediction of Distress (GHQ)

As noted in the Introduction, psychological distress is often a significant component of pain experience and it is therefore important to consider how it may be predicted by the variables above. It was decided to employ the GHQ scores as the dependent variable denoting distress. It will be recalled that GHQ scores and HADs scores were highly correlated, as were HADS and personality measures (see Table 6.2.1). It therefore seemed logical in order to avoid problems of collinearity to employ the GHQ scores as the dependent variable.

The results of the regression analysis are shown in Table 6.3.2 where the significant predictor variables are listed in order of predictive power denoted by their selection on each step number, the amount of variance accounted for, and the Beta value.

(i) Support - the MDQ variable concerning perception of avoidance by family and friends (Hence lack of social support) was found to be a strong predictor of distress and accounted for 19% of variance. The greater this perception of lack of support, the more distress was suffered by the patient. None of the other "support" variables approached significance as predictors.

(ii) Personality - the variable of neuroticism was the second most powerful predictor and accounted for a further 8% of variance. Psychoticism, too, was found to be significant and accounted for a further 3.4% of variance. Although extroversion displayed a negative relationship as a predictor of distress, it was not significant.

(iii) Coping strategy - Distress was predicted by reliance on external support (3.3% of variance). It was also predicted by active coping (2.8%), but in this case the relationship was negative: in other words, the more active the coping strategy, the less the distress suffered.

Step	Variables	R^2	F	df	Beta
1	Avoidance	0.197	25.46***	1,104	0.296
2	Neuroticism	0.079	11.32**	2,103	0.295
3	Psychoticism	0.034	5.04**	3,102	0.245
4	External Coping	0.033	5.12**	4,101	0.30
5	Active Coping	0.028	4.39**	5,100	-0.205
Interaction	N × Avoidance	0.27	38.75***	1,104	0.52

Table 6.3.2 The outcome of stepwise logical regression analysis to determine the prediction of distress as defined by the scores of chronic pain patients on the General Health Questionnaire. ***= p< 0.001; **=p< 0.01.

(iv) **Diagnostic category** - The regression analysis provided no evidence that the latter variables were significant predictors of distress in response to pain.

(v) **Interactions** - A significant interaction is seen in Table 6.3.2 between the personality factor of neuroticism and the MDQ variable of perceived avoidance. The effect of the interaction is, as in the case of the predictor of pain scores, for patients to suffer significantly greater distress when high neuroticism co-occurs with a strong perception of avoidance by family and friends. The interaction is a strong predictor of distress and accounts for 27% of variance.

6.4 Discussion of the Results

The results confirm most, but not all, of the research hypotheses.

6.4.1 Personality

The initial correlation analysis confirmed that high neuroticism was related to higher MPQ scores and greater degrees of emotional distress. Extroversion, on the other hand, showed a negative relationship with the above variables. The regression analysis confirmed this further by showing that neuroticism was a significant predictor of pain on all five dimensions of the MPQ.

The regression analysis did, however, provide greater insight than the correlation. Although neuroticism was an important predictor, it was secondary to the MDQ factor of perception of avoidance (denoting lack of social support) in all but two of the predictions of pain. Thus, for these patients, pain scores are, overall, predicted most powerfully by the perception of lack of support by family and friends.

Personality is important, however, and the interaction effects confirmed that when high neuroticism was associated with marked perception of avoidance, then patients scored more highly on adverse pain experience.

This provides an important new insight: patients who are highly neurotic and who perceive lack of support from family and friends report greater levels of pain. In contrast, those who are highly neurotic but have support, report relatively less pain. Moreover, it is notable that the regression analysis also defined extroversion as a significant predictor of lower pain experience and that this was confined to the sensory dimension of the MPQ. Neuroticism did not predict sensory pain. In this result, an implication may be that the more outgoing social outlook and behaviour of the extroverted person acts to reduce the physical experience of pain. This might be effective through greater activity leading to distraction from pain symptoms. Similarly, the more optimistic outlook of extroverts might lead them to dwell less on symptoms.

It is notable that the factors of perceived avoidance (lack of support) and neuroticism were also significant predictors of the emotional distress suffered by these patients as assessed by the GHQ. Moreover, as in the case of pain scores, the two factors interacted such that highly neurotic individuals who also perceived avoidance by family and friends showed greatest distress.

Psychoticism, too, was an unanticipated predictor of distress. One might speculate that the greater tendency to social isolation seen in those individuals acts to distance them from potential sources of support. Note, however, that psychoticism did not interact with the 'support' variable of perceived avoidance.

Thus the present results confirm two of the main hypotheses: the personality factor of neuroticism is a significant predictor of pain experience and distress. However, in terms of relative power of influence, the patients' perception of lack of support in the form of avoidance by significant others is confirmed as a principal predictor, and one that interacts with neuroticism.

6.4.2 Coping

The research hypotheses also predicted that coping would determine patients' responses to pain. Interestingly, however, this was true only in the case of distress; there was no significant prediction of MPQ pain scores. Reliance on external support (the family, friends etc.) predicts increased distress as assessed by the GHQ, but does not predict the level of pain suffered as assessed by the MPQ.

The present result therefore adds further interesting detail to the results of Anderson and Rehm (1984), Gil et al. (1989) and Paulsen (1995) which were reviewed in Chapter 3. The latter researchers suggested that external support from family and friends tended to result in increased pain behaviours, this apparently paradoxical result being ascribed to social reinforcement of such behaviours by the solicitous care and attention of others. In the present study, it is possible that the effect of external coping on distress might be explained in similar terms. Patients might be 'reinforced' for expressing emotional distress because this evoked care and attention from their family and friends.

Active coping was also shown by the regression analysis to predict a reduction in distress. The latter result would seem straightforward in that research findings reviewed in Chapter 3 confirmed that active coping strategies often imply a strong internal locus of control which is associated with better tolerance and greater optimism in dealing with persistent pain (e.g. Crisson and Keefe, 1988; Jensen et al., 1991; Skevington, 1995).

The secondary hypotheses regarding the more general relationship between distress and pain were borne out by the correlation analyses where high scores on the HADS and GHQ were correlated with high pain scores and greater degrees of reported suffering on the MDQ. Given the high collinearity between HADS and GHQ it was not appropriate to attempt to differentiate between them as predictors in a formal regression analysis.

6.4.3 Diagnostic Category

Although unpredicted, it is important that the analysis confirmed one of the diagnostic categories to be a very significant predictor of pain suffered by these patients. Those patients whose pain derived from prior surgical intervention reported significantly higher total, sensory and miscellaneous pain scores. Such a finding would seem to make logical sense: not only might surgical intervention cause scar tissue and other organic problems which would increase pain, but surgery is also often an intervention of last resort when other treatments have failed. Such patients may, therefore, have more intractable pain problems. The latter group also composed one of the largest sub-groups in the present sample and it may not be surprising that, statistically, that category might have had the greatest chance of showing an effect. Only two patients had a diagnosis of bone cancer and, while such a diagnosis would be expected to have implications for emotional response, such a small sample size would make it very difficult to establish a reliable effect.

It is important also to consider some of the more general implications of the results. The present sample of patients suffering persistent pain show largely similar average personality scores to those of age-matched norms, but with the exception that they score more highly on neuroticism.

Interestingly, high scores on neuroticism are also seen in other patients suffering from chronic conditions which, while having clear physical symptoms, are also associated with marked psychological aspects. For instance, sufferers both of globus pharyngis (a feeling of a "lump in the throat") and temporal mandibular pain dysfunction syndrome have high levels of neuroticism (Deary et al. 1989). Such patients have also been shown to experience higher levels of anxiety and depression, and general emotional distress as measured by the GHQ (Deary et al. 1989). The present sample was consistent with this pattern of response in that they also displayed significant positive correlations between high neuroticism and higher levels of anxiety and depression on the HADS, and greater distress on the GHQ.

Overall, therefore, the general pattern of effects concerning personality and its relation to emotional state seems consistent with the findings of some previous studies. The picture emerges of a group of pain patients whose greater neurotic traits are associated with emotional distress. Moreover, the level of that distress is proportionately higher than that of the age-matched population norm.

It is also interesting to note that states of higher neuroticism may be associated with a lower pain threshold (Klepac, 1985; Lautch, 1971), a fact that may explain the poor post-surgical recovery of highly neurotic patients and their requirements for greater analgesia. The present sample show results that seem consistent with these earlier findings. Neuroticism is shown to correlate positively with high scores on all pain dimensions of the McGill Pain Questionnaire, and particularly in the case of the affective component of pain.

The relatively poor response of the highly neurotic patients to pain as reflected in the McGill scores seems mirrored in their perception of the effects of their pain state on other aspects of their lives. The results show that highly neurotic patients tend to see a bleaker future and perceive a greater negative impact of pain upon the routines of daily life. They perceive themselves as having relatively less support from family and friends, and even perceive themselves to be actively avoided by others. There is also general belief in this sample that their pain has an organic origin, a fact that may not be surprising given that these patients have a long history of pain associated with surgical interventions and well established physical disease states.

The fact that the patients have had a long history of being referred to clinicians for advice about their pain may also tend to reinforce the belief that they have a "medical" condition which, in many people's minds, may indicate a physical complaint.

The way in which patients cope with their persistent pain also reveals evidence of differential responses depending upon personality. While extroverts are less likely to indulge in denial or passive strategies, preferring instead a more direct approach to confront the issue, those scoring highly on neuroticism tend to show a mixture of coping responses. The significant correlations between neuroticism and denial, passive and active coping might imply that such patients attempt a range of methods to cope. The fact that, despite this, their experience of pain appears to be more intense and aversive than those lower in neuroticism, might imply that their chosen method of coping may not be effective. Equally, their greater experience of pain may also reflect random switching from one coping strategy to another to little positive effect.

Given that the majority of these patients have endured long-term persistent pain, it may not be surprising that relatively higher proportions of the sample report levels of distress that considerably exceed those of the population norms. It is notable that similar levels of distress are seen in the patients groups described above by Deary et al. The intensity of unpleasant emotional experience is amplified by the patients' relatively greater neurotic traits.

In conclusion, the results described in Chapter 6 have defined the characteristics of the sample of pain patients and those factors that predict their experience of pain. Principal factors were lack of social support, neuroticism and a history of surgical intervention. It is also evident that many experience considerable emotional distress. It is then of interest to consider whether their attendance at the Pain Relief Clinic can improve their state. This question is addressed in Section 2 which follows.

Chapter 7:

Results:
Section Two

CHAPTER 7: Results

The Influence upon Pain and Distress of Attending the Pain Relief Clinic

7. An Introduction to the Results

It was explained earlier that this is a resubmission of an earlier version of the thesis. In the initial submission, a study and control group were recruited separately and an analysis was conducted to confirm the similarity of the groups prior to the study group's attendance at the pain clinic. In the present submission, the study and control group were combined to form one group in the results described above in Chapter 6. Now, this section of the results will consider the influence of the pain clinic and hence will consider the study and control groups separately.

It is important first to establish that the two groups do not differ significantly in their characteristics at the outset of the study. The first part of these results will therefore describe the analysis to establish whether the groups are comparable. As the results in Chapter 6 have already described the total sample of 106 patients, this part of the results will report only the comparisons between the groups on the main variables in the study.

7.1 Analysis to Confirm the Similarity of the Study and Control Groups Prior to the Study Group's Attendance at the Pain Relief Clinic

7.1.1 Demographic Variables

Table 7.1 shows the principal demographic variables of gender, age, social class and duration of persistent pain. The groups do not differ significantly on any of these measures.

7.1.2 Diagnostic Categories

Table 7.2 shows the diagnostic classification of the two groups according to the diagnosis made by consultants at the Pain Relief Clinic. A X^2 test applied to the data indicates no significant differences between the groups.

7.1.3 Personality and Emotional State

The patients' scores on the EPQ, HADS and GHQ are shown in Table 7.3. It is evident from the table that the two groups are very similar in their personality profiles. Analysis confirms that the groups do not differ significantly on any of the four measures.

Table 7.3 also shows, and analysis confirms, that the groups do not differ in their scores on the anxiety scale of the HADS. The group means show that, as in the case of the overall analysis in Chapter 6, average anxiety falls within the "mild" category according to the HADS norms (Zigmond and Snaith, 1983). However, reference to the individual patient data in Appendix 1 shows that 38 Study group patients (62.4%) and 43 Control patients (69%) score within the mild to severe anxiety classification. The breakdown of the groups is shown in Table 7.4.

Table 7.1 Demographic characteristics of patients:

Study Group Male: female 18:26 (41% :59%)	Control Group Male : female 26: 36 (42% :58%)
Age	
(years) mean 47.6 (range 26-77)	51.5 (range 21-82)
Duration of pain	
(years) mean 7.5 (range 1 -37)	7.8 (1-27)
Social class	
Social class -1 11 (25%)	9 (14.5%)
Social class-2 1 (2.3%)	7 (11.2%)
Social class-3 3 (6.8%)	10 (16.1%)
Social class-4 6 (13.6%)	12 (19.3%)
Social class-5 10 (22.7%)	10 (16.1%)
Social class-6 10 (22.7%)	8 (12.9%)
Social class-7 3 (6.8%)	6 (9.6%)

Demographic characteristics of the study and control groups showing sex, ratio, age, duration of pain and social class (Carstairs Index).

