THE DEVELOPMENT, STANDARDISATION AND VALIDATION OF AN INSTRUMENT DESIGNED TO MEASURE COPING WITH CHRONIC PAIN

Thesis submitted in accordance with the requirements of the University of Liverpool for the degree of Doctor in Philosophy by:

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October, 1987

ABSTRACT

The purpose of the study was to investigate the structure of coping with chronic pain and to develop a standardised, reliable and valid instrument to measure coping with chronic pain. The use of this instrument as a measure of change in the evaluation of a local Pain Management Programe was investigated.

The Pain Coping Questionnaire was developed from analysis of responses of 298 chronic pain patients to a self-report questionnaire concerned with coping with chronic pain. Following empirical psychometric investigations of reliability and validity, four psychologically meaningful dimensions were identified. One dimension, the General Coping Measure, was a measure of psycho-social adjustment to chronic pain. Three dimensions measured beliefs in the use of cognitive and behavioural pain coping strategies. One dimension, Active Coping Strategies, measured active pain coping strategies. Two dimensions, Avoidance and Use of Drugs, measured passive pain coping strategies. Belief in the use of active pain coping strategies was predictive of good psycho-social adjustment. Belief in the use of passive pain coping strategies was predictive of poor psycho-social adjustment. The results from outcome studies indicated that the Pain Coping Questionnaire was a sensitive measure of change. The Pain Management Programme had beneficial effects with respect to short-term outcome.

Limitations were discussed. It was concluded that the Pain Coping Questionnaire represents an original contribution that is likely to have broad applications in the assessment and treatment of chronic pain patients.

ACKNOWLEDGEMENTS

I would like to thank Dr. P. D. Slade, my superviser, for his most excellent and highly valued advice, help and encouragement which I have gratefully received throughout the programme of work.

My thanks to Mr. D. Reid, Ms. A. Wright, Mr. R. Sutherland, Ms. J. Grimshaw and Mr. N. Radcliffe for help in collecting the data.

I would like to thank Mr. M. Dewey for his clear advice on statistics and Dr. G. Humphris for helpful discussions over interpretation of factor analysis.

I would also like to thank Dr. C. Wells, Centre for Pain Relief, and Dr. D. Bowsher, Pain Relief Foundation, for referring patients and for valuable advice.

I would like to thank Mr. R. Jones, Dr. D. Venn and Staff of The Pain Relief Foundation for providing such excellent research facilities. Particular thanks to Dr. C. Hughes for making machines friendly and to Mr. P. Penman for his careful work on the tables. I also thank Mrs. K. Charters and Mrs. D. Harrington for efficient secretarial support.

A special thanks to my wife, Ruth for, among other things, producing such excellent illustrations and to my son, James, for his enthusiastic encouragement.

Finally, I thank all the subjects who took the trouble to complete so many questionnaires.

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CHAPTER 1

LITERATURE REVIEW

1.1 INTRODUCTION

Pain is a useful and adaptive response. It functions to warn the organism that tissue damage has been inflicted and that preventative or healing actions need to be taken. Pain is defined by Merskey et al, 1979 as:-

> "An unpleasant experience which we primarily associate with tissue damage or describe in terms of tissue damage or both."

The aim of treatment is to correct the underlying cause of the pain. When the tissue damage heals, the pain usually subsides and pre-morbid functioning can be resumed. In some cases, the pain persists long past healing time. When this occurs, pain ceases to have any useful function and becomes a maladaptive response that demands treatment in its own right and beyond that of the initial cause of the pain. When the pain persists for longer than 6 months it is usually called chronic pain.

Bonica (1980) estimates that chronic pain affects nearly 35% of Americans and over 50 million of these people are partially or completely disabled for periods of a few days to permanently. In the U.S.A., 56% of the labour force (Snook,1980) will ultimately receive treatment for back pain. Chronic low back pain, in industrial settings, makes up the single most expensive medical insurance cost

factor. In the U.K., D.H.S.S. (1979) figures show that £220 million is lost in output every year and £40 million is paid in sickness, invalidity and disablement for back pain alone. Chronic pain is a very costly problem, both in terms of personal suffering and disability as well as being an economic drain on society.

Medical treatments for chronic pain are often unsuccessful. Despite medical and surgical advances, it is estimated that only 30-40% of chronic pain patients obtain adequate longterm relief from pharmacological or surgical treatments (Loeser, 1974; White,1969). The failure of traditional medical approaches to deal with chronic pain problems together with the development of health psychology and behavioural methods over the past 15 years has brought about a wider perspective on chronic pain that includes a psychological dimension. Psychological theorising has made major contributions to the understanding of chronic pain phenomena. New and innovative methods of pain management based upon psychological principles have been developed with promising results.

1.2 THEORIES OF PAIN

1.2a Specificity Theory

Specificity theory of pain conceptualises pain as a sensation that results directly from a nociceptive stimulus impinging on a pain receptor. Pain is viewed as a sensory experience, mediated by specific central neural substrates and directly proportional to stimulation of peripheral pain receptors. Medical treatments of pain are based upon this model. Treatment interventions that follow from

this model attempt to reduce the tissue damage directly or interrupt the transmission of neural impulses coming from the damaged tissue, so that the perception of pain is eliminated or reduced.

This theory of pain has its roots in Descartes (1664) who proposed a direct transmission of sensory information and pain experience from the skin to the brain. Muller (1842) in his "Doctrine of Specific Nerve Energies" stated that the brain received information about external objects via sensory nerves which were connected to the cortical centre responsible for the sensation. Von Frey (1894) expanded this theory to consider the receptors. He designated free nerve endings as specific pain receptors which project via a pain pathway to a pain centre in the brain. This view of a simple and direct relationship between nociceptive stimulation and pain experience has been reinforced by the successful application of analgesic agents and procedures in the relief of acute pain. Hardy et al. (1952) stated:

> "The adequate stimulus for pain sensation is the damaging of tissue".

Although the physiological/anatomical model of pain has dominated medical approaches to pain relief, an alternative conceptualisation of pain has developed which emphasises pain as a perceptual rather than a sensory experience. Marshall (1894) believed that pleasure and pain were experiences rather than sensations and Head (1920) made a clear distinction between "discomfort" and "pain". The notion that pain is a complex perceptual phenomenon rather than a simple sensation directly proportional to tissue damage has been developed by the much quoted work of Beecher (1946,1956,1962). Beecher (1956) compared the

pain experience and analgesic consumption of war wounded soldiers in comparison to civilian surgical patients. He found in a study of 215 men seriously wounded in battle that only 25% of soldiers wanted a narcotic for pain relief in comparison to 80% of the civilian group with similar surgical wounds made under anaesthesia. The difference in pain reaction was attributed to the significance assigned to the wound rather than the extent of tissue damage. In the case of soldiers, injuries sustained on the battle field meant escape, while in civilian life further surgery meant possible disaster. Beecher commented:-

> "Suffering consists of 2 principle factors, the initial sensation and the reaction to sensation. There is no simple relationship between stimulus and subjective response", (Beecher,1959).

Many experimental studies have been conducted which demonstrate that there is not a simple relationship between tissue damage and experience of pain as predicted by the Specificity theory. There are clinical reports of pain without tissue damage (Melzack,1965) and reports of absence of pain despite severe injury (Beecher,1959). Numerous studies have demonstrated that psychological variables exert a significant influence on pain. Psychological variables that have been shown to be important include personality attributes (Lynn and Eysenck,1961; Bond and Pearson,1969; Bond,1971; Rosen et al.,1980), attention (Blitz and Dinnerstein,1971; McCaul and Haughtvedt,1982), anxiety (Beecher,1972; Hill,1952; Lindsay,1983), perceived controllability (Bowers,1968; Girodo and Wood,1979; Turk and Genest,1979) and socio-cultural factors (Sternbach,1965; Weisenberg et al.1975).

The Specificity theory does not adequately account for clinical and experimental findings which clearly demonstrate that there is not a direct relationship between pain experience and tissue damage. While it is now known that each receptor structure has its own adequate stimulus and that pain-generating receptors transmit impulses that follow certain pathways in the spinal cord and thalamus, pain experience is a more complex phenomenon.

1.2b The Gate Control Theory of Pain

The Gate Control theory of pain was proposed by Melzack and Wall(1965) and represents an attempt to integrate neurophysiological and psychological variables into a unified theory of pain. It was developed from an understanding of the phsyiological and psychological influences of pain experience. These influences were a high degree of fibre and pathway specialisation in the CNS, the role of spatial and temporal patterning in nerve transmission, influences of psychological factors on pain perception and response and the role of spatial and temporal summation in the spread of pain and its persistance after healing.

The theory is outlined in Fig.1.1. The theory proposes that the transmission of impulses from afferent fibres to spinal cord transmission (T)cells is modulated by a spinal gating mechanism in the substantia gelatinosa of the dorsal horns. Large diameter A beta fibres inhibit transmission (close the gate) whereas small diameter A delta and C fibres facilitate transmission (open the gate). The spinal gating mechanism is also influenced by descending impulses from the brain. A specialised system, the central control trigger,

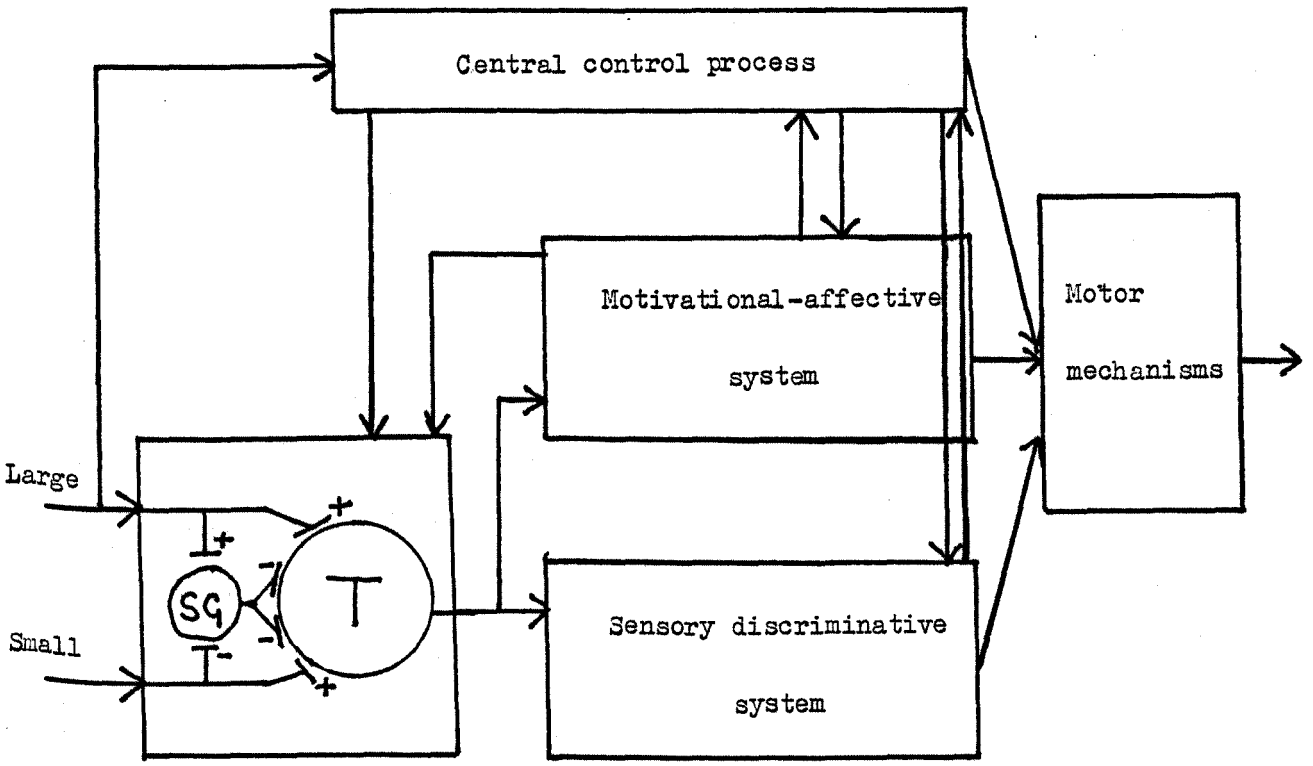


Fig. 1.1 Conceptual model of Gate Control Theory showing sensory, motivational and central control determinants of pain.

activates selective cognitive processes that modulate the spinal gating mechanism. When the T cells exceed a critical level, the central control trigger is activated and pain is experienced.

Melzack and Casey (1968) proposed that there are three major psychological dimensions of pain which are subserved by physiologically specialised systems in the brain. The dimensions are sensory-discriminative, affective-motivational and cognitive-evaluative.

The sensory-descriminative dimension is primarily a sensory process with a physiological basis and dependent on organic pathology and perceived and prevailing levels of nociceptive stimulation within the organism. It is mediated by rapidly conducting neospinalthalamic pathways.