Table 7.2. Diagnostic categories of patients.

Diagnostic Category	Study Group	Control Group
Cancer of Bone	1 (2.3%)	1 (1.6%)
General Degeneration	10 (22.7%)	16 (25%)
Infection	1 (2.3%)	3 (4.8%)
General Illness	2 (4.5%)	4 (6.4%)
Post Surgical	16 (36.4%)	18 (29%)
C N S	4 (9.1%)	-
Back Pain	6 (13.6%)	13 (20.9%)
Others	4 (9.1%)	7 (11.2%)

Diagnostic categories of patients in the study and control groups.

Table 7.3. Scores on the E.P.Q, HADS and GHQ Questionnaires.

Variables	Study Mean	 (S.D.)	Control Mean	 (S.D.)	Norms Mean	 (S.D.)
Extraversion	6.15	(3.38)	7.15	(3.94)	6.35	(3.66)
Neuroticism	6.02	(3.92)	6.68	(3.31)	4.9	(3.57)
Psychoticism	2.16	(2.06)	2.00	(1.73)	2.0	(1.64)
Lie Scale	5.48	(3.12)	5.65	(3.11)	5.06	(2.76)
Anxiety	9.14	(4.38)	9.39	(4.17)	See text	
Depression	6.98	(3.79)	7.68	(4.36)	See text	
G.H.Q.	9.25	(7.21)	8.44	(7.27)	3.92	(0.17)

Scores on Extraversion, Neuroticism, Psychoticism and the Lie Scale from the Eysenck Personality Questionnaire. Scores on Anxiety and Depression from the Hospital Anxiety and Depression Scale. GHQ 'distress' scores from the General Health Questionnaire.

Table 7.4. Distribution of patients in Anxiety.

HADS Anxiety			
Group	Mild	Moderate	Severe
Study	14 (23%)	16 (26%)	9 (15%)
Control	17 (27%)	21 (34%)	5 (8%)

Distribution of patients in the study and control groups across the categories of mild, moderate or severe anxiety according to the scoring categories of the Hospital Anxiety and Depression Scale (HADS).

Analysis by the Chi-Square test confirms that there are no significant differences between the groups in the distribution of anxiety across the three categories of anxiety.

As in the case of anxiety, Table 7.3 shows, and analysis confirms, that the two groups do not differ in average levels of depression. While mean depression scores are below the threshold for "mild" levels of depression according to the HADs norms, the individual patient data (Appendix 1) shows that 18 (41%) of the Study group and 28 (45%) of the Control group score within the low to severe depression classification. Table 7.5 shows the group breakdown according to level of depression.

Chi-square analysis confirms that there are no significant differences between the groups in terms of proportions of patients in each of the categories of depression ($X^2 = 3.60$, df = 4, $p>0.1$).

Table 7.3 also shows the GHQ scores and analysis confirms that the groups do not differ significantly. The groups' mean scores are some 3 points above the threshold for caseness (scores greater than 5), hence indicating emotional distress. Scores in both groups are also substantially higher than those of an age-matched UK normative sample (Goldberg and Williams, 1991, Table 8.2). Reference to the individual patient data in Appendix 1 confirms that 39 (63%) Study group patients and 34 (55%) Control group patients score above the criterion for caseness. Again, this compares with 29% of the age-matched UK normative sample.

Table 7.5. ***Distribution of patients in Depression.***

HADS Depression			
Group	Mild	Moderate	Severe
Study	19 (29.5)	6 (10%)	4 (6.6%)
Control	12 (19.4%)	12 (19.4%)	4 (6.5%)

Distribution of patients in the study and control groups across the categories of mild, moderate or severe depression according to the scoring categories of the Hospital Anxiety and Depression Scale (HADS).

If one takes a more extreme level of caseness as denoted by scores >/= 10, then 19 (43%) of the study group and 22 (36%) of the control group fall in this category.

In summary, therefore, the groups have similar personality profiles and demographic characteristics. Across the groups, similar proportions of patients experience moderate to severe levels of emotional distress. Both groups report considerably greater degrees of emotional distress when compared to population norms.

7.1.4 Pain Beliefs - Pain Beliefs Questionnaire (PBQ) and Beliefs about Pain Control Questionnaire (BPCQ)

Results for the PBQ and BPCQ are shown in Table 7.6. It is evident that the groups are very similar in their pain beliefs, and analysis confirms that there are no significant differences between the groups. On the PBQ, patients have stronger beliefs in an organic basis of pain, while the BPCQ shows that they believe their pain to be more in the control of powerful others (i.e. doctors), and to be controlled by chance, than by their own internal control.

7.1.5 McGill Pain Scores (MPQ)

The average scores on the six dimensions of the MPQ are shown in Table 7.7. While the groups are largely similar there is a tendency for the Control group to show lower average scores. Applying t-tests to the between group differences and the Bonferroni correction for multiple comparisons indicates that none of these differences is significant.

Table 7.6 The Beliefs in Pain Control Questionnaire (BPCQ) and Pain Belief Questionnaire (PBQ).

B.P.C.Q	Study Group	Control Group
Internal	1.91 (.75)	1.98 (.79)
Powerful others	3.83 (.91)	3.87 (.91)
Chance	3.71 (.96)	3.90 (.86)
P.B.Q.		
Organic	4.11 (.67)	4.22 (.65)
Psychological	3.701 (.03)	3.681 (.14)

The Beliefs in Pain Control Questionnaire (BPCQ) and Pain Belief Questionnaire (PBQ) results for the study and control groups. For the BPCQ, "Internal" = belief in the patient's control of pain; "Powerful others" = belief in control by doctors and other health professionals; "Chance" = belief in control of pain by chance events or luck. For the PBQ, "Organic" = a belief that the cause of pain is largely organic or physical in nature; "Psychological" = a belief that much of the pain experience is psychological in nature. Figures in parentheses are standard deviations.

Table 7.7 Mean scores of the McGill Pain.

McGill Pain Scores	Study group	Control Group
Miscellaneous	6.68 (3.82)	4.92 (3.83)
Affective	4.05 (2.72)	2.92 (3.05)
Evaluative	3.75 (1.18)	3.32 (1.59)
Sensory	18.18 (9.28)	15.74 (9.77)
Total pain rating	33.00 (14.26)	26.58 (15.55)
No. of Words Chosen	12.05 (5.34)	9.90 (5.59)

Mean scores (and standard deviations) for the six dimensions of the McGill Pain Questionnaire applied to the study and control groups.

Table 7.8 Mean scores of the Ways of Coping Checklist.

Ways of Coping C.	Study Group	Control Group
Active Coping	50.43 (11.92)	54.19 (11.37)
Denial	23.97 (5.71)	24.45 (5.23)
Passive Coping	17.27 (4.23)	18.31 (4.63)
External Support	14.85 (3.54)	15.29 (4.36)

Mean scores (and standard deviations) on the four dimensions of the Ways of Coping Checklist for the study and control groups.

Table 7.9. Mean scores of the MDQ (Multidimensional Pain Questionnaire).

M.D.Q. Scores	Study Group	Control Group
(1) Effect of Pain on Daily Life	26.18 (5.73)	26.92 (5.85)
(2) Avoidance by Family & Friends	16.09 (5.43)	16.00 (5.34)
(3) Comfort from Religious Beliefs	15.82 (8.01)	15.97 (8.14)
(4) Professional Support	10.48 (4.36)	10.19 (3.57)
(5) Support from Family & Friends	18.18 (5.64)	19.47 (5.08)
(6) Confidence in the Future	9.80 (2.58)	9.63 (2.97)

Mean scores (and standard deviations) on the six dimensions of the MDQ (Multidimensional Pain Questionnaire) for the study and control groups.

7.1.6 Coping with Pain and Perceptions of Pain

(i) Ways of Coping Checklist (WCCL)

Chapter 6 described the unsuccessful attempt to subject the data to Factor Analysis using varimax rotation. Coping responses on the WCCL were categorised according to the following four dimensions: (1) active coping, (2) denial, (3) passive and (4) external support. The higher the score on any dimension, the greater the use of that strategy by an individual patient.

Scores of the study and control groups on the four dimensions are shown in Table 7.8 where it can be seen that the groups' average coping strategies are virtually identical.

7.1.7 MDQ

Scores on the MDQ provided insight to the patients' perception of the effects of pain upon their social and psychological state. As in the case of the WCCL, Factor Analysis failed to converge. Therefore, by inspection, the following categories of experience and perception were distinguished and are shown in Table 7.9:

(1) effects of pain on daily life, (2) avoidance by family and friends, (3) comfort from religious belief, (4) support from health professionals, (5) support by family and friends, and (6) confidence about the future.

The groups' mean scores on these six categories are highly similar and there are no significant differences.

7.2 Comparisons Between the Groups Following the Study Group's Attendance at the Pain Relief Clinic

Having established the equivalence of the study and control groups at baseline, analysis will now turn to establish whether visiting the pain clinic appears to have any significant effect upon the patients' physical and emotional experience of pain. It is hypothesised that the study group will show significant benefits. The analysis will therefore first consider whether overall differences exist between the study and control group at the time of the second questionnaire when only the study group has attended the clinic.

The analysis will then consider whether the factors of personality (principally neuroticism) and coping exert differential influences.

This section of the results considers differences between the study and control groups at the time of administration of the second questionnaire when the study group has attended the Pain Relief Clinic. The results will provide an answer to whether attendance at the pain clinic has any beneficial effect on the study group of patients when compared to the control group.

7.2.1 Emotional State

7.2.1.1 Anxiety

Table 7.10 shows the groups' mean scores on HADS anxiety. It is evident that both groups show a small decrease in mean

Table 7.10 Mean Anxiety scores at Time 1 and Time 2 respectively.

HADS	Group	Time 1	Time 2
Anxiety	Study	9.14 (4.58)	8.16 (4.83)
	Control	9.39 (4.17)	8.50 (4.55)

Mean Anxiety scores (and standard deviations) from the Hospital Anxiety and Depression Scale (HADS) for the study and control groups at the time of the first and second questionnaire (Time 1 and Time 2 respectively). At Time 2, the study group has attended the Pain Relief Clinic.

Table 7.11 Distribution of patients across the category of Anxiety (HADS) in (Time 1 and Time 2 respectively).

HADS Anxiety						
	Time 1			Time 2		
Group	Mild	Moderate	Severe	Mild	Moderate	Severe
Study	14 (23%)	16 (26%)	9 (15%)	9 (21%)	6 (14%)	7(16%)
Control	17 (27%)	21 (34%)	5 (8%)	17 (27%)	12 (19%)	6 (10%)

Distribution of patients in the study and control groups across the three from the Hospital Anxiety and Depression Scale (HADS) as a function of the first and second questionnaires (Time 1 and Time 2 respectively). At time 2, the study group has attended the Pain Relief Clinic.

anxiety from the first to second questionnaire. The data were analysed using analysis of variance (ANOVA).

This analysis is much preferable to multiple t tests and provides the following measures:

a) Main effect of group on anxiety - an indication of whether the groups differ overall in anxiety

b) Main effect of time on anxiety - to assess whether anxiety changes over time regardless of the patient group

c) Interaction between groups and time - this would indicate whether the groups showed a particular difference in anxiety at one of the two assessment periods. The interaction may be the most important outcome of the analysis because it is unlikely that the main effect of groups would be significant given that analysis has shown the groups to be the same at the time of the first questionnaire.

ANOVA reveals that the main effect of group was not significant (F<1.0). Thus the two groups have similar levels of anxiety at both test periods. The main effect of time was significant, indicating that, overall, anxiety reduced significantly for patients in both groups over time (F=8.22, df=1, 103, p<0.006). The interaction of groups x time was not significant (F<1.0)).

The mean scores, being a summary measure, convey only a limited insight to the groups' change in anxiety. Table 7.11 shows the proportion in each group falling within the low, moderate and severe categories according to the HADS norms for the first and second questionnaires.

Overall, there is a small decrease from the first to second questionnaire in the proportion of patients in both groups falling within the low to severe category. While there are someapparent between-group differences, a X^2 analysis confirms that none of these is significant.

7.2.1.2 Depression

Table 7.12 shows mean scores on depression for the two groups at the two assessment periods. Again, ANOVA revealed a significant effect of time of test, confirming that both groups showed a reduction in depression scores over time ($F=10.52$, $df=1,103$, $p<0.003$). Neither the main effect of group, nor the group x time interaction was significant ($F<1.0$ in both cases).

As in the case of anxiety scores above, the scores on depression were also considered as a function of the proportion of patients falling within the low to severe categories, and these are shown in Table 7.13. Again, while there is evidence of a small decrease in the proportion in each group falling in the above categories, there are no significant between-group differences as confirmed by X^2 analysis.

7.2.1.3 GHQ

Table 7.14 shows the groups' mean distress scores on the GHQ for the two assessment periods. It is evident that there is an overall decrease in mean GHQ scores for both groups over time, but the magnitude of the change is greater for the study group. Applying analysis of variance to the data confirms that the main effect of time is significant ($F=13.13$, $df=1,103$, $p<0.001$)

Table 7.12 Mean Depression scores at Time 1 and Time 2 respectively.

HADS	Group	Time 1	Time 2
Depression	Study	6.98 (3.79)	6.14 (3.95)
	Control	7.68 (4.36)	6.82 (4.64)

Mean Depression scores (and standard deviations) from the Hospital Anxiety and Depression Scale (HADS) for the study and control groups at the time of the first and second questionnaire (Time 1 and Time 2 respectively). At Time 2, the study group has attended the Pain Relief Clinic.

Table 7.13. Distribution of patients across the category of Depression (HADS) in (Time 1 and Time 2 respectively).

	HADS Depression					
	Time 1			Time 2		
Group	Mild	Moderate	Severe	Mild	Moderate	Severe
Study	19 (29.5)	6 (10%)	4 (6.6%)	8 (18%)	4 (9%)	1 (2%)
Control	12 (19.4%)	12 (19.4%)	4 (6.5%)	10(16%)	13 (21%)	2 (3%)

Distribution of patients in the study and control groups across the three categories of depression from the Hospital Anxiety and Depression Scale (HADS) as a function of the first and second questionnaires (Time 1 and Time 2 respectively). At time 2, the study group has attended the Pain Relief Clinic.

Table 7.14 Mean Distress scores (GHQ) at Time 1 and Time 2 respectively.

Distress	Group	Time 1	Time 2
G.H.Q.	Study	9.25 (7.21)	5.70 (6.29)
	Control	8.44 (7.27)	7.76 (6.80)

Mean Distress scores (and standard deviations) from the General Health Questionnaire (GHQ) for the study and control groups at the time of the first and second questionnaire (Time 1 and Time 2 respectively). At Time 2, the study group has attended the Pain Relief Clinic.

indicating that both groups experience some reduction in distress over time.

The main effect of group is not significant ($F<1.0$) but the group x time interaction is highly significant, indicating that the study group show a much greater reduction in distress when compared to the control group ($F = 5.61$, df=1,103, $p<0.02$).

It is also important to consider the change in proportion of patients falling within categories of "caseness" from the first to second questionnaire. This is shown in Table 7.15 where caseness is shown for scores greater than 5 and less than or equal to 10 ("moderate distress"), and those above 10 ("high distress").

It is evident from Table 7.15 that the two groups are similar in the proportion of patients reporting moderate and high distress. However, at the time of the second questionnaire, the proportion of patients in the study group reporting high stress more than halves while that in the control group remains virtually the same. A X^2 test applied to the latter data does not, however, reach significance so the effect can be regarded only as a trend but one that is consistent with the significant results of the ANOVA applied to the raw scores.

Table 7.15 The distribution of study and control patients as a function of GHQ 'caseness' at Time 1 and Time 2.

GHQ	Time 1		Time2	
Distress	Moderate	High	Moderate	High
Study Group	7 (16%)	19 (43%)	8 (18%)	8 (18%)
Control Group	12 (19%)	22 (36%)	11 (18%)	21 (34%)

The distribution of patients in the study and control groups falling in the moderate and high distress categories of General Health Questionnaire (GHQ) at Time 1 or Time 2. At Time 2, the study group has attended the Pain Relief Clinic.

7.2.2 Pain Scores

Table 7.16 shows the groups' mean scores on the McGill Pain Questionnaire as a function of the first and second testing period. As in the case of the scores on the emotional variables above, ANOVA was applied to the data. The following results were found for the various dimensions of the McGill Pain Questionnaire.

i) Total Pain Scores - There was no main effect of group ($p>0.25$) but the main effect of time ($F=9.97$, $df=1,98$, $p<0.003$) and the interaction of group x time ($F=13.44$, $df=1,98$, $p<0.001$) indicate that while total pain scores decreased generally over time, the decrease was most marked in the case of the study group. Reference to Table 7.16 confirms the 'crossover' nature of the interaction.

ii) Sensory Pain Scores - As in the case of total scores, only the main effect of time and the group x time interaction were significant ($F=4.42$,$df=1,100$, $p<0.04$). Again, the effect is for study group patients to show a far greater decrease in scores on the sensory dimension of pain.

iii) Evaluative Pain Scores - The study group again show a marked decline in the emotional nature of their pain experience over time, as confirmed by the significant group x time interaction ($F=9.17$, $df=1,100$, $p<0.004$).

iv) Affective Pain Scores - The study group show a further significant reduction in their affective experience of pain over

Table 7.16 Mean scores of the McGill pain Questionnaire at Time 1 and Time 2.

McGill Pain Scores			
Variables	Group	**Time 1**	**Time 2**
Miscellaneous	Study	6.68 (3.82)	4.44 (3.92)
	Control	4.92 (3.83)	4.81 (3.58)
Affective	Study	4.05 (2.72)	2.67 (2.68)
	Control	2.92 (3.05)	3.37 (3.30)
Evaluative	Study	3.75 (1.18)	2.47 (1.71)
	Control	3.32 (1.59)	3.26 (1.72)
Sensory	Study	18.18 (9.28)	15.05 (9.00)
	Control	15.74 (9.77)	15.74 (9.16)
Total pain rating	Study	33.00 (14.26)	24.51 (14.39)
	Control	26.58 (15.55)	27.19 (15.21)
No. of Words Chosen	Study	12.05 (5.34)	9.81 (5.45)
	Control	9.90 (5.59)	10.37 (5.24)

Mean scores (and standard deviations) For the six dimension of the McGill pain Questionnaire for the study and control groups at Time 1 and Time 2. At Time 2, the study group has attended the Pain Relief Clinic.

time as confirmed by the significant group x time interaction (F=9.72, df=1,98, p<0.003).

v) Miscellaneous and Word Count dimensions - analysis of both of these more general assessments of the impact of pain confirm that the study group show a marked and significant reduction in their scores when compared to the control group (F=7.53, df=1,98, p<0.008, and F=7.98, df=1,101, p<0.007 respectively).

7.3 Summary of Results of Assessments of Emotion and Pain Scores

The results show that patients in the study group report significantly lower levels of distress and lower levels of pain when compared to the control group at the time of the second questionnaire. The questionnaire was administered after the study group had attended the Pain Relief Clinic. It is also evident that time itself has an influence because both groups showed reduction in their scores on anxiety, depression, emotional distress and pain from the first to second questionnaire

.7.4 The Influence of the Personality Factor of Neuroticism upon the Effects of the Clinic Visit

The factor of neuroticism has been shown to be a significant predictor of pain and emotional distress in this sample of patients prior to their attendance at the pain clinic. It therefore is important to consider whether neuroticism might also influence responses on the second questionnaires, hence indicating an effect in reaction to the clinic. In particular, one would wish to know whether the apparent improvement in emotional state and reduction in pain scores which was evident for the study group as a whole, was also true of the more neurotic members of the group.

In order to examine the differential effects of high versus low neuroticism on other variables, Eysenck has advocated assigning those scoring above the mean score on neuroticism to a "high N" group, while those scoring below the mean are assigned to a "low N' group. The effects of high and low neuroticism are then assessed by a simple comparison of the two groups. However, the problem with this approach is that it means that those members of the two groups whose scores lie around the mean will be very similar in their degree of neuroticism. To describe an individual whose score lies one point above the mean as "high N" while another whose score is one below the mean is "low N" would seem questionable.

A better approach is that of (Thorp et al., 1993) where those scoring higher than 1 standard deviation above the group mean score are designated the high N group while those scoring less than 1 standard deviation below the mean are designated low N. Although this results in two groups which are smaller than if Eysenck's approach is followed, they are more widely separated and hence more plausibly 'high' versus 'low' N.

Following the above routine, the results for high and low N study group patients on the HADS, GHQ and McGill scores were subjected to ANOVA where high N or low N was the between-group factor and time was the within-group factor. The issue of interest would be whether the two groups differed significantly on any of the measures, and whether the groups differed in their emotional state over time.

The mean scores for the study group are shown in Table 7.19.

7.4.1 Effects of Neuroticism on Anxiety and Depression

ANOVA shows that the high N group scored overall higher on both anxiety and depression than the low N group (F=57.55, df=1,30, $p<0.001$ and F=15.34, df=1,30, $p<0.001$ respectively). Neither the main effect of time nor the group x time interaction was significant in either analysis. Thus, the high N group remained significantly more anxious and depressed even after the visit to the Pain Relief Clinic when compared to their low N counterparts.

7.4.2 Effects of Neuroticism on GHQ Distress Scores

ANOVA revealed a significant main effect of group confirming that the high N group experienced overall greater distress (F=5.14, df=1,30, $p<0.05$). The significant main effect of time (F=7.74, df= 1,30, $p<0.01$) shows that both high and low N patients experienced a significant reduction in their levels of distress from the first to the second questionnaire. The lack of a significant interaction confirms that the reduction in distress in absolute terms was equivalent between the groups. Note, however, that Table 7.19 confirms that the high N group still remains on average considerably above 'caseness'.

7.4.3 Effects of Neuroticism on McGill Pain Scores

i) ANOVA showed similar results for all pain score categories and they will therefore be considered simultaneously. Table 7.17 shows that, overall, patients in the high N group tended to score higher on all pain dimensions than did the low N group. However, it can also be seen that variation within the groups was relatively high (as shown by the standard deviations). This probably explains why there was no significant main effect of personality grouping in any analysis although there was a trend for higher Miscellaneous pain scores in the high N group (F=3.87, df=1,30, p=0.06). The main effect of time was significant in all cases and indicated a significant reduction in pain for both high and low N over time.

The lack of any significant interaction confirms that there were no differential changes in pain over time as a function of high and low N.

7.5 Effects of Neuroticism within the Control Group

The control group patients were also divided into high and low neuroticism groups according to the routine described above. It was important to examine the control group data in order to determine whether the effect of neuroticism seen above in the study group was linked to their visit to the Pain Relief Clinic, or whether it was purely a function of time. If the

Table 7.17. Mean scores of the Influence of the Personality Factor of Neuroticism on (HADS), (GHQ)at time 1 and time 2 for study group.

	Low N		High N	
Variables	**Time 1**	**Time 2**	**Time 1**	**Time 2**
HADS				
Anxiety	5.8(2.4)	4.8(3.0)	13.7 (3.7)	12.6 (4.2)
Depression	5.2 (3.1)	4.5 (3.1)	9.9 (3.8)	9.2 (4.1)
G.H.Q.	7.3 (5.9)	3.9 (3.3)	12.3 (8.4)	8.6 (8.0)
McGill Pain Scores				
Total	29.9 (15.1)	23.7(15.4)	39.0 (11.2)	25.2 (11.8)
Affective	3.5 (2.5)	2.3 (3.0)	5.2 (3.2)	3.2 (2.4)
Sensory	16.9 (8.2)	15.2 (9.4)	20.4 (9.2)	14.2 (7.8)
Evaluative	3.5 (1.2)	2.3 (1.8)	3.6 (0.9)	2.6 (1.7)
Miscellaneous	5.4 (3.9)	4.0 (3.2)	8.9 (3.1)	5.26 (3.9)
N W C	10.7 (5.5)	9.5 (5.8)	13 .6 (4.9)	10.0 (4.2)

Mean scores (and standard deviations) on Anxiety and Depression from the Hospital Anxiety and Depression Scale (HADS), distress on the General Health Questionnaire (GHQ) and McGill Pain Scores for the study group divided into those scoring high and low on the factor of Neuroticism (N). Time 1 = scores derived from the first batch of questionnaires administered to the patients; Time 2 = scores from the second batch of questionnaires administered after the patients had attended the Pain Relief Clinic.

Table 7.18 Mean scores of the Influence of the Personality Factor of Neuroticism on (HADS), (GHQ) and McGill Pain Scores at time 1 and time 2 for control group.

	Low N		High N	
Variables	**Time 1**	**Time 2**	**Time 1**	**Time 2**
HADS				
Anxiety	5.3 (2.7)	3.8 (2.6)	12.7 (2.7)	11.5 (3.5)
Depression	5.1 (3.5)	3.5 (3.0)	10.1 (4.2)	9.4 (4.6)
G.H.Q.	5.6 (4.7)	4.7 (4.8)	12.2 (8.2)	10.7 (7.7)
McGill Pain Scores				
Total	19.3 (11.9)	21.9 (13.4)	32.3 (14.8)	33.1 (16.2)
Affective	1.6 (1.7)	2.3 (2.2)	4.3 (3.4)	4.5 (3.7)
Sensory	11.9 (8.3)	13 .7 (9.6)	18.2 (9.1)	18.4 (9.1)
Evaluative	2.9 (1.6)	2.7 (1.8)	3.9 (1.1)	3.9 (1.2)
Miscellaneous	3.9 (2.7)	3.2 (3.2)	6.4 (3.7)	6.4 (3.8)
N W C	7.2 (4.3)	8.7 (5.2)	12.4 (5.5)	12.6 (5.0)

Mean scores (and standard deviations) on Anxiety and Depression from the Hospital Anxiety and Depression Scale (HADS), distress on the General Health Questionnaire (GHQ) and McGill Pain Scores for the control group divided into those scoring high and low on the factor of Neuroticism (N). Time 1 = scores derived from the first batch of questionnaires administered to the patients; Time 2 = scores from the second batch of questionnaires administered before the patients attended the Pain Relief Clinic.