The affective-motivational dimension is primarily psychological in nature and subject to cognitive evaluation and past experience. It is thought to be mediated by activity in the reticular and limbic systems and influenced by slowly conducting paleospinalthalamic pathways. There is experimental evidence that these structures are implicated in the mediation of aversive emotional states. Electrical simulation of hippocampus, amygdala or other limbic structures may evoke escape or other attempts to stop stimulation (Delgado,1956). Cats show marked changed in affective behaviour including decreased responsiveness to noxious stimulation following ablation of amygdala (Scheiner and Cling,1953). Surgical section of the cingulum bundle produces changes in "negative affect" associated with chronic pain in human subjects (Foltz and White,1962). This evidence suggests that

limbic structures provide the neural substrates for aversive drive and affect that comprise the motivational dimension of pain.

Neocortical or higher central nervous system processes such as evaluation of the input in terms of past experience, exert control over activity in both the discriminative and motivational systems. Thus suggestion, expectation, past experience and cultural values all have profound effects on pain experience. The frontal cortex is thought to play a particularly significant role in mediating between cognitive activities and the motivational-affective features of pain.

These three dimensions of pain interact to provide perceptual information regarding the location, magnitude and spatiotemporal properties of noxious stimulus, motivational tendency and congnitive information. While the Gate Control theory has been criticised with respect to anatomical location and neurophysiological foundations of synaptic connections in the gating mechanisms (Nathan,1976), it has had a profound influence on multidisciplinary approaches to chronic pain. Its great strength lies in providing an integrated theory of physiological and psychological influences on pain and its emphasis on the modulation of pain by central processes.

1.3 CHRONIC PAIN

Chronic pain is usually defined as pain persisting for greater than six months duration. It differs from acute pain in several fundamental ways. Sternbach (1974) draws attention to the differences in physiological responsiveness. Acute pain is typically associated with change in autonomic activity (increases in cardiac rate,

respiration, sweating, muscle tension etc.). In contrast, chronic pain presents as a habituation of the autonomic responses. A pattern of vegetative signs emerges which may include disturbances of appetite and sleep, depressed libido, irritability, withdrawal of interests and depression. The pattern of responses commonly associated with acute pain is anxiety and with chronic pain, depression. Another major difference between chronic and acute pain concerns its impact on the individual. Pain of recent onset and short duration requires rapid but relatively minimal changes and adjustment. Chronic pain has a major impact on every aspect of functioning and as such introduces a psycho-social perspective beyond that involved in acute pain.

In many cases, the presence of chronic pain can be adequately explained in terms of the nature and severity of underlying organic pathology when for example the pain is due to some active disease process such as arthritis or cancer. Chronic benign pain refers to the chronic pain condition not caused by any active disease process, and when the pain becomes a disorder in and of itself. Chapman (1977) describes a set of behaviour patterns that characterise "chronic pain syndrome". A common feature of chronic pain syndrome is that as the pain lingers into chronicity, pain complaints become less consistent with organic pathology and there appears to be an increasing desynchrony between the sensory and emotional components of pain. The pain may increase in intensity and distribution and secondary or tertiary pains may develop.

In acute pain, pain intensity typically varies considerably from moment to moment. Intensity of pain fluctuates until it gradually subsides and eventually disappears when healing takes place. In

chronic pain, patients typically report high levels of constant pain. Swanson and Maruta (1980) asked a group of 200 pain patients admitted to an inpatient Pain Management Programme to rate their pain hourly while awake on a scale of 0 (no pain) to 10 (the most severe pain imaginable). Their estimates were averaged for three days. Thirty-five patients were assigned to a high pain group on the basis of average ratings of 8-10. Thus, from self reports, patients must have been experiencing virtually constant pain of maximal severity all day and every day.

Chronic pain patients are frequently unresponsive to medical treatments. It is not uncommon for patients to undergo multiple investigations and treatment which not infrequently result in an iatrogenic component to their pain problems. As the pain and disability increases, the psychological status may deteriorate and become increasingly characterised by withdrawal from occupational, social and family responsibilities. Many reports on the concurrence of mood change and chronic pain appear in the literature (Fielding,1980; Melzack,1961; Spear,1967; Bond,1978; Pilowsky and Spence,1975). Keefe et al. (1982) state:-

> "Clinical observation suggests that chronic pain patients are prone to report that they feel depression, anxiety and have numerous physical complaints."

Patients may assume a "sick role" or show "illness behaviour" (Mechanic,1962). This refers to a set of invalid behaviours such as passivity, inactivity, dependency and weeping. Mechanic (1962) desribes "illness behaviour" in the following way:-

> "By this term we refer to the ways in which given symptoms may be differentially perceived, evaluated and acted (or not acted) upon by different kinds of persons. Whether by reason of earlier experiences with illness, differential training in respect to symptoms or whatever, some persons will make light of symptoms, shrug them off, and avoid seeking medical care; others will respond to the slightest twinges of pain or discomfort, be quickly seeking such medical care as is available."

The unresponsiveness of chronic pain patients to traditional medical treatments combined with the frequent absence of physical pathology to account for the degree of pain and functional disability has resulted in such patients being labelled as having "psychogenic" pain. Sometimes to the chagrin of the patient, their pain may be seen as "imaginary" or "hysterical" or if in the medico-legal context, as "a malingerer". The descriptive value of these terms, which are often used interchangeably, is really limited to denoting a syndrome that cannot be adequately explained within the nociceptive model of pain.

Much effort and time has been spent by psychologists in diagnosing whether chronic pain patients are suffering from an "organic" or "psychogenic" pain. The assumption is that there are two types of pain which have different psychological characteristics. Various psychometric devises have been used to make this diagnosis. The Minnesota Multiphasic Personal Inventory (MMPI) is by far the most widely used instrument in the psychological investigation of chronic pain patients. Slade (1984) reports a review of over 50 papers on the MMPI and pain. The evidence that MMPI can differentiate "organic" from "functional" pain is conflicting (Hanvik,1951; McCreary et al.,1977; Rook et al.,1981). Fisher (1984) in a selective review concludes that it is an unreliable instrument for the diagnosis of organic/functional pain, the prediction of outcome or the

differentiation of acute from chronic pain. The conflicting and confusing results of this voluminous research is most likely to be due to the weakness of the question rather than the unreliability of the instrument. It is very doubtful whether there is a true dicotomy between organic and functional pain. Sensory and emotional components of pain are inextricably interwoven. They are not mutually exclusive and there is little justification in treating functional and organic pain as separate and discrete entities. Naliboff et al.(1983) concludes:-

> "The data do not support attempts at defining a low back pain or chronic pain personality profile apart from the emotional disturbance associated with chronic limitation and disruption of activity"

1.4 PSYCHOLOGICAL MODELS OF CHRONIC PAIN

1.4a Psychodynamic Models of Chronic Pain

Essentially psychodynamic theories of pain propose that certain early experiences can predispose persons to adopt lifestyles in which suffering is a key element. Chronic pain has been described as conversion neurosis, depressive equivalent or hypochondriacal reaction (Blumer and Heilbron,1982). Freud (1952) viewed pain as a conversion neurosis resulting from a compromise between the fulfillment of a "forbidden wish" and its punishment. Reich (1933) emphasised the relationship between (anal-retentive) personality traits and chronic muscular hyper-tension associated with some chronic pain syndromes.

The "legitimisation motivation" theory of chronic pain, proposed by

Meyer and Lyon (1979) represents an explicitly stated example of a psychodynamic theory of pain. This theory is outlined in Fig 1.2 . The authors suggest that when an individual with personality problems is confronted with stressful life events, this may result in a level of psychological disability that is unacceptable for that individual. If such individuals have an accident or become ill, and especially if they are in pain, their inability to cope socially and psychologically may be legitimised in the sense that it becomes acceptable socially and personally. Thus, according to this theory, some individuals who cannot cope with life, derive psychological benefits from apparent ill health. Meyer and Lyon (1979) in a longitudinal study of accident victims who subsequently developed chronic pain, reported finding increased stress levels before the accident and reduced levels following the accident. The authors concluded that this was evidence that the pain had resulted in life becoming less stressful.

Engel (1959) described the characteristics of "pain-prone" patients. These individuals experience pain in the absence of peripheral stimulation or nociception and are characterised by several features including a) prominance of guilt b) history of suffering, defeat and intolerance of success c) unfulfilled strong aggressive drive and d) development of pain upon loss of threatened loss. Chronic pain is seen as the somatic expression of unresolved psychic pain. The experience of pain serves as a punishment which relieves guilt feelings. Blumer and Heilbron (1982) have further developed these ideas and suggest that pain of uncertain origin should be viewed as a variant of a depressive mood disorder.

Szasz (1957) has proposed a psychoanalytic theory of pain that views

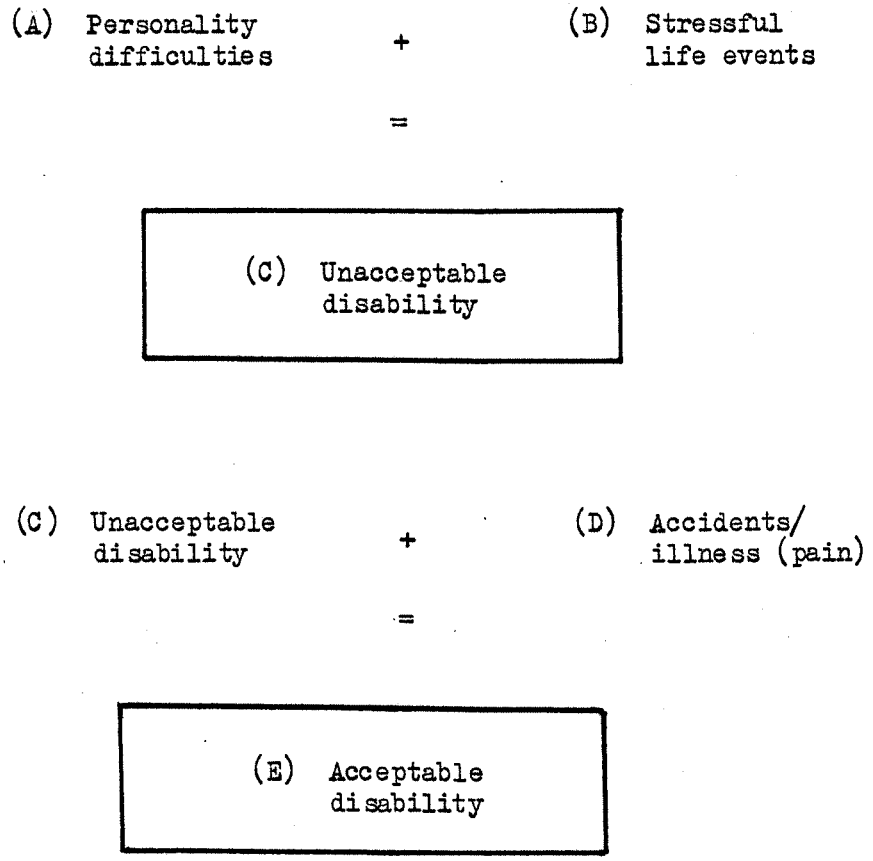


Fig. 1.2 "Legitimization motivation" theory of pain. (Myers and Lyon, 1979)

pain as resulting from the perception of a threat to the integrity of the body. Pain results from perception of threat to the body, regardless of whether the threat is real or imagined. Three levels of meaning of pain are postulated. According to Szasz the body is treated as an "object" by the ego which is separate from it. The ego experiences anxiety and pain when an important part or body function is lost. This constitutes the first level of meaning of pain, pain as a symptom. The second level of meaning of pain is as a form of communication used as a way of soliciting help. The third level of meaning of pain is symbolic and includes various forms of interpersonal manipulations and secondary gains.

Gentry et al. (1974) proposed the "dependency motivation" theory, outlined in Fig.1.3 . They suggest that chronic or dependent pain behaviour may arise through a combination of three factors. The first factor they term "unmet dependency needs" and satisfies individuals who may have suffered relative deprivation of their own requirements for care and protection during childhood and adolescence. They argue these needs may be present in individuals who are later born children from large families, who leave school and start work early, who marry early and who have children early. The second factor is the availability of the support lacking in their earlier life from family members at the time of their accident or pain. The third factor is early parental models for pain and disability. Some evidence for this proposition has come from studies based upon retrospective reports showing that parents, siblings and relatives or patients with chronic back problems have substantially higher numbers of pain complaints than controls (Anderson et al.,1977; Block,1981).