Pain Score	Step	Variables	R^2	f	df	Beta
Total	1	Back Pain	0.123	5.69*	1,42	-0.350
Sensory	1	Back pain	0.154	7.66**	1,42	-0.393
	2	Active Coping	0.092	4.99*	2,42	0.303
Evaluative	1	Denial	0.090	4.31*	1,42	0.305
Affective	1	Professional Support	0.111	5.26**	1,42	-0.333
NWC	1	Surgery	0.141	6.89**	1,42	0.375

7.19 Outcome of regression analysis to examine predictors of the study group change in pain scores after their visit to the Pain Relief Clinic. **= $p< 0.01$; *=$p< 0.05$.

control group show similar effects due to high and low N, then it might imply that the effect is due to time.

The control group mean scores of the high and low N groups for HADS, GHQ and pain scores as a function of the first and second questionnaires are shown in Table 7.18. As in the case of the study group, ANOVA shows that the high N patients in the control group scored significantly higher on anxiety, depression and GHQ distress than did their low N counterparts (F = 80.62, df = 1,39, $p < 0.001$; F = 21.25, df = 1,39, $p < 0.001$; F = 9.90, df = 1,39, $p < 0.005$ respectively). The main effect of time was significant only in the case of anxiety and depression (F = 12.73, df = 1,39, $p < 0.002$; F = 10.63, df = 1,39, $p < 0.003$ respectively) reflecting the fact shown in the overall analysis that GHQ scores did not change significantly over time in the control group.

There were no significant interactions between the factor of personality grouping and that of time, and examination of the means confirms that the high N patients do not show evidence of differential responding at the time of the second questionnaire.

Regarding pain scores, the main effect of personality grouping was not significant for any score dimension. Nor was there any significant main effect of time (reflecting the fact, shown by the significant interactions in the overall analysis comparing the study and control group) that the control group's pain scores remained stable over time while those in the study group significantly decreased. None of the interactions between personality grouping and time was significant.

7.6 Regression Analysis to Predict Change in Pain and Emotional State in the Study Group

The above analyses have been important in establishing that the study group does benefit from attending the Pain Relief Clinic in terms of improved emotional state and reduced pain scores. However, deeper insight may be gained by regression analysis to determine more accurately whether certain variables are predictors of improvement. It was seen in Chapter 6 that pain and distress prior to visiting the Clinic were reliably predicted by the independent variables of personality, coping, diagnostic category and the perception of avoidance / lack of support by family and friends. It would be valuable to determine whether the same variables would predict improvement.

The regression analysis therefore employed the same procedures as described in Chapter 6, namely stepwise regression using the criteria described before and with analysis for interactions. The dependent variables were the McGill Pain Scores and the GHQ scores, but this time expressed as change scores: i.e. the values used in the regression were derived by subtracting scores at Time 2 (after the visit to the Clinic) from Time 1 (before the visit). The new value represented the extent to which pain or distress had changed from the first to second visit. Thus, high scores denoted an improvement in pain over time: this is important to remember when interpreting the beta values in terms of their sign (+ve or -ve) in the analysis table.

The independent variables were as before: i.e. age, sex, diagnostic category, personality, coping strategy (WCCL) and the MDQ variables denoting the patients' perception of pain and its effects.

The results of the regression analyses are shown in Table 7.19 where the following variables are seen to be predictive of McGill Pain Scores.

(i) Diagnostic Category - Back pain was seen to be a significant predictor whereby those patients diagnosed as suffering back pain showed less improvement in their total pain scores (Beta value being negative). The effect accounted for some 12% of total variance and was the only significant predictor of change in this main dimension of the MPQ.

Back pain was also the primary predictor of less improvement in sensory pain scores, the effect accounting for some 15% of variance.

The diagnostic category of "surgery" (denoting those whose pain derived from prior surgical interventions) predicted NWC scores on the McGill. Patients whose pain derived from surgery showed a greater change in this dimension indicating lower scores after visiting the Clinic (14% of variance). It was the only variable to predict a change in this variable.

(ii) Coping strategy - The coping strategy predicted only one dimension of change in pain. Active coping was a significant predictor of a reduction in sensory pain scores and accounted for a further 9% of variance after that of the primary predictor of back pain described above.

Denial was the sole predictor of a reduction in evaluative pain scores and accounted for 9% of variance.

(iii) MDQ "Belief in the Importance of Professional Support - This factor was negatively predictive of affective pain. In other words, patients with this belief were likely to show a smaller reduction in their affective pain score after visiting the Clinic (11% of variance). One may note that personality was not a predictor of change in pain score after the clinic visit.

A further regression analysis was undertaken where GHQ change scores were the dependent variable denoting change in psychological distress after the clinic visit. No variables were found to be significant predictors of a change in GHQ score. Again it is notable that personality was not a predictor of change in GHQ distress after the clinic visit.

7.7 Regression Analysis Applied to the Control Group

The above regression analysis was undertaken to determine whether any factors predicted change in the study group after visiting the Pain Clinic. The underlying assumption was that any predictors would be reflecting the beneficial effects of the Clinic. However, the passage of time may itself be a factor and it is therefore important to apply the same analysis to the control group to see whether any change in their pain or GHQ scores can be predicted. Such an analysis was conducted, using the same procedures as those described in the preceding sections.

As shown in Table 7.20, the analysis revealed no variables that were predictive of any change in McGill Pain Scores (which, as shown above, changed little over time anyway). However, GHQ distress was predicted by the coping strategy of denial which showed that the strategy predicted a smaller reduction in GHQ distress scores. Thus, over time, those patients who employ denial to cope with pain will benefit by way of a reduction in their emotional distress even in the absence of any consultation with the Pain Clinic.

GHQ Score	Step	Variables	R^2	f	df	Beta
GHQ	1	Denial	0.081	5.29*	1,60	-0.285

Table 7.20 Outcome of regression analysis to examine predictors of change in the control group' pain scores at the time of the second questionnaire assessment. *= $p < 0.05$

7.8 Review and Discussion of the Results of Chapter 7

It is perhaps important to begin with an observation about the methodology and its implications for the results. The importance of using a control group is illustrated by the fact that anxiety and depression scores became significantly lower in both the study and control groups from the time of the first to second questionnaire. Without the control group, one might have drawn the misleading conclusion that the study group had particularly benefited from attending the pain clinic in terms of their states of anxiety and depression. The fact that the control group also experienced a reduction in the strength of these emotions indicates that time itself (and perhaps some other unknown intervening factors) can influence emotion.

The GHQ scores do, however, provide evidence of a benefit from attending the pain clinic which is independent of (or perhaps in addition to) the effects of the passage of time. Although both groups do experience a reduction in their levels of distress over time (shown by the significant main effect of time), the significant interaction of time x group confirms that the reduction is significantly greater for the study group. Further evidence to support this reduction in distress is seen in the trend for proportionately fewer patients in the study group to fall in the "caseness" categories of the GHQ.

Evidence of benefit to the study group of attending the pain clinic was also seen in the significant group x time interactions on all dimensions of the McGill Pain Questionnaire.

It appears that attendance at the pain clinic results in a reduction in the perception of the physical and emotional intensity of the pain when compared with control group patients. Given that the study group would be receiving various treatment interventions and psychological support at their visit, it may hardly be surprising to see such improvements. Nevertheless, it is important that the nature and degree of the improvement has been assesses objectively.

Particular interest attaches to whether these changes in pain experience and distress vary as a function of personality. The results confirm that individuals with high neuroticism scores continue to have significantly higher scores on anxiety, depression and GHQ distress over time when compared to patients with low neuroticism scores. The lack of an interaction with the factor of time shows that the degree of this difference does not change after the clinic visit. Hence, one might conclude that personality does not seem to exert any influence upon whatever beneficial effect the clinic has upon emotional state.

The same conclusion is true of pain scores. Patients with high levels of neuroticism continue to have overall higher levels of pain after the clinic visit.

The latter result would seem consistent with the pessimistic and catastrophising outlook that is often a feature of patients with high levels of neuroticism. It has been shown in dentistry that highly anxious patients continue to respond with high emotion to the anticipation of dental treatment, even when it is likely to be painless, and even when previous consultations have been pain-free. Such patients anticipate that pain will continue despite many disconfirming episodes (Kent, 1990).

The regression analysis was important in establishing those factors that might predict any change in pain experience or emotional state after the visit to the clinic. Given the results described above, it may not be surprising that it showed that personality was not a predictor of change in pain and distress after visiting the clinic. This marks a contrast with the results of Chapter 6 where the factors of neuroticism and extroversion were both shown to be significant predictors of the patients' state prior to the Clinic visit. One might conclude that personality factors may be useful predictors of overall pain experience and distress, but they are not predictors of change in such measures following treatment interventions at this pain relief clinic.

The diagnostic category was, just as in the case of Chapter 6, again seen to be important. On this occasion, it was the factor of back pain that was particularly salient and predicted a smaller reduction in both total and sensory pain scores. Thus it appears that patients whose chronic pain state is due to a low back pain condition are less likely to report benefit, at least in terms of their pain experience recorded by the McGill Pain Questionnaire.

This result contrasts with that of Chapter 6 where it was the factor of prior surgery that was the strongest predictor of pain prior to the visit to the clinic. Note, however, that in the present analysis, prior surgery did predict a reduction in the NWC pain score. Overall, this result is interesting because it would imply that the salience of the patient's diagnostic state to their pain experience score may depend upon the stage in their pain 'career'. Prior to the intervention of the Pain Clinic, those with pain deriving from prior surgery are those whose pain is strongly predicted by that factor. After visiting the Clinic, all patients show a reduction in their pain scores across the dimensions, but those with back pain show relatively less of a reduction.

It is notable that active coping strategies were associated with a reduction in sensory pain scores. One might hypothesise that patients indulging in active strategies may be more likely to engage in behaviours and intellectual activities that help to distract them from their pain, hence reducing the impact of the condition upon them. Interestingly, denial was also seen to be beneficial in reducing affective pain scores. Denial would therefore seem to reduce the emotional impact of pain after the visit to the pain clinic where the patient has received treatment interventions and care.

It is interesting that no factors predicted changes in GHQ distress in the study group, while the coping strategy of denial was predictive of lesser reduction of those scores in the control group. In the latter group, one assumes that any changes (or the lack of them) from the first to the second questionnaire reflects simply the passage of time. The early part of this section showed that GHQ scores reduced significantly over time for both groups (although significantly greater overall for the study group). The regression analysis adds further detail by showing that such reduction was relatively less in the case of control group patients who used denial as a coping strategy. One might conclude that untreated patients who rely upon denial to cope with their pain are likely to show relatively little improvement over time in their distress relative to those using less denial or other coping strategies. It is interesting that the use of denial in the control group is associated with a relatively negative outcome over time (i.e. little improvement in distress), while 'deniers' in the study group (who receive care and attention at the clinic) show a benefit in the reduction of the emotional impact of pain.

The results of analysis in Chapter 7 therefore indicate that attending the pain clinic is beneficial. Highly neurotic individuals continue to suffer more pain and distress than their less neurotic fellows. The strongest predictors of changes in pain state are, however, the diagnostic category and coping strategies employed.

Chapter 8:

Results:

Section Three

CHAPTER 8: Results

Factors Affecting Benefit from Attending the Pain Relief Clinic

In this final section of the results, the analysis is concerned with factors that may differentiate between patients who appear to benefit clinically from their attendance at the Pain Relief Clinic and those who do not. These results are therefore qualitatively different from those in Chapter 7 where 'outcome' was described in terms of the patients' self-assessments of their state by the various questionnaires.

In the present chapter, the outcome is derived from the clinicians' ratings of the patients' state. Patients also rate the clinic in terms of its effectiveness in helping their pain. These assessment were made by a questionnaire distributed to patients after the clinician had rated their response to treatment (see Chapter 5 for description of the questionnaire).

Given the relative brevity of these results, this section will also include discussion as the results are described.

8.1 Outcome

The outcome for each study group patient following their attendance at the Pain Relief Clinic was judged by the consultant in charge of the clinic. Each patient was assigned to one of the four categories of outcome depending on their clinical state. These are shown in Table 8.1.

Outcome category	No. of Patients	and Percentage
1 = No Better	10	22.7%
2 = Short-term Improvement	4	9.1%
3 = Much Better	16	36.4%
4 = Excellent	8	18.2%
5 = Unknown Outcome	6	13.6%

Table 8.1 The five outcome categories applied to patients in the study group showing the number of patients in each category and their equivalent percentage.

It is evident that more than half the sample are judged to have benefited from attending the clinic, while some 31% show little or no improvement. A small proportion were lost to follow up and their outcome remains unknown.

In order to examine factors that might be relevant to outcome, the study group was subdivided into two outcome groups. The first group was composed of patients falling in categories "1" and "2" and was designated the "poor outcome group" (N = 14). The second group consisted of those patients in categories "3" and "4" and was designated the "good outcome group" (N = 24).

8.1.1 Personality and Clinical Outcome

The first analysis considered the factor of personality and whether the two outcome groups differed in their stable

Table 8.1.1 Mean scores on the Eysenck Personality Questionnaire (EPQ) as a function of patients having good or poor outcome in the study group.

	Poor Outcome	Good Outcome
EPQ		
Extroversion	6.1 (3.9)	6.3 (3.1)
Neuroticism	4.9 (3.9)	5.3 (4.0)
Psychoticism	2.1 (1.8)	2.3 (2.2)
Lie	5.6 (2.9)	5.3 (3.2)

Mean scores (and standard deviations) on the factors of Extroversion, Neuroticism, Psychoticism and Lie on the Eysenck Personality Questionnaire (EPQ) as a function of patients having good or poor outcome in the study group.

Table 8.2. Mean scores on the Hospital Anxiety and Depression Scale (HADS) and General Health Questionnaire (GHQ) for the good and poor outcome sub-groups of the study group.

	Poor Outcome		Good Outcome	
	Time1	**Time 2**	**Time 1**	**Time 2**
HADS				
Anxiety	7.9 (4.9)	6.8 (5.5)	9.3 (3.8)	8.7 (4.7)
Depression	6.9 (4.7)	6.9 (5.1)	6.9 (3.4)	5.8 (3.4)
G.H.Q	6.6 (7.2)	4.6 (6.3)	11.1 (6.1)	6.4 (5.9)

Mean scores (and standard deviations) on Anxiety and Depression from the Hospital Anxiety and Depression Scale (HADS) and distress from the General Health Questionnaire (GHQ) for the good and poor outcome sub-groups of the study group. Time 1 = scores derived from the first batch of questionnaires administered to the patients; Time 2 = scores from the second batch of questionnaires administered after the patients had attended the Pain Relief Clinic.

personality characteristics. The mean values on P, N, E and L are shown in Table 8.1.1 Inspection of the table confirms that the two groups were very similar in mean personality scale values, and one-way ANOVA confirms that there were no significant differences between the groups on the four measures (all F ratios < 1.0).

8.1.2 Anxiety, Depression, GHQ and Clinical Outcome

The second analysis considered whether any changes in scores on depression, anxiety and general distress (GHQ) from the first to second questionnaire might be related to outcome group. The groups' scores were subjected to MANOVA where group was the between-group factor and time (first vs. second questionnaire) was the within-group factor. A main effect of group, or an interaction, would indicate a possible effect relating to outcome.

The mean scores on depression, anxiety and GHQ are shown for the good and poor outcome groups as a function of first and second questionnaires in Table 8.2. Inspection of the table shows that the groups appear virtually identical in their anxiety and depression scores. Analysis confirms that there are no significant between group differences or group x time interactions.

However, GHQ scores show a different pattern where the scores of the poor outcome group remain relatively low over time while those of the good outcome group begin high but reduce markedly over time. The effect seems quite large but the underlying interaction does not reach significance (F=1.69, df=1,35, p<0.21). Overall, therefore the effect can only be regarded as a trend.

8.1.3 Pain Scores and Clinical Outcome

The groups' scores on the dimensions of the McGill Pain Questionnaire are shown in Table 8.3. Analysis reveals a significant difference between the groups on the Evaluative dimension. The main effect of group is significant (F=5.55, df=1,34, p<0.03) and Table 3.4 confirms that overall the poor outcome group has a higher mean evaluative pain score. The group x time interaction is of borderline significance (F=3.61, df=1,34, P=0.066) confirming that while the scores of the poor outcome group remain the same over time, those of the good outcome group are almost halved.

This result would seem to indicate that when clinicians rate a patient as improved, this may be reflected in the patient's impression of a reduction in the evaluative dimension of their pain experience whereby the impact of the pain is regarded as less severe.

8.1.4 Coping Styles and Beliefs about Pain

Given that responses on the WCCL and MDQ have been shown important in explaining responses to pain in previous chapters, it is of interest whether they might have similar relevance to outcome. The mean scores for the good and poor outcome groups on the WCCL and MDQ are shown in Table 8.4. Analysis confirms a number of significant differences.

Table 8.3 Mean scores on the McGill Pain Questionnaire for the good and poor outcome sub-groups of the study group.

	Poor Outcome		Good Outcome	
	Time1	Time 2	Time 1	Time 2
McGill Pain Scores				
Total	35.1 (14.1)	28.1 (15.4)	33.4 (14.7)	23.4 (14.7)
Sensory	19.3 (8.7)	17.3 (10.3)	19.2 (9.5)	14.8 (8.8)
Evaluative	3.8 (0.9)	3.4 (1.3)	3.6 (1.1)	1.9 (1.8)
Affective	4.4 (3.1)	2.4 (2.8)	3.9 (2.6)	2.8 (2.8)
Misc.aneous	6.3 (3.3)	5.0 (4.2)	6.5 (4.1)	4.1 (3.8)
NWC	11.5(4.6)	10.2 (5.7)	12.3 (6.2)	9.5 (5.8)

Mean scores (and standard deviations) on the McGill Pain Questionnaire for the good and poor outcome sub-groups of the study group. Time 1 = scores derived from the first batch of questionnaires administered to the patients; Time 2 = scores from the second batch of questionnaires administered after the patients had attended the Pain Relief Clinic.

The poor outcome group score significantly lower in "active coping" on the WCCL when compared to the good outcome group (F=6.73, df=1,35, p<0.02). It is likely that such patients do little to help distract themselves from pain by devising activities or pursuits, or intellectual processes to prevent pain taking over their lives.

The poor outcome group also score lower on the MDQ the belief that health professionals can help them cope with their pain (F=4.49, df=1,37, p<0.05). This attitude derives from the patients' scores on the MDQ administered before the clinic visit. Such an attitude may be very unhelpful because it may become a "self-fulfilling prophecy". Patients who have a preconception or expectation that the clinic staff will be ineffective may be less likely to interpret even real improvements in their pain state as positive. They may continue to complain of pain, hence increasing the likelihood that the consultant will rate their outcome as 'poor'. The patients may also be less likely to follow advice because they lack confidence in it: this, too, would be likely to have an adverse consequence for outcome.

While not significant, it is also important to observe some trends in the data that seem to distinguish the poor and good outcome groups. The poor outcome group show higher scores on the perception that others avoid them because of their pain. They also perceive that they receive less support from family and friends. Moreover, they report less comfort from religious beliefs.

Table 8.4. Mean scores on the Ways of Coping Check List and the MDQ as a function of the good and poor outcome sub-groups of the study group.

	Poor Outcome	Good Outcome
Ways of Coping Check List		
Active	44.4 (9.9)	53.7 (10.9)
Denial	21.5 (4.4)	24.6 (5.7)
Passive	15.6 (5.0)	17.8 (3.4)
External	13.3 (2.5)	15.5 (4.0)
MDQ		
Effect Daily Life	24.4 (5.2)	26.7 (6.1)
Prof. Support	8.7 (2.6)	11.6 (4.8)
Religious Belief	15.1 (7.6)	17.0 (9.0)
Family Support	17.0 (4.2)	19.3 (6.6)
Avoid	17.6 (7.7)	15.3 (4.3)
Confidence in F.	9.8(3.0)	10.5 (2.6)

Diagnostic Category	Poor Outcome	Good Outcome
Cancer of Bone		1
Degeneration		9
Infection	1	
General Ilness		1
Post Surgical	3	9
C N S	2	
Back Pain	2	3
Others	2	1

Table 8.5 Clinicians' ratings of outcome as a function of the diagnostic classification of patients in the study group.

Step	Variables	R^2	f	df	Beta
1	Active Coping	0.135	6.58*	1,42	0.367
2	Degeneration	0.106	5.71*	2,42	0.327

Table 8.6. The result of the stepwise logical regression analysis of factors predicting the clinical outcome after the patients' treatment at the Pain Relief Clinic. The factor of active coping is the most powerful predictor, followed by the diagnostic category of degenerative pain condition. *=$p<0.05$

8.1.5 Diagnostic Category and Outcome

The clinical outcome as a function of diagnostic category is shown in Table 8.5. The cell sizes for some categories are so small as to make any conclusions difficult. However, it is evident that all patients whose pain resulted from degenerative process (largely rheumatoid) were rated as having a good outcome. Similarly, the majority (75%) of those whose pain was a result of prior surgical interventions were rated as having a good outcome.

8.2 Regression Analysis to Predict Outcome

The results above provide an indication of factors that seem associated with differential outcome. However, the results do not convey the relative strength of the contribution of the factors. It was therefore thought important to apply a regression analysis to the data in order to determine the relative importance of the factors above in predicting outcome.

Regression analysis was applied following the general procedure described in Chapter 6. The dependent variable of "outcome" was defined categorically as "good" and "poor". The dependent variables of personality, diagnostic category, coping strategy, MDQ categories and demographic variables were entered in a stepwise procedure.

The results of the regression analysis are shown in Table 8.6. Active coping was found to be the strongest predictor of a good outcome, and accounted for some 14% of variance. This result accords with the conclusion drawn from comparison of mean data in section 8.1.4 above. The second most powerful predictor of good outcome was where patients suffered a degenerative condition, and this accounted for a further 11% of variance. It is perhaps hardly surprising that the latter variable was a significant predictor given that all patients in that category were rated by the clinicians as having a good outcome.

No other variables were found to be significant predictors of outcome in the regression analysis.

8.3 Patients' Perceptions of Benefit from the Pain Relief Clinic

The results above consider factors that relate to the clinicians' rating of outcome. The patients themselves may, however, have a different perception of the effect of the clinic and the benefits they derive. Tables 8.7.1 to 8.7.5 show the results of the questionnaire to assess the study group patients' perceptions of benefit or outcome after having attended the clinic. Table 8.7.1 shows that 38% of the group felt that their pain was much improved while only 9% believed that their condition had worsened. For the others, their state remained much as before.

In Table 8.7.2, it is clear that patients found the staff to be very supportive in that 80% of the group reported the staff to be understanding or very understanding. No patient reported a lack of concern by the staff.

Regarding the medical treatment, Table 8.7.3 shows that 64% of patients found the treatment acceptable but 23% found it stressful or distressing.

In terms of benefits, Table 8.7.4 shows that, unfortunately, relatively few patients perceived that they obtained long-term relief of their pain (9%). About one third of the sample did, however, report short-term relief and the benefit of sympathy and understanding from the staff. Reduction in worry was reported by 16% of patients.

Table 8.7.5 shows that only 40% of the group gained any improvement in insight or understanding regarding their pain after visiting the clinic.

Table 8.7.1 Patients' perception of pain after attending clinic.

	Number	Percentage
Much worse	1	2
Worse	3	7
Neither worse nor less	22	50
Less of a problem	12	27
Much less of a problem	5	11

Table 8.7.2 Patients' perception of staff at the clinic

	Number	Percentage
Very unconcerned about my pain	0	0
Unconcerned about my pain	0	0
Neutral in their attitude to my pain	8	18
Understanding about my pain	18	41
Very understanding about my pain	17	39

Table 8.7.3 Patients' perception of medical treatment at the clinic.

	Number	Percentage
Entirely acceptable	14	32
Fairly acceptable	14	32
Neither acceptable nor unacceptable	5	11
Stressful	9	21
Very distressing	1	2.3

Table 8.7.4 Patients' Benefits in attending clinic.

Benefits	Number	Percentage
Long term pain relief	4	9
Short term pain relief	14	32
Reduction in worry	7	16
Sympathy and understanding	13	30
Advice from a specialist	22	50

Table 8.7.5 Patients' understanding of pain after treatment.

Understanding	Number	Percentage
Much improved	5	11
Improved	13	30
Unchanged	24	55
Worse	1	2

8.3.1 Perceived Benefit as a Function of Outcome and Neuroticism

It seems obvious that the patients' perceived benefits of attending the clinic might depend upon the clinical outcome (as assessed by the consultant and shown in Table 8.1). Moreover, given the evidence from earlier results in this thesis, and the fact that the principal interest focuses upon personality, it is important to consider the personality factor of neuroticism. The dependent variables of particular interest would be those of the patients' perception of pain, and their perception of treatment, after attending the clinic.

Table 8.8.1 shows pain perception as a function of outcome. The numbers are too small for reliable statistical analysis but it can be seen that patients' rating of their pain is generally much more favourable amongst those where the consultant also perceived a favourable outcome. However, interpreting such an effect might be difficult. Patients may rate their pain as less because their outcome genuinely is 'good' and their pain has reduced. Equally, they may be subtly biased to believe that their pain is less if the consultant is particularly enthusiastic and encouraging about what he or she perceives to be an improvement in the patient's condition.

Regarding the acceptability of treatment, Table 8.8.2 shows relatively little difference in patients' perceptions as a function of the consultant-rating of outcome.