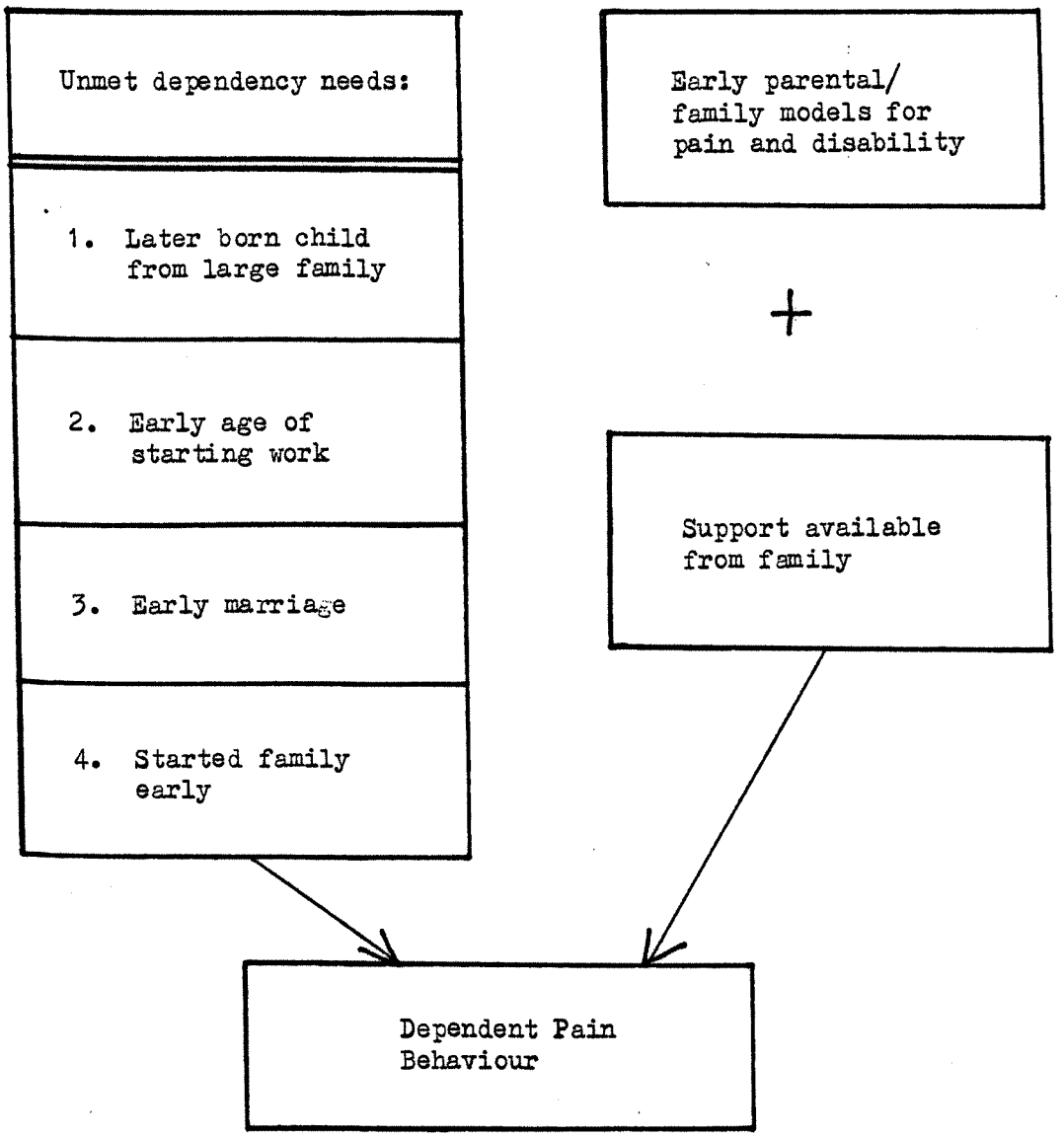


Fig. 1.3 "Dependency motivation" theory of pain (Gentry et al 1974)

Several uncontrolled experimental studies provide some empirical support for some of the assumptions made by psychoanalytically orientated theorists. Recordings of EMG activity over the painful area in chronic pain patients undergoing psychoanalysis have shown increased muscular activity when personal conflicts, especially hostility, guilt and frustration were addressed (Holmes and Wolf,1950; Dorpat and Holmes,1962). Theorists predicting both high levels of depression in chronic pain (Leavitt and Garron,1980) and low levels of depression (Castelnuovo-Tedesca and Krout,1970) have found support from studies investigating MMPI profiles (Blumer and Heilbronn,1982; Myer and Lyon,1979). Merskey and Spear (1967) report finding a greater proportion of chronic pain patients as being resentful and hostile persons and that psychodynamic predictions about underlying mechanisms are supported by objective clinical data.

Overall, the evidence of a usable psychodynamic model of chronic pain is weak and unconvincing. As with all psychodynamic approaches, the theories generated are unfalsifiable and this makes evaluations of clinical studies providing empirical support for the theory a somewhat perfunctory exercise. The evidence that is quoted lacks suitable control groups, lacks information about base rates of patients who suffer putative conflicts yet have no pain and is generally equivocal. Studies of the MMPI reviewed by Slade (1984) do not reveal any clear or consistent psychological profile to identify chronic pain patients. In general, personality characteristics found in chronic pain patients are the same as those found in many chronic medical conditions (Swanson et al.,1976). Psychodynamic models of pain are closely related to the medical model in that the detection and cure of pathology, albeit of psychic origin, is the central issue. This

approach, with the assumption that explanation and treatment lies within the person, has not been successful in chronic pain and psychoanalytic approaches have not offered any significant contributions to treatment. The main strength of these theories is the emphasis on early experience in shaping behaviour patterns and the main weakness is the failure to recognise the importance of environmental influences in determining ongoing behaviour.

1.4b Respondent Model of Chronic Pain

Gentry and Bernal (1977) suggest that classical conditioning of pain and tension may occur in an acute pain state due to some form of physical damage leading to a pain-tension cycle. Pain results from sustained muscular hypertension. Avoidance of movement may be used to reduce pain, leading to increased immobility that may increase tension and pain still more. Depression and dependency on medication may follow and intensify the pain-tension cycle further. Caldwell and Chase (1977) assumed that once an active pain problem exists, conditioned fear of movement may develop, motivating avoidance of activity and leading to muscular atrophy and increasing disability. The aim of treatment is to help the sufferer reduce the overactive physiological response (usually muscular tension) which is causing the pain. Relaxation training, anxiety management, autogenic training and biofeedback have all been used for this application.

Most of the research in this area has addressed headaches (Philips,1976; Chapman,1986) although a small number of studies have looked at other musculo-skeletal pain syndromes such as myofascial pain dysfunction (Budzynski and Stoyva,1973; Dohrmann and Laskin,1978;

Ghadiali,1979), chronic neck and shoulder pain (Hendler et al.,1977) and low back pain (Nouwen and Salinger,1979; Wolf et al.,1982; Linton and Melin,1983; Keefe et al.,1981). Although assessment measures, treatment variables and patient characteristics vary, making comparisons difficult, most studies demonstrate that relaxation training and EMG biofeedback significantly reduce pain ratings (Linton,1986). It has not been adequately demonstrated that EMG biofeedback offers any clear cut advantages over more conventional relaxation procedures (Turner and Chapman,1982; Chapman,1986).

The central assumption of the respondent model of pain is that elevation of EMG levels in key muscle groups and behaviour motivated by pain are highly associated and that reduction in muscle tension produces corresponding reductions in pain ratings. A number of studies have examined the relationship between muscular hypertension and pain. Increased lumbar EMG levels in low back pain patients compared with healthy controls have been reported in prone resting position (Grobel,1973), during differential relaxation (Kravitz et al.,1981) or during standing (Hoyt,1982). Not all studies have found the expected association between increased EMG levels and pain. Collins et al. (1982) did not find any differences between low back pain patients and healthy controls when measuring their lumbar EMG levels in different positions. Similar findings have been reported by other workers (Basmajian,1976,1978).

Treatment of pain derived from the respondent model predicts that reduction in muscle tension produces corresponding reduction in pain ratings. A number of studies have suggested that reducing EMG levels does not necessarily entail synchronous reductions in pain experience

or behaviour (Andrasik and Holroyd,1980; Martin and Matthews,1978). Philips and Hunter (1981) failed to discover the assumed relationship between tension levels and severity of headaches in tension headache sufferers. Forty per cent of a severe tension headache group showed no tonic abnormality. Other studies have shown that EMG levels cannot reliably differentiate migraine and tension headache sufferers. Stenn (1979) treated a group of myofascial pain dysfunction patients with progressive relaxation techniques and EMG biofeedback. He reported that despite reports of lowered pain levels after treatment, the level of muscle tension did not appear to be lowered.

Dohrmann and Laskin (1978) treated myofascial pain dysfunction with EMG biofeedback of masseter muscle activity. Subjects treated with feedback reported marked pain reduction and improved ability to open their mouths without discomfort. Again, EMG data were inconsistent with self report and other measures. Variations in EMG levels did not correspond with pain levels.

Louwen and Salinger (1979) compared EMG biofeedback assisted relaxation with no treatment controls in a group of low back pain sufferers. The biofeedback group showed significant decreases in subjective pain estimates and EMG levels with no change in the control group. Pain decrease and reduction in EMG levels, however, appeared to be independent. EMG levels steadily increased when biofeedback training was finished and returned to pre-treatment levels at 3 months followup. Decreases in pain ratings however were maintained. The authors attributed the independence of EMG levels and pain ratings to the sense of self-control which the patients who had received biofeedback training had gained. The patients learned that muscle

tension levels and thus pain could be controlled and this pain control continued even in the absence of continued muscle tension control.

These studies demonstrate that although relaxation and related procedures do sigificantly reduce pain ratings in some patients, there is not always a clear correlation between levels of muscular activity and pain as predicted by the respondent model. Technical and procedural difficulties may account for some of the failures to establish this relationship (Chapman, 1986).

Biofeedback and related procedures have important cognitive as well as physiological components and these may be the important aspects of treatment. Studies which have compared the effectiveness of psychophysiological interventions with other psychological approaches have suggested that psychophysiological stategies are often insufficient to lead to long term reductions in pain.

Turner (1982) reported that while relaxation and cognitive interventions were equally effective in reducing pain in back pain patients upon completion of treatment, significant differences emerged at one month followup. Subjects treated with relaxation training alone reported an increase in pain whereas subjects treated with cognitive intervention as well as relaxation training maintained this improvement.

Holroyd, Andrasik and Westbrook (1977) reported similar findings in that a stress coping intervention but not EMG biofeedback led to a decrease in pain in a sample of tension headache patients.

In a recent review, Linton (1986) reported that of five studies examining relaxation as a treatment for chronic pain, four of them used relaxation as a cognitive coping strategy where relaxation was used in everyday situations to control pain.

These findings point to a major weakness of the simple respondent model of pain in that it does not take account of important cognitive factors in determining pain experience and response to treatment. There is not a direct relationship between physiological activity and pain and therefore treatment if focused directly on changing physiological reactivity will not necessarily lead to reduction in pain.

1.4c Operant Model of Chronic Pain

Fordyce (1968;1973;1978) has applied principles of operant conditioning (Skinner,1953) to the problem of chronic pain. Skinner distinguished between two fundamentally different types of behavioural response, "respondent" and "operant". Respondents, involving smooth muscles or glandular reactions, are reflexive and controlled by antecedent stimuli. Operants, in contrast, involve striated and voluntary muscles. They can be elicited by antecedent stimuli but also are sensitive to environmental influences. Fordyce proposes that in some cases pain behaviour may begin as a respondent but may come to be controlled by the environment through a process of conditioning. If a behaviour is followed by positive consequence then the probability of that behaviour occurring again in the future is increased. If behaviour is followed by a negative consequence then the probability of that behaviour occurring again is diminished. In

the case of pain behaviour, Fordyce proposes that positive reinforcement (attention, sympathy and medication), negative reinforcement (avoidance of unwanted responsibilities) and extinction of well behaviours are the main processes by which pain behaviour can come under environmental control. These concepts are outlined in Fig.1.4..

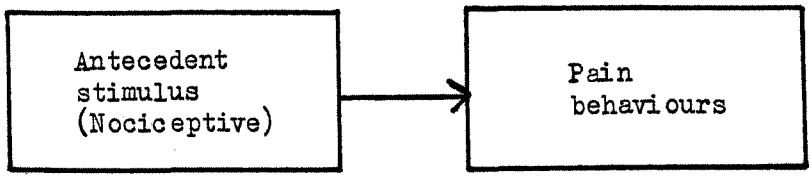
Fordyce (1978) emphasises that pain behaviour can be either respondent or operant in nature depending upon whether it is controlled by antecedent stimulation (nociception) or by environmental contingencies. Functional analysis of pain behaviour determines whether it is operant, respondent or some combination of the two.

This model does not consider suffering, pain or other "internal events" commonly associated with pain experience. It is solely concerned with overt and observable actions and behaviours. Pain exprience or other cognitive events cannot be directly observed and therefore although their reality is not denied, they are irrelevant in a behavioural analysis. Only the external expression of such experiences can be observed and modified by manipulating environmental contingencies.