Table 8.8.3 shows that proportionately more of the good outcome patients found staff understanding about their pain (57% vs. 23% found staff "understanding" or "very understanding" about their pain in the good and poor outcome groups respectively). Patients who have an objectively good outcome may have a more friendly and approachable demeanour, hence encouraging more positive interactions with staff. Patients might then perceive staff as understanding and interested in their condition. In contrast, patients with a poor outcome may be more hostile or withdrawn, thus perhaps reducing the tendency of staff to communicate so frequently with them. This might have the effect of creating quite opposite perceptions in poor outcome patients.

Table 8.8.4 indicates that there is relatively little difference in patients' perception of their pain as a function of neuroticism level (patients were classed as being high or low neuroticism according to the routine described in Chapter 6). Patients with low neuroticism scores were, however, more likely to report the perception of greater supportiveness and understanding from staff (Table 8.8.2). In the case of acceptability of treatment as shown in Table 8.8.5, there is an indication that those low in neuroticism are proportionately more likely to find treatment acceptable.

Table 8.8.1 Patients' perception of pain as a function of outcome.

	Poor Outcome	Good Outcome
Much worse	1 (3%)	0
Worse	1 (3%)	2 (5%)
Neither worse nor less	10 (26%)	10 (26%)
Of less of a problem	1 (3%)	8 (21%)
Much less of a problem	1 (3%)	4 (10%)

Table 8.8.2 Patients' perception of treatment as a function of outcome.

	Poor Outcome	Good Outcome
Entirely acceptable	2 (5%)	11 (29%)
Fairly acceptable	7 (18%)	4 (10%)
Neither acceptable nor unacceptable	2 (5%)	3 (8%)
Stressful	3 (8%)	5 (13%)
Very distressing	0	1 (3%)

Table 8.8.3 Patients' perception of staff as a function of outcome.

	Poor Outcome	Good Outcome
Unconcerned about my pain	0	0
Unconcerned about my pain	0	0
Neutral in their attitude to my pain	5 (13%)	2 (5%)
Understanding about my pain	5 (13%)	9 (23%)
Very understanding about my pain	4 (10%)	13 (34%)

Table 8.8.4. Patients' perception of pain as a function of high and low neuroticism.

	Low N.	High N
Much worse	1	0
Worse	2	1
Neither worse nor less	14	8
Less of a problem	4	8
Much less of a problem	4	1

Table 8.8.5. Patients' perception of treatment as a function of high and low neuroticism.

	Low N	High N
Entirely acceptable	9	5
Fairly acceptable	7	7
Neither acceptable nor unacceptable	5	0
Stressful	4	5
Very distressing	0	1

Table 8.8.7. Patients' perception of staff concern as a function of high and low neuroticism.

	Low N	High N
Very unconcerned about my pain	0	0
Unconcerned about my pain	0	0
Neutral in their attitude to my pain	2	6
Understanding about my pain	9	9
Very understanding about my pain	14	3

The latter group was also more likely to report that staff were supportive and understanding as shown in Table 8.8.7.

8.4 Summary of Results and Discussion of Chapter 8

Most patients benefit clinically from attending the Pain Relief Clinic, at least in the short-term. This benefit may be due to an interaction of factors such as a genuine effect of treatment, the positive expectations of some patients, the enthusiasm and friendliness of clinic staff, and the charisma of consultants who, by virtue of their status, may be expected to exert a particular influence on patients.

The clinicians' rating of improvement also accords with the patients' rating of their pain in that those having a good outcome do evaluate their pain in less severe terms on the McGill Pain Questionnaire.

The regression analysis confirms that active coping is associated with a better outcome and, indeed, that active coping is the best predictor of a good outcome. Such patients may be less likely to 'give in' to their pain. They may maintain a more active life, adhere more to treatment and have a more positive outlook. All of these characteristics may lead to a better objective outcome and may also exert a subtle positive influence on the clinician's rating of the patient. In contrast, the patient who believes that medicine has little to offer may be unlikely to have a good outcome for reasons of pessimistic expectation and other behaviours that may accentuate the patient's pain and persuade the clinician that there has been little improvement.

It is interesting that the regression analysis identified the degenerative diagnostic category as the only other significant predictor of the clinicians' rating of outcome. This effect contrast with the results of analyses in preceding chapters where the diagnostic categories of prior surgical intervention and low back pain were associated with pain scores and emotional distress. This difference will be considered in detail in the general discussion which follows in Chapter 9.

The results concerning personality seem consistent with those described in previous chapters where low levels of neuroticism are often associated with less adverse effects of the chronic pain state. They may reflect the more stable characteristics of the individual who is low in neuroticism. These contrast with the high anxiety and pessimism of the neurotic individual, both of these characteristics being likely to provoke poor adaptation to pain (as shown in Chapters 6 and 7), and perhaps the anticipation that little can be done medically to improve the condition. Note, however, that unlike pervious analyses, personality was not found to be a significant predictor of outcome according to the regression analysis.

Part Four
Discussion

Chapter 9 General Discussion

The results described in Chapters 6, 7 and 8 have been discussed in detail at the end of their respective chapters. The intention in this General Discussion is to consider the overall perspective provided by the results, particularly in terms of their support for the research hypotheses and in the context of previous research. A later section of the discussion will also consider the methodological flaws in the present work.

9.1 Characteristics of the Patient in Persistent Pain

9.1.1 Personality

One of the main hypotheses in this study was that personality would be a significant variable in predicting the chronic pain patient's experience of pain. Specifically, it was hypothesised that neuroticism would predict an adverse experience of pain (in terms of physical and emotional suffering) while extroversion might be associated with relatively less suffering. This hypothesis was derived from literature reviewed in Chapters 3 and 4 that showed the personality factor of neuroticism to be a significant predictor of responses to acute pain states, and the theoretical proposals of investigators such as Spinhoven et al. (1990) who predicted that the personality factor might also affect the experience of chronic pain.

General confirmation of the salience of neuroticism was seen in the early analysis in Chapter 6 which revealed that the personality profile of the sample of persistent pain patients differed from the age-matched norms in terms of neuroticism. The sample were, on average, more neurotic than the norm but similar to normative values in terms of extroversion and psychoticism. It was noted in the literature review that neurotic traits are associated both with psychosomatic symptoms in other illnesses, and with adverse responses to acute pain conditions (e.g. Thomas, 1990). For instance, Neitzer et al. (1997) have very recently confirmed that neuroticism is a highly significant predictor of reporting of somatic symptoms. The personality factor was also closely associated with depressive symptoms. They suggest that mood states which may be related to personality characteristics are therefore important in determining the extent to which people may focus upon, and become preoccupied with, bodily symptoms and changes.

The conclusions of Neitzer et al. seem plausible in view of the established characteristics of neurotic types whereby there is a tendency to pessimism and "catastrophising" which may augment their known lower threshold to changes in physical (and often painful) stimulation (Lautch, 1971; Klepac, 1984).

It is of further relevance to note that these chronic pain patients share characteristics with patients suffering from other pain conditions which are known to have psychosomatic features. Patients with mandibular pain dysfunction syndrome are known to have high levels of depression and anxiety, and to be of a neurotic disposition (Southwell et al., 1990; Wright et al., 1991). Their symptoms and distressed state are often highly resistant to psychological interventions.

The syndrome of globus pharyngis (a feeling of the discomfort of a lump in the throat) also gives rise to persistent symptoms in the absence of organic disease. It is associated with high levels of anxiety and depression, and patients are often characterised by their high scores on neuroticism (Wilson et al., 1991; Deary et al., 1992, 1995). As in the case of the present pain patients, it is likely that the factor of neuroticism is instrumental in exacerbating the symptoms of suffered by these patients.

It is important to emphasise the particular insight gained by the regression analysis which allowed definition of the relative 'strength' with which variables predicted pain and distress. Thus neuroticism was clearly defined as a significant predictor of pain, but often less powerfully so than a "social support" variable (which will be considered in its own right in more detail below). Moreover, the fact that the analysis showed that neuroticism interacted with support indicates that the adverse effects of the personality factor may be multiplied when it occurs with a significant social variable.

These significant effects of neuroticism were evident in the results of Chapter 6 which was concerned with factors predicting the patient's state prior to visiting the Pain Relief Clinic. It becomes notable, however, that in the analyses which follow the patient's visit to the clinic that neuroticism largely ceases to have any marked effect. In regression analysis, the factor does not predict changes in pain state or distress after visiting the clinic, nor does it predict the clinician's rating of outcome or similar measures in Chapter 8. It is true that patients with high levels of neuroticism are characterised generally throughout the study as having higher pain scores and more emotional distress but, as seen above, this would be expected on the basis of previous research. The fact that the personality factor is not predictive of changes after the visit to the clinic might permit one to draw the conclusion that it is a variable which becomes relatively less important to the patient's condition once there has been an introduction to treatment at the clinic. Of course this conclusion must be guarded because the period over which the patients were assessed was relatively brief. With a more extended post-clinic assessment (and particularly where treatment proved ineffective in the long-term) it may be that the salience of neuroticism to the patient's state of pain and distress would be reasserted.

The Gate Control Theory may be relevant in the context of neuroticism. Booker (1994) has explained how it provides a model that may help to explain to patients how their pain may be affected by their emotional or psychological state. The model may be particularly helpful in the case of patients who are resistant to the idea that pain is 'in the mind'. The high levels of anxiety and tension seen in neurotic patients, and their pessimism and expectation of pain (Kent, 1990) would be expected to lower the pain threshold: in other words, their state would 'open the gate' to the transmission of painful stimuli and hence increase their experience of pain. The results of studies by Thorp et al. (1993), Boyle (1977) and Thomas (1990) confirm that the pain experience of neurotic patients is consistent with the model described by the Gate Control Theory.

The general nature of the problem encountered by neurotic patients seems to be one of heightened emotional distress in the face of pain, and their distress is maintained even when their perception of pain intensity or aversiveness is reduced. Such people have a bleak view of the future which is tinged with pessimism. Their perception is one where pain exerts an adverse effect upon their daily life, and is anticipated to continue to do so in the future.

This pessimism and higher distress may create difficulties for the clinician working in the pain clinic who is attempting to improve matters for his or her patients. Those with high neuroticism may continue to report distress and fears for the future despite the clinician's best endeavours.

The results confirm that the present sample of chronic pain patients report higher levels of distress than age-matched norms, according to the HADS and GHQ. This fact may not be surprising given the patients' past history and the evidence of their perception of the effects of pain on their daily lives.

However, a question remains as to whether the high distress is a consequence of the pain state or whether these patients were by nature more prone to anxiety and depression even before they suffered persistent pain. It is always difficult to establish cause and effect when one has little or no information about a patient's past characteristics. One possibility might be to ask patients or their family to recall the patient's general emotional state before becoming ill. The problem with this approach is, however, that memories may be biased by the present state and experiences of pain.

As noted in the introduction, anxiety and neuroticism are often considered 'volume controls' to sensory stimulation so that both physical and emotional stimuli produce relatively stronger responses in such individuals. Anxious patients are known to react more strongly to pain (Lautch, 1971) and this is compounded by the fact that they often seem to have lower pain thresholds (Klepac, 1985) and to anticipate more pain (Kent, 1990). Anxious and phobic patients are well known to cite fear of loss of control as contributing to heightened emotional state (Lindsay and Powell, 1994). If they are given a belief that they have more control of their pain, even if this belief is an illusion, it can often be of benefit to them. As noted above, explanation to the patient in terms of the Gate Control Theory may be helpful.

The more benign influence of extroversion was also observed upon the patient's state. At first, this might be ascribed to the fact that such individuals are less prone to the levels of high anxiety and pessimism that characterise the neurotic. Similarly, one might suppose that the more out-going and social characteristics of the extrovert would result in a more active life that would distract from the pain state or make it seem less of an impediment in life.

Extroverts may fare better when coping with chronic pain because their out-going behaviour keeps them in company with others and involved in activities that help to distract them from their pain. The fact that they may be more active as part of their stimulus-seeking behaviour may also create the perception within them that they are coping with the pain and that it does little to hinder their lives. This in turn would contribute to a better emotional state as the results confirmed: extroversion was associated with relatively lower levels of anxiety, depression and HADS distress.

Moreover, being in the company of others may expose them to more supportive comments and behaviour from family and friends. They may receive compliments on the fact that they are getting on with their lives despite the burden of their pain: this would provide reinforcement for further positive coping behaviour. Their situation contrasts with that of the neurotic patients described above where there is poor perception of support and a darker view of the effects of pain upon life and the future.

However, the latter view could be countered by pointing out that an out-going personality and social life might be more likely to lead the patient to situations where he or she were made very aware of the limitations imposed upon them by their pain state. This might then lead to an increase in emotional distress. The fact that there was little evidence of emotional distress in extroverted patients (in fact the analysis tended to show a negative relationship between extroversion and anxiety, depression and GHQ distress) might imply that the better state of these patients is due to life-style changes. This can only be speculation, however, because unfortunately the method did not include measures of lifestyle.