The model focuses attention on pain behaviour. Pain behaviour simply refers to anything that the patient says or does that is identified by an observer as an indicator of the presence of pain. Loeser (1980) proposed a framework which distinguishes between nociception, pain, suffering and pain behaviour. These terms were defined in the following way:-

TWO TYPES OF PAIN:

1. Respondent pain



(Organic/physiological basis)

2. Operant pain

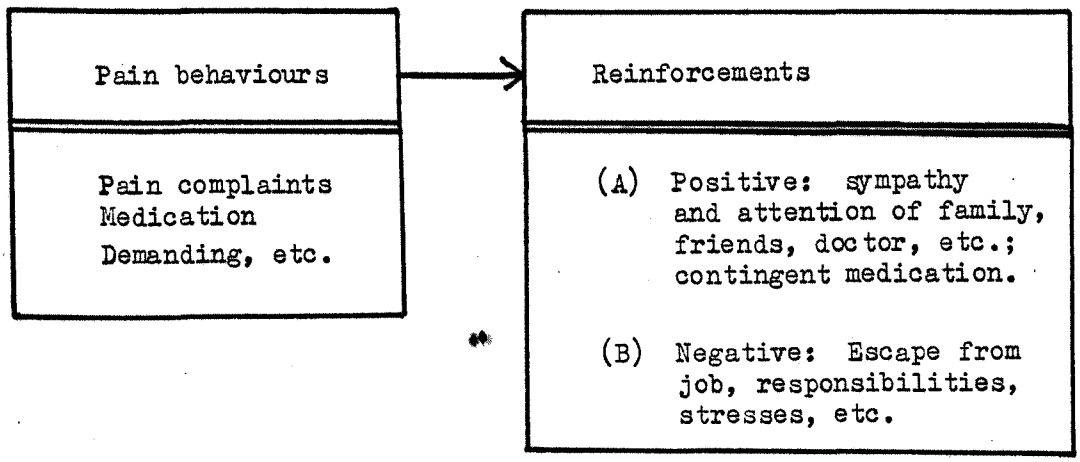


Fig. 1.4 Operant Model of Pain (Fordyce, 1978)

Nociception: potential tissue damaging thermal or mechanical energy impinging upon specialised nerve endings of A-delta and C fibres.

Pain: perceived nociception input to the nervous system.

Suffering: negative affective response generated in higher nervous centres by pain and other situations such as loss of loved objects, stress and anxiety.

Pain behaviour: all forms of behaviour generated by the individual commonly understood to reflect the presence of nociception, including speech, facial expression, posture, medication, health care utilisation.

This framework emphasises that there is no inherent link between pain and nociception. It is possible to have pain without nociception (e.g. phantom limb pain) and nociception without pain, as for example when soldiers injured on the battle front do not experience pain despite serious wounds (Beecher, 1962). Pain and suffering are confused in language by the labels given to communication of suffering. We describe a person as a "pain" meaning the person makes us suffer and not that we have nociceptive input in some part of the body. Pain behaviour can be influenced by nociception, pain and suffering. It can also come under environmental control and hence can be manipulated by identifying and changing the contingencies that are controlling the behaviour.

There are several studies which have demonstrated that pain behaviour

does have a systematic relationship with environmental contingencies predicted by the operant model. Fordyce et al. (1981) correlated pain behaviour with the amount of exercise performed in a group of chronic pain patients. Pain behaviours were any visible or audible indicators of pain or suffering. All patients had limitations upon the number of exercises they were capable of performing due to pain. If pain behaviour was controlled by nociception then one would expect a positive correlation between exercise and pain behaviour given that all patients had previously reported limitations of exercise due to pain. In other words one would expect that the more patients exercised then the more pain would have been generated and the more pain behaviour would have been observed. The results demonstrated a negative correlation betwen exercise and pain. The more the patients exercised, the less pain behaviour was observed. The authors concluded that this demonstrated that there was not the expected association between exercise (with the perceived nociception) and pain behaviour. The implication was that pain behaviour was controlled by environmental stimuli rather than nociception.

Block et al. (1980) required chronic pain patients to report pain levels in two different conditions; once when being observed by their spouse and once when being observed by a neutral observer, the ward clerk. They found that patients who reported that their spouses were relatively non-solicitous in responding to pain behaviour reported significantly lower pain levels in the spouse observer condition than in the neutral observer condition. Patients who reported that their spouses were relatively solicitous in responding to pain behaviour reported marginally higher levels of pain in the spouse observed condition than in the neutral observer condition. The authors

explained this in terms of the discriminative properties of the spouse. They further reported that the solicitous spouse group had significantly longer history of pain (15.5 years) than did the non-solicitous group (4.5 years). One possible explanation is that patients may have been reinforced for pain behaviour by their spouse as predicted by the operant model. Another possibility is that the spouse may have become more solicitous as the pain lingered into extended chronicity. Some form of natural selection may have influenced the spouses resonse during the course of chronic disability. The authors commented:-

> "During the first few years of illness some spouses may respond to pain with anger or frustration but, with increasing chronicity, may either adapt to the situation and respond solicitously or leave the marriage".

Roberts and Reinhardt (1980) demonstrated that characteristics of spouses of chronic pain patients have a systematic relationship with pain behaviour. They compared personality profiles of spouses of chronic pain patients who had undergone a pain treatment programme. They found that spouses of patients who had been successfully treated had lower scores on the Hypochondriasis and Hysteria scales of the MMPI when compared with spouses of patients who did not benefit from treatment. This finding is consistent with the notion that spouses who have preoccupations with physical symptoms may show a greater readiness to reinforce pain behaviour. As in the Block study (1980) it is possible that the spouses characteristics may have been modified by living with a chronic pain sufferer and that determined pain behaviour (reflected by non-response to treatment) results in a greater preoccupation with physical symptoms in their spouse

(reflected by elevated scores on Hypochondriasis and Hysteria scales).

Cairns and Pasino (1977) systematically varied physical therapist programme feedback response in a series of nine chronic pain patients exercising to tolerance. Following baseline, performance on one exercise, the fixed bicycle, received systematic praise and reinforcment contingent upon increments, while a second exercise did not. A reversal was instituted followed by an extinction phase when all reinforcements were withdrawn from both exercises. The number of exercises performed under the different conditions was examined. Results demonstrated that patients' performance varied markedly and systematically according to whether the physical therapist was delivering praise.

Doleys et al. (1982) examined the effects of verbal reinforcment, graphic feedback and exercise quotas on activity in three pain patients. The exercise quotas and reinforcement resulted in a gradual increase in exercise behaviour. In this study these effects did not generalise to exercises that were not included in the programme.

Further indirect evidence of the operant model comes from reports of efficacy of treatment. Varni et al. (1980) reported a case study using multiple baseline and reversal designs in which social contingencies to pain behaviours were manipulated systematically in a three year old child with chronic burn pain. Results of this study demonstrated that therapist behaviour had marked effect on expresssion of suffering and pain behaviour. Redd (1982) described the use of social contingencies to reduced screaming and crying in a patient with terminal cancer. Fordyce et al. (1982) described using rest as an

exercise contingent reinforcement to increase walking behaviour in a patient wheelchair bound because of pain.

Whilst the operant model recognises that environmental contingencies can maintain pain behaviour long past healing time, it has several weaknesses. The model does not account for subjective aspects of pain experience. It does not explain why individuals with similar pain behaviour have different pain experiences. This is a major weakness given that suffering and distress associated with pain are the most important factors for the patient. Alleviation of suffering is usually the aim of most treatments for pain. Although there are frequent reports of changes in pain experience with significant reductions in pain ratings following treatment on behavioural regimes, the operant model does not strictly provide an explanation of how these changes may take place. Fordyce (1985) by ignoring cognitive factors is forced to use somewhat dubious physiological concepts such as "stress induced analgesia" or "increasing strength of muscles" to account for improvements in pain experience following operant treatment. There is a danger with this line of reasoning of over simplifying pain as either "respondent" or "operant" which has close parallels with the organic/functional dichotomy which has not proved to be a useful way of conceptualising chronic pain patients. Despite these shortcomings, the operant model has, without doubt, had a profound influence on increasing understanding of chronic pain and problems and has provided the background for the development of innovative approaches to treatment.

1.4d Cognitive Model of Chronic Pain

The cognitive model assumes that the individuals thoughts, attitudes, beliefs and appraisal of the environment are critical determinants of emotional response and experience of pain. Cognitive variables have a critical role in the Gate Control theory (Melzack,1965) and there are many experimental studies which have explored the relationship between cognitive factors and pain experience (Turk et al.,1983). Evidence for this relationship has come from studies of placebo response, studies of experimentally induced pain, studies of patients undergoing painful medical or surgical procedures and treatment studies of chronic pain patients.

The placebo response emphasises the crucial role of cognitive variables in experience of pain. Psychological mechanisms associated with the placebo response include social influences such as suggestion, pursuasion and operant conditioning, expectancy effects such as hope, cognitive dissonance and classical conditioning and evaluative effects such as response artefacts, labelling and misattention (Shapiro,1978). Evans (1974) found that placebo is indistinguishable from active drug being mimmicked in terms of dose-response effects, time-effect curves and side-effects and that about 35% of patients will report significnt pain relief from placebos. Effectiveness of placebo was shown to be directly proportional to apparent effectiveness of active analgesic with which it was being compared.

A number of studies have demonstrated the effects of cognitive variables on pain threshold and tolerance in experimentally induced pain. Johnson (1973) found that a detailed description of specific sensory characteristics of the pain to be experienced prior to

induction of ischaemic pain significantly reduced the amount of distress reported by the subjects. Kanfer and Goldfoot (1966) demonstrated that presentation of a negative set prior to measurement of pain tolerance using the cold pressor test significantly increased discomfort ratings and reduced pain tolerance. Sternbach (1975) reported that cultural background and ethnic membership can affect pain tolerance as well as physiological responses to experimentally induced pain. Turk et al. (1983) have reviewed extensively studies investigating the effectiveness of different types of cognitive strategies to moderate experimentally induced pain. He classified these findings into six main coping strategies:-

1) Imaginative inattention; evoke mental imagery incompatible with pain.

2) Imaginative transformation of pain; relabel pain sensation so as to minimise and reduce pain.

3) Imaginative transformation of context; imagine pain occurring in a different context or setting.

4) Attention diversion - internal; focus on internal thoughts other than pain.

5) Attention diversion - external; focus on external stimuli.

6) Somatisation; focus on pain in a detatched, objective manner.

The results of the effectiveness of these strategies in reducing pain

was equivocal. Methodological problems inherent in many of the studies documented clouded interpretation. These problems included difficulties in comparing different types of experimentally induced noxious stimulation and difficulties in controlling personal coping strategies that the subjects may have been using in preferance to the experimental strategies under investigation (Barber and Cooper,1972; Chaves and Barber,1974).

Studies investigating cognitive variables in patients undergoing painful medical or surgical procedures provide further evidence for the important role that cognitive factors play in the experience of pain. Chapman and Cox (1977) reported that the subjective response to surgery is affected by the type of surgery and the meaning attached to it. They compared renal transplant donors and recipients and general surgery patients and found differential patterns of pain between general surgery patients and kidney patients. Mathews and Ridgeway (1981) found that higher levels of neurotisism and trait anxiety correlated with poor physical recovery in surgical patients.

There have been a number of studies documenting the effectiveness of provision of different types of information in preparation for patients undergoing painful surgery. Most studies show that psychological preparation of patients prior to surgery results in better post-surgical recovery on one or more indices of recovery (Kendall and Watson,1981). There does appear to be an interaction between the type of information given and personal coping styles. Langer et al. (1975) found preparatory information ineffective in reducing post-operative pain and proposed that information given which was mainly procedural may have sensitised the patient to the

discomforting aspects of impending surgery.

Andrew (1970) explored the relationship between preparatory information and coping styles and found that preparatory information was most helpful in individuals who were "vigilant" and least helpful in individual who were "avoiders".

Auerbach (1976) found that dental patients who scored high on internal locus of control showed better adjustment including pain ratings during dental surgery when exposed to specific information, while patients who were high on external control responded more favourably to general information.

The use of other types of coping strategies has also been demonstrated to influence experience of acute pain. Langer et al. (1975) emphasised the importance of cognitive coping methods directed at patients' worries rather than providing information per se. Other behavioural strategies include relaxation (Wilson,1981) and use of filmed modelling (Melamed,1977) have been effective in improving responses to painful surgery. Overall results suggest that intervention given to modify cognitions can influence pain experience and that the effect of these interventions to some extent depends upon "coping styles" or "personality predisposition".

There have been some studies exploring the relationship between cognitive variables and chronic pain. Meichenbaum and Turk (1976) emphasised the importance of cognitive processes in coping with pain. They report that maladaptive evaluation of pain experience (e.g. catastrophising) may lead to feelings of helplessness and hopelessness

and a general sense of loss of control. They suggest that this contributes to the development of chronic pain. Some evidence that maladaptive pain cognitions may be important in the development of some chronic pain problems is provided by Lefebvre (1981) who demonstrated the presence of certain cognitive distortions in a group of chronic low back pain patients.

Melzack and Perry (1975) compared alpha biofeedback, hypnotic training (including relxation and ego strengthening techniques) and a combination of the two in a group of mixed chronic pain patients. All patients managed to increase alpha output but only a combination of biofeedback and hypnotic training resulted in significant reduction of pain. They concluded that pain relief was not simply due to alpha production but was more related to distraction of attention, suggestion and relaxation which may have enhanced a sense of control over pain.