Psychoticism exerted an unanticipated role but one which in retrospect seems plausible. The regression analysis in Chapter 6 showed that psychoticism was a predictor of emotional distress prior to the visit to the clinic. Psychotic characteristics (within the model of Eysenck and Eysenck, 1991) include social isolation and an indifference to others. Such individuals may therefore cut themselves off from potential social support which, as seen in previous studies and confirmed in the present analysis, is an important modifier of the pain and distress suffered by chronic pain patients. Moreover, their indifference to others may be manifest in their behaviour which might, in the reciprocal model of communication proposed by Swimmer et al. (1992: see Chapter 3), lead to active avoidance of them by others.

9.1.2 Coping

The variable of coping was hypothesised to have a significant effect upon pain state and distress, and it was proposed that it might interact with personality. However, the results have shown that coping (at least as assessed by the measures in this thesis) had rather subtle effects in terms of predicting the patients' experience. In Chapter 6 the regression analysis showed that while coping strategies did not predict pain scores, they were predictive of the distress suffered by the patient before attending the clinic. Those who used active coping strategies suffered relatively less distress while those whose strategy was to depend on other for external support suffered relatively more.

Active coping was also seen to be beneficial in the results of Chapters 7 and 8 when the patients had attended the Pain Relief Clinic. The strategy predicted a reduction in sensory pain scores and lower distress. It was also the strongest predictor of a "good" outcome according to the clinicians' ratings.

The discussion in previous chapters has proposed that active coping may have beneficial effects because it may entail behaviours and thought processes (attitudes, beliefs and motivations) whose nature help to distract the patients or allow them to reinterpret their pain in a positive way. Although the factor of coping style did not interact with personality (or any other factor), there may be positive qualities to those who adopt such a style that results in more support from others (or at least lack of avoidance) which in itself is beneficial. Similarly, clinicians may respond unconsciously to the more positive and active style of such patients when making ratings of their conditions. Two patients may have objectively the same clinical state, but it is not implausible to propose that a clinician may be swayed to rate a better outcome in the patient who is apparently actively coping with their lot.

While the regression analysis was undoubtedly the most powerful analytical approach, it is important to observe some relationships between coping, personality and emotional state that were evident in the correlation analysis which was also conducted in Chapter 6. Those patients who had more neurotic traits, and those with higher levels of anxiety, depression and GHQ distress were shown to cope less well as indicated by increased use of denial and passivity. This would imply that such patients have problems in the stage of "secondary appraisal" in coping (Lazarus and Folkman, 1968). The stage involves assessing the stressful situation, deciding what can be done about it, and predicting whether a given coping response will be effective.

This result and its implications may be useful for clinicians because it may predict those patients who, when referred to the pain relief clinic, may require particular support or help to benefit from treatment. In some cases where anxiety is a problem contributing to difficulty in coping, it is known that provision of information may often help reduce uncertainty which, in turn, tends to lead to a reduction in anxiety (Jackson and Lindsay, 1995). A further research study might consider the use of information-giving in pain clinics targeted particularly at patients showing emotional distress.

More generally, one may note that there is evidence that differences in the use of pain coping strategies may play a significant role in adjustment to chronic pain (Buckelew et al., 1990; Bombardier et al.; 1990; Jensen et al.;1991, 1995; Elton et al.; 1994; Geisser et al.; 1994; Hill et al.; 1995). These authors have emphasised that there is a need for a greater understanding of factors relating to adjustment.

In order to understand the role of coping strategies in chronic illness, a range of coping strategies needs to be considered. For example when pain is chronic, patients typically develop a repertoire of behavioural and cognitive coping strategies (Tan, 1982). Some patients cope well with their pain and continue to lead active, productive lives, while others cope poorly and experience excessively high levels of psychological and physical disability (Beckham et al., 1994). Although psychological factors have been studied extensively with regard to the process of coping with pain over the years, some suggest that the focus of research needs to be more on causality. For example, Hill et al. (1995) point out that there is a need to devise a study which can answer questions of causality, perhaps through the use of coping skills training programs where coping and adjustment are examined at both pre- and post-treatment phases.

Jensen et al. (1991) conducted an investigation of the effectiveness of three pain-coping strategies. These were ignoring pain, using coping self-statements and increasing activities when in pain. All were related to adjustment over and above the effects of pain severity and were directly associated with psychological functioning. Their findings argue for continued research to determine the mechanism by which perceived pain severity affects the effectiveness of coping strategies.

It was noted in Chapters 3 and 4 how family, parents, friends, social support, religious beliefs and health professionals have important roles in enabling people to cope with pain (e.g. Bracken, 1980). Morley et al. (1995) propose that beliefs about the experience of pain should be related to other key psychological constructs such as coping strategies and compliance with treatment. Depending upon their nature, these factors may help or hinder the coping process. It is unfortunate that the present methodology did not include measures of compliance with treatment: clearly such a measure might be affected by such factors as pain beliefs and support, and would in turn affect the nature of outcome. It is interesting that none of the studies reviewed above had incorporated this important methodological proposal.

9.1.3 Support

The literature review showed that social support is an important factor in influencing the pain and distress suffered by the patient in chronic pain. It is therefore encouraging that the present research confirmed the importance of the factor in that it was evident that some patients who perceived a lack of support from family, and avoidance by others because of their pain experienced more pain and distress. The regression analysis of Chapter 6 showed that the factor was the most powerful predictor of pain and distress, and that it interacted with neuroticism.

The interaction was interesting because it showed that neurotic individuals who also perceived that they were avoided by their close family and friends experienced more pain (assessed by the MPQ), and also greater distress (shown in their GHQ scores). This result provides interesting additional insight to the influence of social support on the pain patient. Chapter 3 described the studies by Gil et al. (1987) and Swimmer et al. (1992) which showed how family and friends can reinforce pain behaviours. Swimmer et al. made the particular point that the interaction between patient and family was probably reciprocal in that just as the family might influence the patient, so the patient might influence the family. Swimmer et al. speculated that the patient's characteristics might influence this interaction: the present results might imply that neuroticism is a relevant characteristic and one that may have an adverse effect, particularly where the patient has a poor perception of the family's attitude towards him (or her).

This perception of lack of support was, however, only predictive of pain and distress in the period sampled prior to the patients' attendance at the Pain Relief Clinic. One might then speculate that the factor is either irrelevant to the patient's condition after attending the clinic or that attending the clinic provides some supportive function which makes up for the lack of support in the patient's personal life. In this regard it will be recalled from Chapter 8 that the majority of patients gave a very high rating to the care and interest shown by staff at the clinic. It might seem plausible then to propose that, in the short-term at least, a beneficial supportive function is provided by the clinic. It is highly relevant here to note the personal communication to the author of the observation by Dr. Rogers the head of the Pain Relief Clinic. Dr. Rogers has commented that many patients are realistic in appreciating that the clinic is limited in what it can do to improve their physical state. They do, however, appear to benefit simply from attending the clinic and talking to staff. Dr. Rogers commented that some patients will telephone before going on holiday just to speak to their consultant who will give some reassuring words that sustain the patient during their travels.

One might speculate then that when patients lack social support (and the beneficial effect that this may have upon their pain experience) this may be at least partially mitigated by the support provide at the clinic. Note, however, that such support from the clinic need not necessarily be beneficial. The regression analysis in Chapter 7 showed that a strong belief in the power of health professionals to help was actually associated with a smaller improvement in affective pain scores. The clinic may, while being supportive, inadvertently act to reinforce the patient's pain behaviour and beliefs. This would be entirely consistent with the results of Gil et al. (1987) and Miller (1993c) who have shown enhanced pain behaviour under some conditions of support. Clinic staff should, therefore, be made aware of the fact that they may, despite their good intentions, have the effects of increasing the patient's likelihood of reporting pain.

The fact that some patients do perceive a lack of support from family and friends might imply that interventions to help the patient would include spouses and partners in therapeutic discussion. It was noted in the introduction that while the spouse or family could be important agents for good in helping the patient with pain, they could also have an adverse effect if over-solicitous, hence reinforcing pain behaviours (e.g. Benjamin, 1989; Gil et al., 1987; Paulsen, 1995). Similarly, if the patient's pain behaviour is causing marital or family disharmony, then this will increase stress for all concerned and may increase the patient's perception that the situation is beyond their ability to cope. Many pain clinics have psychologists on their staff whose expertise is to help patients manage the physical discomfort and emotional distress caused by their pain. They may provide simple behavioural techniques to help in daily pain management, or cognitive approaches that distract patients from their pain or encourage them to re-interpret their pain in less threatening ways.

9.1.4 Diagnostic Category

The literature review showed that the majority of previous studies of chronic pain have tended to use heterogeneous patient samples: in other words, the patients suffer from a variety of physical conditions causing pain such as low back pain, prior surgical intervention and cancer. From a methodological point of view, it might be more satisfactory to focus upon a homogeneous group, i.e. a group of patients all of whom are in the same diagnostic category. This important issue will be considered in depth below when issues of methodology are discussed. At present, the discussion will focus upon the implications of the results arising from the present heterogeneous sample.

While unpredicted in the research hypotheses, the diagnostic category was predictive of pain scores, but not distress, in Chapters 6 and 7. Moreover, there were different predictive effects according to whether the assessment was made before or after the patients' visit to the Pain Relief Clinic.

Prior surgery was a predictor of total and sensory pain before the clinic visit. Those patients whose condition was diagnosed as due to previous surgical intervention(s) experienced more pain. Although prior surgery also influenced pain scores after the clinic visit, the effect was opposite in nature in that it was reflected in lower scores on the rather obscure score dimension of the McGill entitled "number of words chosen" (NWC: fewer words chosen to describe the pain are supposed to reflect less pain). The latter effect may be difficult to interpret and must be set in the context of the fact that the analysis showed that low back pain was the most powerful predictor of pain after the clinic visit. Those patients suffering low back pain showed least improvement in total pain score after attending the clinic. This result is consistent with Anderson and Rehm's (1984) report that patients suffering low back pain showed least improvement in response to treatment in their heterogeneous sample (which excluded cancer patients).

Low back pain patients seem to comprise a group who have poor prognosis. Waddell (1987) and Waddell et al. (1986) have concluded that there is no evidence that any treatment for low back pain is better than "a combination of the natural history [of the disease] and placebo effect." The researchers have concluded that the main problem for such patients is emotional distress rather than physical symptoms. One implication of this might be that psychological interventions may be more effective than the conventional 'medical' treatments administered in the pain clinic environment. This conclusion would seem to reinforce the earlier conclusion of Keel (1984) that back pain cannot be explained solely in medical terms, but also requires a "biopsychosocial" approach; i.e. one that takes account of social and psychological factors in addition to the supposed physical basis of the pain.

While low back pain predicted continuing pain after the clinic visit, the diagnostic category of "degeneration" predicted a good outcome rating by the clinician. Degenerative conditions were primarily those arising from arthritic / rheumatoid conditions.

None of the above diagnostic categories interacted with other variables that might have helped to explain the rather different effects of diagnosis upon pain and outcome. It is also notable that none of the diagnostic categories was predictive of distress. This may, however, be an artefact of the very small number of patients in some of the diagnostic categories. For instance, only two patients were included who suffered from cancer. This issue will be considered in detail below in the section concerned with methodological flaws.

9.2 Implications for Psychological Interventions

Most pain relief clinics have a psychologist on staff, or available, to provide psychological interventions to help patients. There are several interventions available.

A simple approach might be one of education: it was noted above that information leaflets can be helpful on the basis that a reduction in uncertainty is often associated with a reduction in anxiety (Jackson and Lindsay, 1995). It was evident from Chapter 8 that relatively few patients had gained insight to their pain condition after attending the Pain Relief Clinic. This might imply that the Clinic could usefully consider providing information, tailored to the patient's needs, in the interests of reducing anxiety and hence, perhaps, pain and distress.

It is beneficial to many patients if the cause of their pain is explained to them, and particularly if it is couched in terms of the Gate Control Theory so that they can understand how their psychological state may affect their pain (Booker, 1994). This point was made earlier in the context of neurotic patients whose state of high anxiety, tension and pessimism may be additive in 'opening the gate' and increasing the experience of pain.

The approach of cognitive restructuring is also beneficial because patients are helped to reconsider beliefs and attitudes to their pain that may be factually incorrect or maladaptive. For example, Weiner (1988) reports success in having patients re-evaluate the extent to which pain impedes their daily activities. Patients may state that "I can do very little because of my pain", but when a diary is kept of their actual activities it may reveal that they are much more active than their pessimistic statements suggest. This may come as a revelation to the patient. The psychologist can use the objective evidence to counter the patient's pessimistic beliefs. The patient can be encouraged to change his or her perception, and hence change their pain behaviour.

Such an approach might be employed in the context of the present patients' perception of avoidance / lack of support by others. Cognitive restructuring would permit the problem to be tackled in two ways. First, if it were objectively true that the patient was being avoided, then they could be encouraged to consider what aspects of their pain behaviour might lead others to avoid them and hence, if that behaviour were changed, how matters might improve. Secondly, if their perception of avoidance was in fact a misperception, they could be encouraged to find evidence to challenge that belief and hence reinterpret the situation in a more positive light (Lindsay and Powell, 1994).