Flor et al. (1983) found that a group of chronic low back pain patients treated with EMG biofeedback had less thoughts expressing feelings of helplessness and loss of control in back problems following treatment.

There have been a number of studies supporting the efficacy of cognitive interventions for chronic pain and this adds some support to the cognitive model of pain (Mitchell and White,1977; Holroyd,Androsik and Westbrook,1977; Turner,1982; Rybstein-Blinchik,1979). Recent reviews of cognitive treatment for chronic pain have commented upon the difficulty in establishing effectiveness of these methods due to poor experimental design, lack of control studies, lack of follow-up,

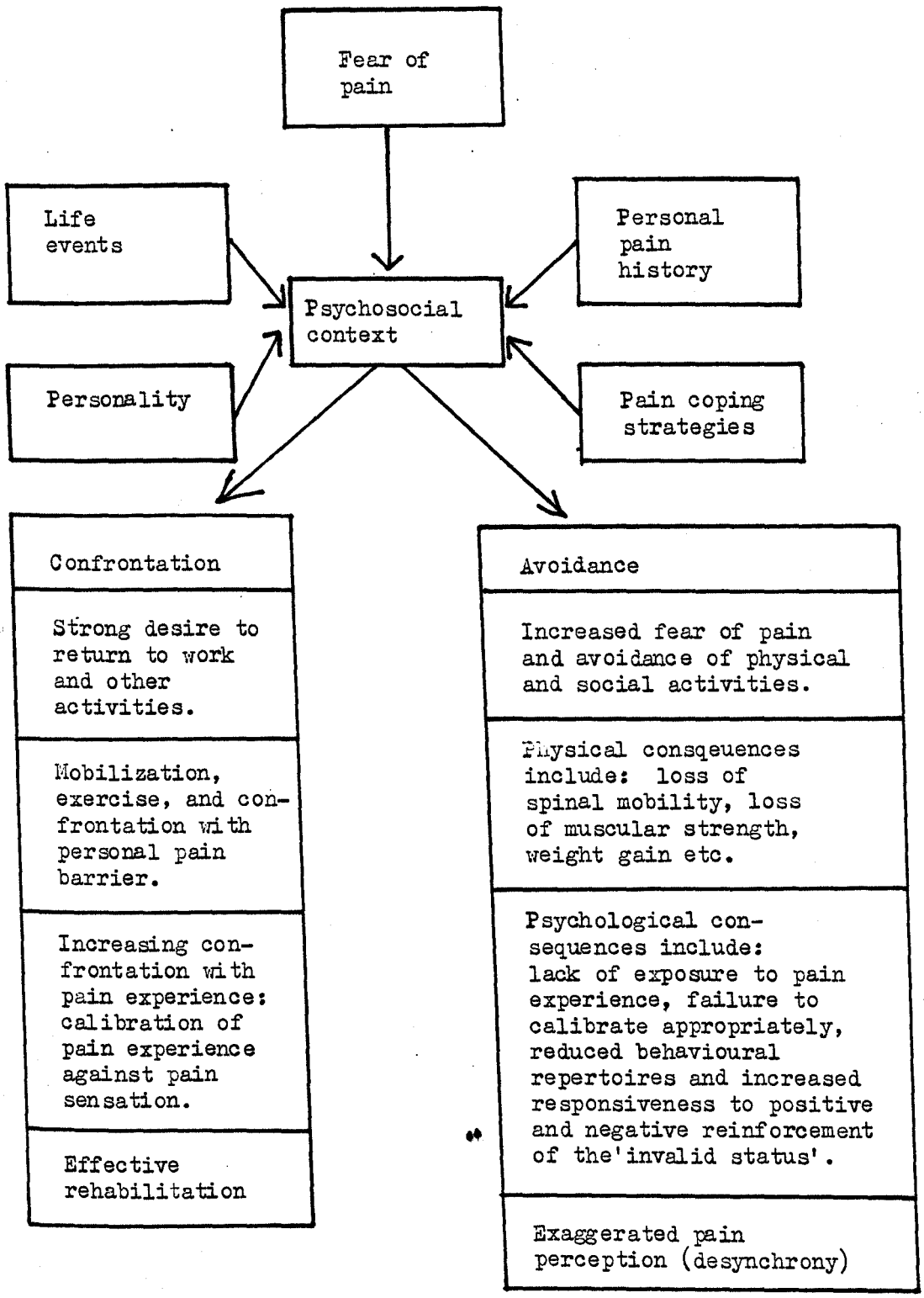


Fig. 1.5 Fear-avoidance model of exaggerated pain perception (Slade et al, 1983)

insensitivity of single pain measures and general lack of appropriate outcome measures (Tan,1982;Turner and Chapman,1982). Pearce (1983) in a recent review of cognitive behavioural methods for the treatment of chronic pain syndromes other than headaches, emphasised the lack of appropriate outcome measures.

Slade et al. (1983) recently proposed a theory that incorporates operant conditioning, early learning experiences and cognitive coping strategies into a unified theory of chronic pain phenomenon. The "fear-avoidance model of exaggerated pain perception" is outlined in Fig.1.5. Individual differences in pain experience and behaviour are accounted for by differences in coping strategies. Slade proposes a continuum between "avoidance" and "confrontation" strategies and that adoption of these strategies determined pain experience and behaviour. A number of different influences determines where on the continuum an individual is placed in terms of coping strategies. Fear of pain is central to the model and this largely determines the response from extreme "avoidance" to extreme "confrontation". Pyscho-social context also influences the strategies adopted and this is determined by:

1) The presence/absence of stressful life events.
2) Personal pain history.
3) Personal coping strategies.
4) Characteristic behaviour patterns (personality).

1.5 PSYCHOLOGICAL TREATMENTS OF CHRONIC PAIN

In general, the aim of psychological treatment of chronic pain is to help the patient manage or cope with their pain more ably. While this

implies that the distress and functional disability is improved, it is rarely the aim of psychological treatment to cure or remove the pain completely. In most cases, some pathological changes have occurred and this means psychological treatment is usually conducted within a multidisciplinary framework with close liason with medical personnel responsible for any treatable pathology. Psychological treatment focuses on psychological components of the pain problem. An individual who has received some form of psychological therapy and who does not report a change in pain levels at the end of treatment, would not. necessarily be considered a treatment failure. In contrast, an individual who has undergone a cordotomy for relief of pain but who still reports pain following the procedure, would be considered to be a treatment failure. Success of psychological treatment is measured by reference to changes in psychological component of pain experience and behaviour. The emphasis of psychological therapy is to help the patient manage their pain more ably. Inherent in this approach is helping the patients take a more active role in treatment in contrast to many medical approaches to pain where the patient is a passive recipient of drugs or surgical procedures.

Psychological treatments for chronic pain have mainly been derived from the respondent, behavioural and cognitive models of pain outlined previously. In many cases some or all models have been combined to offer a comprehensive treatment approach. A brief review of treatments derived from these models follows. This will be selective. It is intended to give an overall view of the status of psychological treatments and provide the background to the treatment approach that is the main focus of this study. It is not intended to present a detailed appraisal of individual methods.

1.5a Respondent Treatment Approaches

The aim of respondent treatment approaches is to reduce some overactive physiological response (usually muscle tension) that is considered to be causing or contributing to the pain problem. This is achieved by a variety of techniques which all have muscular relaxation as a central element. EMG biofeedback is frequently used. It has been applied to conditions where relaxation is the response required to relieve the pain and also in conditions where relaxation is seen as an adjunct to some other form of therapy.

Relaxation and related procedures have been used successfully in pain syndromes where sustained muscular tension is considered to be the prime aetiological factor. These syndromes include tension headaches (Philips,1976), myofascial pain dysfunction (Ghadiali,1979; Stenn,1979), chronic muscle pain (Large and Lamb,1983), chronic low back pain (Keefe et al.,1981). It has also been used as a component in other forms of treatment including operant (Seres and Newman,1976), cognitive (Khatami and Rush,1978), autogenic training (Sahrion,1973) or part of a general treatment package (Keefe and Brown,1982).

Comprehensive reviews on the efficacy of relaxation as a treatment for chronic pain generally provides favourable results (Turner and Chapman,1982; Linton,1986). The role of EMG biofeedback has not been established as effective above and beyond progressive relaxation training (Chapman,1986).

Recent studies have compared relaxation approaches with other

treatments. Sanders (1983) found relaxation to be the most important aspect of a treatment programme in a single case comparison of functional pain behaviour analysis, relaxation, assertiveness training and social reinforcement. Turner (1982) compared progressive relaxation with no treatment and a coping strategy based on relaxation and "cognitive strategies". Although both treatments resulted in significant improvement, few differences between progressive relaxation and progressive relaxation plus cognitive strategies were found. Linton and Gotestum (1984) compared the effect of relaxation and outpatient operant management. It was found that the operant plus relaxation group was somewhat better on variables of activity and medication reduction while the applied relaxation group on its own was superior regarding pain intensity ratings. The authors suggested that the operant programme specifically treated activity and medication reduction, whereas relaxation was aimed at the subjective aspects of pain.

There is little doubt that relaxation and related procedures is a very useful treatment for chronic pain. The evidence suggests that it is most usefully applied as an adjunct to other psychological therapies rather than a single physiological response. Keefe et al. (1982) commented:-

> "Single response training is too limited an approach for most chronic pain problems".

1.5b Cognitive Approaches to Treatment

Cognitive approaches to treatment of chronic pain assume that

cognition can influence experience of pain. Therapy aims to help patients change or alter cognitions such as to moderate the experience of pain and later behaviour. A central assumption underlying this approach is that changes in belief and attitude are followed by changes in behaviour.

There is considerable evidence that cognitive factors can influence experience of pain in acute pain or experimental pain (Tan,1982; Turner and Chapman,1982) Findings of cognitive influences in acute pain has been applied to chronic pain conditions (Sanders,1979; Turk and Genest,1979). Most of the studies of the effect of cognitive methods have been directed at headache sufferers (Bakai et al.,1981;Holroyd et al.,1977). A small number of studies have looked at other pain groups including burn pain (Wernick et al.,1981), chronic low back pain (Turner,1982) and a mixed group of chronic pain sufferers (Rybstein-Blinchik,1979).

Pearce (1983) has reviewed empirical studies using cognitive methods for the treatment of chronic pain conditions. She classified treatments as being "pain-directed" or "stress-directed" according to the primary aim of therapy. Pain directed methods included techniques such as distraction, relabelling and attention switch. The primary aim of these types of interventions is to modify subjective experience of pain. Stress-directed methods do not address pain experience directly but rather help the patient to manage and control stress more effectively and thereby improve ability to cope with pain.

An example of a "pain-directed" method is the Stress Inoculation Technique described by Meichenbaum and Turk (1975).

> "The first phase, educational in nature, is designed to provide the subject with a conceptual framework for understanding the nature of stressful reactions. From such a conceptual framework a number of behavioural and cognitive coping skills are offered for the subject to rehearse during the second phase of training. During the third phase the subject is given an opportunity to practice his coping skills during exposure to a variety of stresses".

This method has been applied in a number of pain syndromes (Turk et al.,1983; Rybstein-Blinchik,1979) with some promising results.

There are relatively few studies evaluating pain-directed cognitive behavioural methods with chronic pain patients and those that have been reported lack methodological rigour with no control groups and limited outcome measures making interpretation of outcome difficult. Most stress-directed methods have been applied to headaches although there are some reports with mixed pain syndromes (Khatami and Rush,1978). As with stress directed studies lack of control groups and broad outcome measures make interpretation of outcome difficult. An added complication is that many of these cognitive-behavioural methods include techniques such as relaxation (Linton,1986) or operant conditioning (Khatami and Rush,1978) which makes it difficult to assess what aspect of the treatment is important.

Overall, outcome studies of cognitive-behavioural methods for chronic pain management is at best only suggestive of effectiveness. Pearce (1983) concludes:

> "Despite considerable optimism and interest in cognitive behavioural methods for chronic pain management data at this stage do not support their efficacy".

Turner and Chapman (1982) in a comprehensive review concluded that evaluation is difficult partly because of the private nature of treatment, lack of follow-up, use of different outcome measures making comparison between treatments difficult. Tan (1982) also in a recent review concluded efficacy of cognitive-behavioural strategies is not proven. Despite these muted comments these methods are promising given the early stages of application with this difficult group. Another important aspect of these treatments is that although these reviews have considered them as an individual treatment, the cognitive-behavioural perspective can be readily employed on a broader basis and in conjunction with other treatment modalities and this is likely to be the most fruitful area of further research (Chapman et al.,1981; Stenn et al.,1979; Turk et al.,1983).

1.5c Operant Treatment of Chronic Pain

The aims of operant treatments of chronic pain are to increase frequencies of "well behaviours" and decrease frequency of "pain behaviours". This is achieved by altering the social and environmental contingencies that are controlling such behaviours. Typically, these treatments are conducted in a tightly controlled inpatient setting which offers the opportunity for maximal environmental control over reinforcements. Spouse involvement is usually considered an integral aspect of the programme in order to aid generalisation and maintenance of behaviour change in the natural setting. The treatment does not involve concepts such as suffering, pain experience or other "internal events". It is solely concerned with observable behaviour with the main focus being upon decreasing functional disability (Fordyce et

al.,1968; Fordyce et al 1973; Roberts and Reinhardt,1980).