The management of anger is also helpful because it is the patient's family which is often the focus for understandable feelings of frustration and hostility that build up in the patients suffering persistent pain (Deffenbacher, 1991). The present results noted that some patients felt isolated from family and friends and this may be a reflection of the latter's perception of hostility from the patient (unfortunately, no direct measure of hostility or anger was taken, so this must remain a speculation). Relaxation techniques can be helpful when applied with training of the patient to anticipate situations where anger is likely to arise.

Relaxation and breathing control can be taught as a general coping skill because it helps reduce pain which arises in tense patients through muscle tension. Breathing control also distracts the patient's attention and helps the patient to sleep (Turk et al., 1983). Again, such an approach might be particularly beneficial in the present study where pain and distress were associated with neurotic tendencies. Neuroticism is associated with tension and anxiety, both of which could benefit from relaxation and breathing control.

Control of breathing is also helpful because patients in persistent pain are often prone to hyper-ventilation which in turn can lead to anxiety or panic attacks, hence exacerbating the pain (Syrjala, 1990). The technique of progressive muscular relaxation is also helpful (Jacobson, 1974).

Attention was mentioned above and this, too, is amenable to control. Again, Turk et al. (1983) and Fernandez and Turk (1989) have advocated several strategies that are helpful. A simple strategy might involve attempting to ignore the pain by focusing on pleasant images or memories. Unfortunately, it is known from dental research that such a technique is often ineffective where patients are highly anxious (Kent and Blinkhorn, 1994). Given the high levels of anxiety and neuroticism seen in the present sample, such an approach might not, therefore, be particularly effective. More effective attentional approaches involve those that do not dismiss the reality of the pain but attempt to change the perception of it (much like cognitive restructuring above). For example, "somatisation" involves the patient attempting to scrutinise the painful area in a detached or impersonal way to analyse the physical properties of the pain devoid of emotion.

The effectiveness of such psychological interventions has been established in reviews of studies where careful use has been made of control and placebo conditions (Flor et al., 1992). However, adhering to psychological interventions can be a problem and it is recognised that between 30 and 70% of patients fail to maintain the skills that have been taught (Keefe et al., 1986). It would seem important to conduct a study to examine whether it is possible to predict the situations or patient characteristics that lead to non-adherence.

9.3 Omissions and Flaws in the Study

The method section described the initial difficulty in recruiting the control group. Although this was resolved, such that both the study and control group were drawn from the same patient population, the delay in recruitment meant that the control group was not sampled in parallel with the study group. Moreover, Chapter 5 explained that the present thesis is a re submission of an earlier version. It was explained that in the re-analysis the present study and control groups were combined after their recruitment in order to form a large single group upon which to make general assessments to test the main hypotheses. Clearly, it would have been better to have recruited the total group first and then divided it on a random basis to form the study and control groups. While there is no reason to think that this may have had an adverse effect, it is not methodologically ideal and would be avoided in any further research.

The size of the present sample was comparable to those of previous investigations and adequate for overall statistical purposes as confirmed by the power calculation reported in Chapter 5. In such studies as this, sample size is limited by the willingness of patients to participate and this may be influenced by the nature of the medical condition. It was recorded in Chapter 6 that some 50% of those approached actually agreed to take part.

The high refusal rate must raise the question of how representative the sample might be. For instance, it is possible that those who were particularly distressed or incapacitated by their pain felt that participation was beyond them. The study would then fail to sample extreme reactions to pain. Those who agreed to participate may not only be less impaired by pain but may also be more outgoing types. The latter proposal may, however, be less plausible because Chapter 6 showed that the present sample were similar in personality characteristics to the population norm with the exception of their high scores on neuroticism. Nonetheless, it is clear that the sample may have suffered some degree of bias due to the high refusal rate and the results must be viewed with that fact in mind.

One must also comment upon the fact that patients completed the questionnaires at home. This method was adopted because of the demands made upon the patients' time at the Pain Relief Clinic. It was impractical to have the patients complete the questionnaires while waiting to be seen at the clinic because they would invariably be called while filling in the forms, hence causing disruption. The waiting area was not ideal because of distraction due to noise and the activities of staff and other patients. It was also pointless to attempt to have patients complete the questionnaires after their consultation because, understandably, the majority wished to leave the clinic as soon as possible and return home.

Thus, given the number of questionnaires, and the need to have patients give careful consideration to their answers, it was thought best to have them complete the forms at home. This was not without its own potential disadvantage, however. At home, the patient might seek the advice of a partner or relative as to how best answer questions when the patient was uncertain how to respond. Some responses might then reflect the partner's view of the situation rather than that of the patient.

Given the number of assessments to be made in the present study, it is difficult to see how to propose a better way of having patients complete the forms. Equally, it must be recognised that the number of forms to be completed may have acted as a disincentive for some patients to participate, hence partially explaining the relatively high refusal rate discussed above.

The heterogeneity of the present sample has also been discussed briefly above. Although it was noted in the literature review that many previous studies have used similar heterogeneous samples, it would have been methodologically more sound to recruit patients from only one diagnostic category because the resulting homogeneous sample would be likely to reduce inter-subject variation in the measures. However, one might defend the present heterogeneous sample on the following grounds.

First, the sample is representative of the typical range of patients seen at the Gartnavel Pain Relief Clinic. Given that one of the aims of the research was to determine whether the Clinic was beneficial to its patients, it might seem logical to sample from the range of cases typically seen.

Secondly, given the difficulties in recruitment described above, it was pragmatic to recruit all possible patients to the study in order to attain a sufficient sample size for the analysis. Thirdly, the statistical analysis does, in theory at least, permit one to examine variation between the diagnostic categories in order to determine their effects upon pain and distress.

The latter defence concerning the statistical analysis does, of course, encounter problems with the fact that some of the diagnostic categories had very few patients. For example, only two patients were suffering from pain due to malignant disease. Even if there were profound emotional consequences associated with such pain, the analysis would be most unlikely to detect the effect. In contrast, where categories such as prior surgery or back pain involved relatively large numbers of patients, there is the risk that they may give rise to 'significant' effects that are in part artefact. An example of this is seen in Chapter 8 where all patients in the "degenerative" category had a good outcome, hence resulting in that factor being a very powerful predictor of outcome. However, if there had been more patients in some of the other categories it is possible that other predictors might also have been seen.

While it is important to acknowledge the possible error introduced by the problem of sample size, it should be recalled that many of the present results are consistent with the results of previous studies in the literature. For instance, low back pain predicted a small change in pain score after attending the Clinic, a result that is consistent with the studies by Waddell and colleagues mentioned above. Nonetheless, if the present research were to be repeated, then it would be preferable to attempt to recruit patients to form a much more homogeneous diagnostic group.

A final methodological issue relates to the observation in the literature review that a proportion of persistent pain patients suffer some kind of mental disorder (Benjamin, 1988). Although the present interest was in 'normal' personality rather than pathological states, it might, in retrospect, have been appropriate to have screened the present sample for psychiatric problems. An instrument such as the Symptom Check List 90 (SCL-90) would have been appropriate. Green et al. (1996) have shown it useful in screening for psychopathology in anxious dental patients many of whom report inappropriate experience of pain during treatment.

9.4 Final Statement on the Outcome of the Research

It must be acknowledged that the present research has a number of methodological flaws that, if the research were to be repeated, would certainly require amendment.

Those flaws have been described above and their possible effects upon the results have been discussed.

Despite these undoubted failings, however, it would seem that a number of reliable conclusions can be made from the results that confirm the research hypotheses. Chronic pain patients do appear to constitute a particular group characterised by higher levels of neuroticism and higher emotional distress than the age-matched population norm. Moreover, regression analysis confirms that neuroticism is an important predictor of the pain and distress suffered by these patients prior to receiving treatment at a pain clinic. The factor also interacts with specific diagnostic state to result in more marked suffering. Neuroticism does not, however, predict outcome after attending the clinic.

The coping strategy adopted by the patient was also confirmed to be an important predictor of distress prior to and after attending the clinic. The same was true of the influence of social support in that it was seen to be a significant predictor of the patient's state both before and after attending the clinic.

It might therefore be helpful to the staff of pain relief clinics if they had available the results of assessment of patients' personalities, coping skills and support networks in order to anticipate the patients' likely behaviour and response to treatment. They should be aware that some patients may be prone to perceive avoidance by others as a response to their pain and that this is associated with emotional distress and increased pain. Staff should be careful to ensure that their own behaviour did not reinforce such a perception. On the basis of previous research, they should also be made aware that the process of communication between staff and patients may exert subtle behavioural effects that may reinforce some pain behaviours.

Finally, the results suggest that different diagnostic categories may predict different degrees of pain and distress depending upon whether the patient has or has not attended the pain clinic. It was acknowledged that such a conclusion might be tenuous because of the small number of patients in some of the diagnostic categories, but it might indicate a productive area for further research.

Overall, the results indicate that there may be many opportunities for the psychological interventions discussed above to help patients who suffer chronic pain. In applying such interventions, it would seem necessary to take careful account of the effects of personality, coping style, social support and the diagnostic category if one is to understand fully the basis of the patient's pain and distress.

9.5 Final Speculations on Unconscious Processes

In this final section, the author would like to turn from the empirical study of pain described above to introduce consideration of a facet of the process of coping with pain and other stress that has been neglected. Part of this neglect may arise from the fact that it is based in a theoretical structure that would be difficult to subject to empirical test. The author's interest is a reflection of his own background in a different culture to that which has formed the concepts and theories of Western psychology. Eastern culture and philosophy is concerned with religion and its role in every day life. It is also concerned with psychodynamic forces. In the following paragraphs, some consideration will be given to the possible role of the unconscious in coping with pain and other problems.

Ellenberger (1970) has noted the assumption that a part of psychic life escapes man's conscious knowledge has been held for many centuries. In the seventeenth and eighteenth centuries, it attracted more attention; in the nineteenth century it became one of the cornerstones of modern dynamic psychiatry.

From many perspectives, whether philosophical, clinical or experimental, the concept of the unconscious becomes a compelling assumption for psychological theory. However, as Grossman (1995) points out, "the form that the unconscious takes is open to debate."

It can be proposed that future emphasis in research might pay more attention to the interaction between conscious and unconscious effects in the experience of emotional stress and pain. An additional measure of an individual's personality might be the interaction between the conscious and unconscious experience.

Most of the investigators who have studied chronic pain patients have focused on mental states that are represented in phenomenal awareness such as motivation, behavioural coping strategies, overt personality, feelings, thoughts and beliefs. However, this neglects unconscious forces.

Coping strategies and personality may reflect interactions between conscious and unconscious energies. Indeed, apparently conscious behavioural strategies may be influenced by unconscious ones, a point of view that would be advocated by psychodynamic theorists.

Unfortunately, such a view may be difficult to confirm. Miller (1993a) notes that "in most cases it is more difficult to operationalize a passion than a perception, to design an experiment that will study an unconscious motive, rather than a conscious intention. Similarly, Lazarus (1991a) has observed that "the notion of an unconscious emotion, in contrast with an unconscious appraisal or coping process, is logically and empirically awkward."

Kihlstrom (1993) has also observed that the topic of the unconscious has often been regarded as of "cult interest", which might imply that many investigators have tended to regard it askance. This would seem true in the past: Eysenck (1960) was one who was vocal in questioning whether the psychodynamic approach had any insight to offer by way of understanding human experience. Gamsa (1994a) has noted that such attitudes led to a strong tendency to ignore concepts of the unconscious but through the 1970s and 80s there was developing recognition of the therapeutic usefulness of techniques such as meditation and self-control which drew upon 'inner processes' which might be inaccessible to conscious thought.

Nonetheless, some investigations have perceived the value of considering unconscious processes in the treatment of their patients. For example, Schultz et al. (1992) and Gibson (1994) refer to the earlier work of Williams et al. (1988) which demonstrates clearly that non-conscious information processing occurs routinely as a part of every day experience. Bakal (1979) has asserted that we need to revise our thinking about unconscious mental processes. Patients and physicians alike believe that processes outside of awareness may underlie many medical complaints. Therefore "they recommend that medicine become more holistic, more based on treating patients with physical skills, psychological skills, and concern for making the patients become more fully functioning (Bakal, 1979).

The holistic approach is certainly part of the new ethos in "behavioural medicine" or "health psychology". However, Miller (1994a) has made the interesting observation that "Behavioural medicine is a boom industry where it is used in the treatment of psychophysiologic disorders. However, to remain a viable therapeutic modality with a respectable record of clinical efficacy, behavioural medicine will have to face some disturbing complexities in both its theoretical conceptions and practical applications."

With direct relevance to Miller's statement, Eccleston (1994) has pointed out that recent reviews in pain research have been critical in tone for researchers to think more widely and creatively about the theoretical needs of pain research. Power et al. (1991) refer to the recent works of many authors who, partly in response to advances in experimental cognitive psychology, have drawn attention to the role of unconscious processes (Brewin, 1988, 1989; Masonry, 1980; Meichenbaum and Gilmore, 1984; Power, 1987: Van Den Bergh and Eelen, 1984). Specifically, Weiss and Sampson of the San Francisco Psychotherapy Research Group (1986) have asserted the central role of the patient's unconscious in analytic treatment for pain. Again, perhaps this marks an important avenue for further research.