Fordyce et al. (1973) were the first to apply operant conditioning techniques to chronic pain patients in the context of an inpatient programme. They describe results achieved with 36 patients suffering very severe and chronic pain. Two conditioning techniques were used. First, nursing staff and the patient's spouse were taught to withold social reinforcement when patients displayed pain behaviour, such as complaining about pain, while providing attention and praise for well behaviours such as physical exercise. Secondly, to reduce the reinforcing value of medications, patients were given medications on a time contingent rather than a pain contingent basis. Medications were given in a "pain cocktail" with the amount of active ingredient being disguised by a masking substance and gradually reduced over time. This programme resulted in highly significant increases in activity levels and exercise tolerance and decreases in medication intake and average pain ratings during inpatient treatment. At 22 months followup, most patients had maintained post-treatment levels of physical activity.

Many operant treatments subsequently were developed from this approach and the effectiveness of operant methods for treatment of chronic pain has been documented in several followup studies (Cairns et al.,1976; Follick et al.,1985; Roberts and Reinhardt,1980; Seres and Newman,1976). These and other studies developing out of the operant model are summarised in Table 1.1. .

Operant treatments have been critised on a number of levels. In most cases, fairly rigid selection criteria are applied in order to select

patients suitable for treatment. These included only selecting patients who show obvious pain behaviour, patients must be motivated, be married to a spouse who is willing and able to co-operate in the programme and not be receiving compensation. Sometimes other criteria are applied. This means that the treatment is in practice only offered to a relatively small and highly selective group of patients. Whilst in some respects this is quite acceptable, it does mean that its utility as a model and treatment for chronic pain has only limited applicability.

The operant approach is not concerned with modification of internal events such as suffering or pain experience. Success is therefore defined in purely behavioural terms. Roberts and Reinhardt (1980) conducted a follow-up study of 26 chronic pain patients treated on an inpatient operant pain managements programme. Seventy-seven per cent of the patients were leading "normal" lives at follow-up between one and eight years post-treatment. Whilst these results sound impressive, normality was operationally defined as being employed, not receiving compensation and being active eight hours per day. Although these results clearly represent an improvement for these patients, there is still considerable room for psychological disturbance and suffering within this definition of "normality". Broader based measurements including subjective aspects of pain are clearly required to ascertain the effectiveness of the operant approach on all aspects of pain (Sanders,1979; Turk and Kerns,1983).

A number of studies have suggested that although behaviour change does occur in treatment settings, there is a failure to generalise to activities not directly treated and the behaviour gains are not

maintained when the reinforcements are removed (Cairns and Pasino,1977; Doleys,1982). A number of authors have also noted the importance of the natural environment in the maintenance of treatment effects (Fordyce,1976; Fordyce,1978; Turk et al.,1983). Holzman et al. (1982) reported findings of an outpatient operant treatment programme, which although it offers less control over contingenies during treatment, might be expected to result in better transfer and generalisation. Other studies have noted problems organising, administering and gaining control over the important reinforcers in operant treatment programmes (White and Donovan,1980; Vinck,1981).

1.5d Multi-Modal Treatment of Chronic Pain

Although the treatments previously described are specifically concerned with a particular component of pain, in practice many treatments involve components derived from more than one model. For example, treatments that are considered to be operant frequently include relaxation, counselling, occupational therapy, physiotherapy and patient education (Fordyce,1973; Greenhoot and Sternbach,1974; Seres and Newman,1976). The contribution that these other components of treatment make to behaviour change has not been assessed. Cognitive approaches have included operant conditioning (Khatami and Rush,1978) and relaxation (Holroyd and Andrasik, 1978). Approaches founded on the respondent model such as relaxation procedures have been shown to have important cognitive and behavioural components (Phillips and Hunter,1981).

In recent years, pain treatment programmes have been developed that combine treatment of the different components of pain in a single unified package. These treatments have been called eclectic, cognitive-behavioural, multidisciplinary, multi-modal, operant or multifaceted treatment approaches. They all have in common the view that chronic pain is a complex multifaceted phenomenon that requires a multidisciplinary approach to treatment. In many respects these treatment packages represent a progression from more restricted behavioural methods derived for use on specific pain syndromes such as tension headaches or experimental studies to broadly based behavioural treatment for chronic pain patients in general.

Keefe (1982) comments:

> "The programmes share one common assumption; if chronic pain is complex then a combination of treatment techniques is needed to successfully treat the patient".

Multi-modal treatments have their roots in inpatient operant programmes and have developed mainly with the incorporation of cognitively based interventions. Behaviour therapy methods are the major components of most programmes. The distinction between operant, cognitive-behavioural or multi-modal treatments is somewhat arbitrary and really reflects the relative contribution and emphasis placed upon the different components. They are similar in that they all incorporate operant, cognitive and physiologically based intervention. Some programmes emphasise behaviour change through manipulating environmental contingencies (Fordyce,1973; Roberts and Reinhardt,1980). Even these programmes however include patient

education approaches, presumably to correct misconceptions or misinterpretations and thereby influence behaviour change through a predominantly cognitive intervention. Other programmes emphasise self management techniques which place responsibility for behaviour change mainly on the patient and therefore rely more heavily on cognitive interventions (Gottlieb,1977; Keefe et al.,1981). These two types of programmes can both be accommodated within a cognitive-behavioural perspective and therefore will be reviewed under multi-modal treatment approaches. Outcome studies of multi-modal treatment approaches are summarised in table 1.1.

A typical multi-modal programme is described by Swanson et al. (1976) who incorporate the following components into treatment:-

1) Behaviour modification: targets, activity, pain and mood reporting, pain behaviours.

2) Physical measures: anatomy class, physical therapy, occupational therapy, vocational planning.

3) Medical management.

4) Family member participation.

5) Other psychological approaches: group work on pain related topics, biofeedback, relaxation, supportive treatment.

In a study of 50 chronic pain patients,79% were rated as moderately to markedly improved in attitude, medication use and activity following treatment on this programme. Unfortunately there was no control

TABLE 1.1 - *Summary of Pain Management Programmes, designs, outcome measures and treatment outcome*

AUTHORS	N	POPULATION	INTERVENTIONS	DESIGN	OUTCOME MEASURES	FOLLOW-UP	RESULTS
Fordyce et al (1968)	3	Low back pain	Inpatient and outpatient operant conditioning programme, systematic medication reduction occupational therapy, physical therapy.	Systematic case studies	Daily walking distance, Medication use, activity level.	None	Increased walking, activity levels, decreased medication.
Fordyce et al (1973)	36	Diverse	Inpatient operant conditioning programme. Spouse involvement, occupational therapy, physical therapy, medication reduction, vocational rehabilitation.	Uncontrolled single group outcome	Activity level, medication intake, follow-up questionnaire	22 mo.	Increased activity, decreased medication, at follow-up improvement in pain levels and activity maintained.
Greenhoot & Sternbach (1974)	54	Diverse	Inpatient operant conditioning, relaxation, physical therapy, group therapy, medication reduction, biofeedback, T.N.S., vocational rehabilitation.	Uncontrolled single group outcome	Self-recording of pain activities, MMPI	None	Decreased pain intensity, increased activity.
Sternbach (1974)	75	Diverse	Similar to Fordyce (1975), 25 patients received surgery.	Uncontrolled single group outcome	Medication, pain ratings, activity, MMPI, follow-up questionnaire.	6 mo.	Increased activity, decreased medication & pain. Maintained at follow-up.

TABLE 1.1 (Continued)

AUTHORS	N	POPULATION	INTERVENTIONS	DESIGN	OUTCOME MEASURES	FOLLOW-UP	RESULTS
Fowler (1975)	36	Low back pain	Similar to Fordyce (1973)	Uncontrolled single group outcome	Self-recording activity levels, staff recording activity, medication.	None	Decreased medication, increased activity.
Seres and Newman (1976)	100	Low back pain	Similar to Fordyce (1973) + biofeedback, relaxation, education, psychotherapy.	Uncontrolled single group outcome.	Medication and muscle strength, mobility.	3 mo.	Medication decrease, activity and mobility increased, maintained at follow-up.
Cairns et al (1976)	100	Low back pain	Similar to Fordyce (1975)	Uncontrolled single group outcome.	Medication, pain ratings, activity.	10 mo.	At follow-up, 58% decreased medication, 70% decreased pain or increased activity.
Swanson et al (1976)	50	Diverse	Similar to Fordyce (1975) + bio-feedback, group therapy, education, TNS	Uncontrolled single group outcome.	Self-rating of pain, staff rating of attitude, medication usage, activity levels.	None	79% rated moderately to markedly improved in attitude, medication use, activity.
Gottlieb et al (1977)	72	Low back pain	Inpatient programme, assertiveness training, education, medication reduction, biofeedback, physical therapy, vocational rehabilitation.	Uncontrolled single group outcome.	Pain ratings, activity, medication, clinical ratings.	1 mo.	69% improved, 81% working or seeking work.

TABLE 1.1 (Continued)

AUTHORS	N	POPULATION	INTERVENTIONS	DESIGN	OUTCOME MEASURES	FOLLOW-UP	RESULTS
Anderson et al (1977)	34	Diverse	Similar to Fordyce (1975) + family therapy	Uncontrolled single group outcome	Unspecified	6 mo. - 7 yr.	74% of patients who completed programme leading 'normal' lives without medication usage.
Cairns & Pasino (1977)	9	Low back pain	1. Verbal reinforcement 2. Verbal reinforcement + graphic feedback 3. Control	Multiple group outcome	Staff recording of uptime, walking, bicycle riding.	None	Group 1 = 2 3 on all measures.
Ignelzi et al (1977)	54	Diverse	As described in Greenhoot & Sternbach (1974)	Uncontrolled single group outcome follow-up	Self-report of pain intensity, medication, activity.	3 yr.	Reduced pain levels, medication use and increased activity levels at follow-up
Seres et al (1977)	36	Low back pain	As described in Seres & Newman (1976)	Uncontrolled single group outcome	Self-report medication, health care utilisation, pain, activity, physical therapist ratings.	3 yr	
Khatami & Rush (1978)	5	Diverse	Outpatient relaxation, cognitive therapy, operant family therapy	Uncontrolled single group therapy	Pain ratings, depression, cognitive measures.	1 yr.	Pain, depression, medication hopelessness decreased. Maintained at follow-up.

TABLE 1.1 (Continued)

AUTHORS	N	POPULATION	INTERVENTIONS	DESIGN	OUTCOME MEASURES	FOLLOW-UP	RESULTS
Newman et al (1978)	36	Low back pain	As described in Seres & Newman (1976)	Uncontrolled group outcome	Self-report questionnaire mobility, exercise.	14-26 mo.	Improved activity, decreased medication. Pain worse, but most patients reported better able to cope with it.
Swanson et al (1979)	200	Diverse	As described in Fordyce (1973)	Uncontrolled single group outcome.	Self-rating of pain, activity, staff ratings of pain behaviour, staff rating of attitude medication. Follow-up questionnaire.	3-12 mo.	59% rated moderately to markedly improved in attitude, medication usage, activity, pain behaviour.
Roberts & Reinhardt (1980)	58	Diverse	Inpatient operant conditioning, physical therapy, occupational therapy, medication reduction.	Group outcome 1. Operant treatment 2. Patients rejected for treatment 3. Patients refusing treatment	Activity, MMPI, self-report of medication use, employment, compensation, pain treatments. Since discharge, interference with daily activities.	1-8 yr.	77% of operant group functioning 'normally' at follow-up compared with 1/20 of group rejected and 0/12 who refused treatment.
Gottlieb et al (1979)	47	Low back pain	Same as Gottlieb et al (1977)	Uncontrolled single group outcome	Activity, medication, pain ratings, employment status, follow-up questionnaire.	1 yr.	46% of patients working or seeking vocation.
Khatami et al (1979)	6	Diverse	Same as Khatami and Rush (1978)	Uncontrolled single group outcome	Pain ratings, locus of control, anxiety, Beck depression.	None	Decreased hopelessness, pain ratings, anxiety and depression.

TABLE 1.1 (Continued)

AUTHORS	N	POPULATION	INTERVENTIONS	DESIGN	OUTCOME MEASURE	FOLLOW-UP	RESULTS
Block et al (1980)	36	Diverse	Inpatient operant conditioning, cognitive therapy, communication skills	Uncontrolled single group outcome	Rathus Assertiveness Scale, Locus of Control, Zung depression, pain ratings.	None	Decreased pain, depression and increased assertiveness.
Timming et al (1980)	40	Diverse	Inpatient operant conditioning, education, relaxation, group and cognitive therapy.	Uncontrolled single group outcome.	Unspecified	None	Increased activity, decreased medication.
Chapman et al (1981)	100	Diverse	Outpatient education, group and cognitive therapy, relaxation, medication reduction, reinforcement of 'well' behaviour.	Uncontrolled single group outcome.	Self-report of activity, medication, pain intensity, M.P.Q.	21 mo.	Pain decreased, medication decreased, activities increased Maintained at follow-up.
Herman and Baptiste (1981)	75	Diverse	Outpatient education, relaxation, group & cognitive therapy, nerve blocks.	Uncontrolled single group outcome	Pain ratings, medication, up-time, Beck depression, locus of control, unspecified attitudinal measure.	None	Deepened depression and pain, improved attitude.
Keefe et al (1981)	111	Low back pain	Inpatient relaxation, physical therapy, self-management medication, physical therapy.	Uncontrolled single group outcome.	Subjective tension, EMG levels, medication, activity levels, pain ratings.	None	Subjective tension ratings decreased, 29% pain ratings decreased, 49% decreased medication, 63% increased activity.

TABLE 1.1 (Continued)

AUTHOR	N	POPULATION	INTERVENTIONS	DESIGN	OUTCOME MEASURE	FOLLOW-UP	RESULTS
Malec et al (1981)	32	Unspecified	As in Fordyce et al (1973) + coping and vocational counselling.	Uncontrolled single group outcome	Medication, activity, employment states.	6 mo.-3 yr.	At follow-up 57% not using drugs, 75% employed, 86% had same or less pain, 37% considered successfully treated.
Cinciripini & Floreen (1982)	171	Low back pain	Inpatient operant conditioning, relaxation, contract goals, self-monitoring, family training.	Uncontrolled single group outcome.	Staff rating of pain behaviour, self-monitoring of pain and activity, pedometer, physical exercises.	None	Medication reduced, 'pain talk' reduced, 'pain behaviour' reduced, pain report decreased, activity increased.
Miller & Lelieuvre (1982)	4	Diverse geriatric	Inpatient operant conditioning.	Single subject ABAB	Medication, pain behaviours observed, activities, pain ratings (MPQ)	None	Medication reduced. Some changes in pain behaviour and activity, but not maintained. Pain ratings decreased.
Gottlieb et al (1982)	78	Low back pain	Inpatient operant conditioning + relaxation, counselling, education, physical therapy.	Uncontrolled single group outcome	Telephone interviews, life style, activity, physical functionings, financial support, vocational status.	1 yr.	45% working. Pain and medication related to work status.
Lutz et al (1983)	57	Low back pain	Similar to Gottlieb et al (1982) + injections, hypnosis	Uncontrolled single group outcome	Self-report questionnaire		All variables improved, improved pain, lifestyle, medication intake.

TABLE 1.1 (Continued)

AUTHOR	N.	POPULATION	INTERVENTIONS	DESIGN	OUTCOME MEASURES	FOLLOW-UP	RESULTS
Sanders (1983)	4	Low back pain	1. Functional pain-behaviour analysis. 2. Relaxation 3. Assertion training. 4. Social reinforcement	Single subject, multiple baseline.	Up-time, medication intake, pain intensity.	None	2 contributed most to improvement, followed by 4. 1 and 3 minimal effect.
Linton & Gotestam (1984)	15	Low back pain	1. Waiting list control. 2. Outpatient relaxation. 3. Operant programme.	3 group outcome + single subject.	Self-monitoring pain, medication, mood, anxiety, down-time, exercise, Beck depression, Activities of Daily Living.	None	Pain 2 > 1; exercise 3 > 1; activities 2,3 > 1; depression 2,3 > 1.
Guck et al (1985)	40	Diverse	Inpatient operant conditioning, cognitive and group therapy.	2 group outcome with no-treatment control.	Follow-up questionnaire, pain ratings, Beck depression.	1-5 yr.	60% of treated group met criteria of success established by Roberts & Reinhardt (1980). Treated patients increased activity, less pain, less depression, fewer hospitalizations.
Large (1985)	4	Diverse	Outpatient programme, relaxation, education, cognitive behavioural methods.	Uncontrolled single group outcome	Attitudes measured by repertory grid technique, anxiety, Beck depression, Eysench Personality Inventory, Illness Behaviour questionnaire, pain ratings.	None	Improved attitudes, no change in pain, no change in depression, anxiety or personality measures.

TABLE 1.1 (Continued)

AUTHOR	N	POPULATION	INTERVENTIONS	DESIGN	OUTCOME MEASURE	FOLLOW-UP	RESULTS
Beckman et al (1985)	50	Low back pain	Inpatient operant conditioning + education, relaxation, vocational counselling.	Group outcome with quasi-control group (no treatment)	Tennessee Self-Concept Scale	1,3,6 mo.	Treated group had improved self-concept, maintained at follow-up.
Turner & Clancy (1986)	74	Low back pain	1. Waiting list control. 2. Cognitive behavioural therapy. 3. Operant behavioural therapy.	3 group outcome	Coping Strategy Questionnaire, Pain diary, down-time, Sickness Impact Profile, Beck Depression.	None	Both treatments resulted in changes in coping strategies.

group, no follow-up and no objective or standardised measures of attitude.

Seres and Newman (1976) described a programme that contained similar elements although with a greater emphasis on educational component where patients learn more about their anatomy, physiology, pain mechanisms and medical interventions. Seres (1984) has suggested that the higher the rating on patient satisfaction with the educational component, the more positive the outcome at followup.

Some programmes include medical interventions. Chapman et al. (1981) combined operant treatment with sympathetic nerve blocks that were given contingent on activity increase and medication reduction, physical therapy, education, counselling and behavioural education for the patients and their families in an outpatient approach. They reported outcome on 100 chronic pain patients. Patients reported significant pain reduction on Present Pain Intensity and Pain Rating Index of the McGill Pain Questionnaire, as well as significant medication reduction and activity increase at post-treatment and an average of 21 months follow-up. There was no control group and no broad based subjective outcome measures were used.

Some programmes emphasise self management techniques. These techniques teach the patient to recognise and alter the association between certain environmental stimuli and pain. Keefe et al. (1981) examined outcome in 111 chronic low back pain patients treated with a self-management regime of EMG biofeedback, relaxation and self-paced medication reduction. Significant decreases in pain, subjective tension and analgesic intake occurred and the majority of patients had

increases in activity.

Gottlieb et al. (1977) treated 72 chronic low back pain patients with a comprehensive programme of self-management techniques including relaxation, instruction in self medication reduction, assertiveness training and self directed physical-exercise programmes. Of 72 patients treated, 50 who completed the programme were rated by clinicians as showing significantly less pain behaviour and increases in functional activity. Improvements were maintained at follow-up. No control group was used and no subjective measures were taken.

In a further development of these techniques, Gottlieb (1982) described a comprehensive inpatient programme based upon a cognitive-behavioural perspective which included self-management, biofeedback, counselling, assertiveness training, self-regulated medication reduction, patient participation in case conferences, physical therapy, vocational rehabilitation, education and therapeutic millieu. At one year followup, 45% of the patients were working or in training with continued use of pain control skills. There was no control group with this study and outcome measures did not include measures of pain, distress or subjective states.

The outcome studies evaluating multi-modal Pain Management Programmes suffer from a number of methodological difficulties. This has partly resulted from the difficulties inherent in studying a diverse population with longstanding and often intractable problems and partly reflects the preliminary stage of psychological research into behavioural treatment for chronic pain.

Of the 35 studies reviewed only six had a control group and of these, four had been reported in the past three years. This lack of controlled outcome studies makes it difficult to access treatment effects although there are signs of more rigorous research designs being conducted as the programmes become more established. Most patients treated in multi-modal programmes have long histories of pain with repeated failures to respond to a variety of other treatments. The chronic nature of the problem in itself provides some baseline against which to evaluate treatment effectiveness.

Another weakness of the studies is the lack of follow-up data. Sixteen of the 35 studies reviewed did report a follow-up and most reported that the gains made had persisted following treatment. These data are however weakened by the fact that many of the follow-up studies relied on telephone interviews, self-report questionnaires and measures that were not part of the pre or post-test evaluation (Aranoff et al.,1982).

A major weakness of most of the studies is a lack of appropriate outcome measures and this has been emphasised in many recent reviews of the area (Aranoff et al.,1982; Turner and Chapman,1982; Keefe,1982; Linton,1982; Pearce,1983; Turk and Flor,1984; Linton,1986). Most of the programmes assess outcome in behavioural terms such as activity levels, medication, return to work, use of health care facilities and this reflects the roots of multi-modal treatments within the operant framework. The aim of multi-modal treatments is to effect changes in behavioural, cognitive, emotional and physiological aspects of pain experience. This means that in order to assess whether the treatment has been effective, a broad-based assessment procedure is required

that measures all aspects of pain experience and behaviour. There is a notable lack of appropriately standardised, reliable and valid instruments to measure subjective aspects of pain experience. Turner and Chapman (1982) comment:-

> "In order to further understanding of pain, to determine effective treatments for specific aspects of various pain problems, to accurately evaluate a treatment and compare results of different studies, a comprehensive assessment of the patient is needed. This would include assessment of the physical/physiological, operant-behavioural, cognitive-affective, psychosocial and economic aspects of the pain problem".

To summarise, despite the methodological shortcomings, the results from outcome studies of multi-modal behavioural treatments of chronic pain strongly suggest that these treatment significantly help many patients. The great majority of studies report favourable results and most gains are maintained at follow-up. Recent major reviews of multi-modal treatments have all commented upon the generally favourable results (Turner and Chapman,1982; Aranoff, 1982; Linton 1982; Linton,1986; Keefe,1982; Turk,1984). Methodological weaknesses have made interpretation of some positive findings questionable although there is a trend in recent years for more rigorous designs with broader outcome measures, control groups and appropriate follow-up data. A consistent and major deficiency in outcome measurements are lack of standardised, reliable and valid measures of subjective-affective aspects of pain experience (Keefe, 1982; Sanders,1979, Turk and Kerns,1983).

1.6 ASSESSMENT OF OUTCOME ON MULTI-MODAL PAIN MANAGEMENT PROGRAMMES

Psychological assessment techniques for evaluating outcome of psychological treatments of chronic pain has correctly focused upon measuring the accepted aim of the treatment. Although the range and scope of psychological treatment for chronic pain has evolved from a predominantly operant perspective with its emphasis on measuring behaviour change, to a broader based approach that includes cognitive and physiological components, development of suitable assessment measures to assess these changes has lagged behind. Measures of behavioural and subjective componants of pain have been used to assess outcome.

Behavioural methods have focused on the analysis of patterns of "well" and "pain" behaviour. There is a strong and well developed technology for measuring behaviour change and this reflects the domination of operant and behavioural approaches in the psychological approaches to chronic pain problems. Methods for quantifying behaviour change have included direct observation of "well" and "pain" behaviour (Keefe and Block,1982), behavioural interview (Fordyce,1976), activity diaries (Fordyce,1976), self report measures (Skevington,1983), automated devices (Cairns et al.,1975; Sanders,1980), medication usage (Fordyce,1973) and employment status (Roberts and Reinhardt,1980). Although measurement of behaviour change is central in assessing outcome of pain treatment programmes, additional measures that tap subjective and cognitive aspects are required.

Assessment of subjective aspects of pain experience has broadly followed the distinction between the sensory and emotional components of pain experience. Sensory aspects have traditionally been assessed by using various types of simple rating scales. Patients are asked to

select a number (e.g. from 0-10) or a word (e.g. mild, moderate, severe) to describe the intensity of pain. A simple and very widely used method of rating pain is the Visual Analogue Scale (Scott and Huskisson,1976). Subjects are told to indicate the intensity of pain by marking a 10cm line that is labelled "no pain" at one end and "worst pain imaginable" at the other end. Although this is the most popular method of assessing pain in the clinical context, its validity has been open to question, particularly when applied to chronic pain patients (Carlsson,1983). It is not known how people use such a scale. The assumption that the mark on the line corresponds to a sensory experience in a one to one fashion with interval or ratio level scaling may not be justified (Tursky,Jamner and Friedman,1982). Another problem, particularly relevant with chronic pain patients, is it is not clear just what aspects of pain experience individuals are describing. There is evidence that affective states may confound assessment with these types of techniques by inducing a response set (Atkinson et al.,1982). Pain is a complex multidimensional phenomenon and it seems intuitively unreasonable to expect that it could be validly measured by such a simple, unidimensional instrument.

The McGill Pain Questionnaire (Melzack and Torgerson,1971) is a pencil and paper instrument that is designed to quantify three dimensions of pain exprience, sensory, affective and evaluative. It represents a refinement of simple unidimensional rating scales by assessing different components of pain experience. It consists of a series of adjective pain descriptors which the patients are asked to select to best describe their pain experience. It has been shown to possess construct validity (McCreary et al.,1981) and discriminative validity (Dubbison and Melzack,1976). It is probably the most widely used

measure of subjective pain report in chronic pain studies. Recent reports have questioned the discriminant validity and concluded that only the total score of the Pain Rating Index is appropriate for pain assessment (Turk et al.,1985).

Traditionally, assessment of pain reports has been down played by the behavioural approach because the aim of therapy is to reduce disability rather than influence pain. It is nevertheless an important aspect of assessment of outcome of psychological treatment because a) patients who show behaviour change but continue to complain of pain may elicit responses from others that reverse the benefits b) persistent pain reports may increase the likelihood of repeated surgeries, medication, which are associated with poor outcome and c) perception of pain is often the patient's primary concern (Keefe,1982).

Assessment of the affective aspects of pain is concerned with the evaluation of the emotional impact of pain and disability upon the individual. Mood rating scales and inventories that have been standardised on psychiatric groups are commonly used and include measures of depression (Beck et al.,1961; Zung,1965), anxiety (Spielberger,1970),psycho-social adjustment to health (Berger et al.,1981), as well as personality inventories (Eysenck,1964; Bradley et al.,1981) and measures of illness behaviour (Pilowsky,1983). The MMPI is the most widely used measure of affective responses of chronic pain patients, at least in North America (Bradley et al.,1981; Crown,1980). Most of the research has been concerned with descriptive, diagnostic or predictive studies. The fact the test does appear to measure a mixture of clinical affective states as well as

personality traits has led to its use as an outcome measure on some pain management programmes (Roberts and Reinhardt,1980).

The growing interest and development of cognitive approaches to pain management has been reflected in the growing use of measures of beliefs and attitudes as outcome variables in the evaluation of pain management programmes. It is central to the cognitive-behavioural perspective that beliefs are important determinants of behaviour. Attitudes may be considered to be measured by a combination of belief and affective components (Fishbein and Ajzen,1975).

Attempts to use attitudinal measures have been rudimentary. Swanson et al. (1976) included staff ratings of attitude to pain as an assessment of a multi-modal pain treatment programme. No standardised or reproducible measure was used and no details as to how or on what basis staff judgements of patients attitudes were made were given. Large (1985) reported a single group outcome study of an outpatient pain management programme which included repertory grid design to tap patients self concepts and attitudes towards illness. No changes in the symptom inventories or pain rating were obtained post-treatment although there did appear to be an improvement in attitide. Interpretation of causality given the lack of a control condition and the fact that only four patients completed the programme. Nevertheless the study is highlighted by the use of an attitudinal measure which seemed to show changes in the absence of changes in pain report.

Attributions of locus of control are important concepts in pain management programmes with the emphasis on gaining more personal control over pain and disability and measures of locus of control have

been used as outcome variables on some programmes (Block et al.,1980; Herman and Baptiste,1981).

Despite the growing interest in the use of attitudinal measures to assess outcome on pain management programmes, no appropriately standardised measure of beliefs and attitudes of chronic pain patients has been developed.

1.7 COPING WITH CHRONIC PAIN

Partly in recognition of the importance of cognitive variables in the experience of pain and partly in response to the fact that psychological treatment of chronic pain does not "cure" the patient or remove the source of the pain in the vast majority of cases, there has been a growing interest in exploring ways that chronic pain patients cope with their problems. Linton (1982) comments in a review of outcome studies of behavioural treatments for chronic pain:-

> "...with many types of chronic problems a return to the pre-problem state is not possible; therefore treatment should be orientated towards helping the patient live as normally and productively as possible".

In many respects the aim of psychological treatment for chronic pain conditions is to help the patients cope with their problems more ably. This is in contrast with medical models of treatment which aim to cure or remove the pain. Given the central role of coping in psychological treatments of chronic pain it is important to develop an understanding of how patients with chronic pain cope with their problems and to develop specific instruments to measure coping with pain.

"Coping" refers to thoughts and behaviours people use to manage their pain or their emotional reactions to pain, so as to reduce emotional distress. There is considerable evidence that coping responses of individuals to stressors play an important role in adjustment to the stress (Billings and Moos,1981; Perlin and Schooler,1978). It has been proposed that the coping strategies or efforts people adopt account for differences in adjustment to acute and chronic pain (Slade et al.,1983; Lethem et al.,1983).

Many studies have documented the importance of individual coping strategies in helping ill adults maintain reasonable levels of emotional well-being (Cohen and Lazarus,1979; Moos,1982). Studies have found coping strategies to include denial, selective ignoring, information seeking, taking refuge in activity, avoidance, learning illness related procedures, wish-fulfillment fantasies, hoping, praying, catastrophising, blaming others and seeking comfort in others (Felton and Revenson,1984).

A small number of studies have explored the coping strategies used by pain patients. Copp (1974) interviewed over 100 acute and chronic pain patients and found that most had developed cognitive and behavioural coping strategies to deal with their pain. Examples of cognitive coping strategies were praying, counting, focusing on distracting features in the environment. Examples of behavioural strategies included walking, physical activity and talking to others.

Chaves and Brown (1978) found that the coping strategies patients used to deal with pain during a dental procedure were clearly related to the amount of distress they reported. Turk and Genest (1979) have

reviewed experimental studies investigating the effectiveness of different types of cognitive coping strategies in reducing discomfort of laboratory pain (see para. 1.5b). Chaves and Barber (1974) reported in a study comparing the effectiveness of different cognitive coping strategies in reducing laboratory pain, that their results were confounded by the fact that some subjects used their own strategies in preference to the experimental ones.

Little research has been carried out on the coping strategies people naturally use to cope with acute pain and even less work on chronic pain. Coping strategies used naturally by people in pain have tended to be seen as confounding variables in the context of laboratory pain studies rather than of interest in their own right (Turner and Chapman,1982; Tan,1982).

Recognition of the lack of information about coping with chronic pain and the importance of this area with the cognitive-behavioural perspective has prompted some workers to explore coping strategies in chronic pain populations. Rosenstiel and Keefe (1983) assessed cognitive and behavioural coping strategies in chronic pain patients by asking 61 chronic low back pain sufferers to report how frequently they used different strategies and how helpful the strategies were in controlling and reducing pain. Strategies were included in the questionnaire on the basis of research in acute and laboratory pain and clinical observations. Cognitive strategies included were distraction, reinterpreting pain sensations, positive self-statements, ignoring pain sensations, praying/hoping and catastrophising. Behavioural strategies were increasing or decreasing activity. Subjects were asked to rate how frequently they used the strategies

whenever they had pain by rating each according to the categories "never", "sometimes" or "always". Principal component factor analysis of the responses on the questionnaire resulted in the following three factors which accounted for 69% of the variance:-

1) Cognitive coping and suppression. This involved strategies such as positive self statements, ignoring pain or reinterpreting pain sensations.

2) Helplessness. This involved strategies such as decreasing activity, catastrophising and low ratings of coping strategy efficiency.

3) Praying and distraction. This involved praying or hoping or distraction strategies.

The strategies seemed to be grouped broadly into two main groups according to whether they were essentially active (Cognitive coping and suppression) or passive (Helplessness). The authors found that these factors were predictive of behavioural and emotional adjustment to chronic pain beyond what may be predicted from analysis of patient variables such as disability, duration of pain and tendency to somatisise. The use of these coping strategies was not however associated with less disability or distress. It was found that the use of some strategies (e.g. catastophising) was associated with greater distress. Patients high on cognitive coping and suppression were more impaired functionally. Contrary to findings in the literature with acute and laboratory pain, they found that coping self-statements, reinterpretation and cognitive distraction were not

related to lower ratings of pain (Kenser and Goldfoot,1966; Rybstein-Blinchick,1979; Spanos et al.,1975). Patients high on the helplessness factor were not adjusted well in terms of anxiety or depression and patients high on diverting attention and praying had more pain and functional impairment. The authors concluded that the use of some of these strategies was associated with poor adjustment.

Use of the strategies was not associated with reduced distress or greater emotional well-being. As coping implies thoughts and behaviours that are adopted to reduce discomfort, these strategies cannot be considered to be coping strategies. One possible reason that the strategies did not appear to reduce distress is that most of the strategies were derived from studies of acute and laboratory pain. Chronic pain is a very different phenomenon to acute pain (Sternbach,1974) and strategies that are useful for acute pain may simply not be relevant for chronic pain. Reinterpretation or distraction by counting numbers from a noxious stimulus that lasts seconds or minutes may be feasible and helpful. The same strategies may simply not be relevant when the noxious stimulation is present on a continual basis. Clearly, investigation of coping strategies used by chronic pain patients is required.

Another weakness of the Coping Strategies Questionnaire is that it is based upon assessing the frequency that the various strategies are used "when pain is experienced". Whilst this approach may be relevant in acute pain states, the fact that the vast majority of chronic pain patients report continuous pain (Sternbach,1974) may make this approach to assessment of coping strategies less meaningful. For example, it seems unreasonable to expect an individual in constant

pain to respond they "always" "count numbers in my head" or "run a song through my mind" whenever pain is experienced. Even if the subject did find distraction a useful strategy, they could hardly report engaging in these strategies on a continual basis. It may be more valid to assess belief in helpfulness of certain strategies rather than estimations of frequencies in engaging what may be difficult subjective estimates to make.

Another major weakness of the Coping Strategy Questionnaire is that no measures of emotional distress or discomfort are incorporated into the questionnaire. Although the Coping Strategy Questionnaire offers the subjects the opportunity to rate the effectiveness of certain strategies in terms of control over pain and ability to reduce pain, this is probably not a suitable way of assessing coping in chronic pain states. The important variable is not whether "pain" is reduced or controlled but whether distress or discomfort is reduced or controlled. There is confusion over the emotional and sensory aspects of pain, particularly in chronic pain states, and the distinction needs to be made clearly. For example, some individuals in chronic pain use activity as a coping strategy. Often patients who use this strategy report that their pain levels are unchanged or even increased. They still find it a helpful strategy because the benefits that often result from increased activity levels such as increased opportunity for positive reinforcement outweigh any cost in terms of increased pain levels.

A further study reported by Keefe and Dolan (1986) used the Coping Strategy Questionnaire and measures of pain behaviour to assess coping strategies in 32 low back pain patients and 32 myofascial pain

dysfunction patients. Both groups reported high levels of distress and pain behaviour and also reported using a variety of coping strategies. There were differences between the two groups with the low back pain group being more demonstrative in pain behaviour, reporting higher levels of distress and greater use of pain coping strategies. The authors commented upon the discrepancy between how patients reported they were coping (in terms of their responses on the Coping Strategy Questionnaire) and what they actually did. This was explained in terms of a mismatch between what chronic pain patients say and do (Fordyce,1976). The study however also showed a mismatch between two self-report measures, the Symptom Check List 90R (SCL-90R) that was used to measure psychological distress and the Coping Strategy Questionnaire. This finding casts further doubt on the Coping Strategy Questionnaire as a valid measure of coping with chronic pain as one would expect it to be related to measures of distress.

Turner and Clancy (1986) have recently replicated the factor structure of the Coping Strategy Questionnaire on a group of 74 chronic low back pain patients and used the questionnaire to assess outcome of a cognitive-behavioural treatment, an operant treatment and a waiting list control group. Both treatments resulted in significant changes in the type of coping strategies used to deal with pain. The fact that in two previous studies (Rosenstiel and Keefe,1983; Keefe and Dolan,1986) use of coping strategies was associated with high levels of distress, pain and disability makes its use as a valid outcome measure somewhat dubious.

Kerns et al. (1985) developed a multidimensional assessment instrument for use with chronic pain patients linked to a cognitive behavioural

perspective. The West Haven Yale Multidimensional Pain Inventory was designed to fill a void in the assessment of subjective aspects of pain experience previously highlighted. The authors commented:-

> "Knowledge about patient's idiosyncratic appraisals of their experience of pain and coping repertoires becomes critical for optimal treatment planning and for accurately evaluating treatment outcome".

The instrument was partly designed to assess coping and coping strategies in chronic pain patients. It consists of 52 items that are grouped into three categories. The first part focuses on assessment of pain experience and includes negative mood and pain severity. The second part examines responses of others to patients' communications of pain and the third part consists of frequency reports of participation in various day to day activities. The instrument was standardised on 120 chronic pain patients, 81% of whom were male, mostly being veterans of the U.S.A. armed services.

The instrument was shown to have adequate psychometric properties. Unlike the Coping Strategy Questionnaire, the affective aspect of pain was well represented. Unfortunately there was little reference to behavioural or cognitive strategies that might be considered to reduce or minimise discomfort caused by pain and consequently it provides little opportunity to assess coping strategies in chronic pain patients. Another problem with the instrument is that it was standardised on a rather unrepresentative group of chronic pain patients. The extent to which the findings can be generalised to other chronic pain groups is open to question.

CHAPTER 2

RATIONALE OF THE THESIS

2.1 IMPLICATIONS OF THE LITERATURE REVIEW

Psychological approaches to management of chronic pain have developed rapidly over the past 15 years. The lack of effective treatments for chronic pain derived from the medical model and the development of psychological models of health related behaviours have both contributed to the growing recognition that psychological factors play an important role in the aetiology and maintenance of chronic pain problems.

Psychological treatment for chronic pain has been strongly influenced by the behavioural approach pioneered by Fordyce (1973). He applied principles and technology of learning theory to the problem of chronic pain. This approach has been of fundamental importance in emphasising that chronic pain cannot be fully understood in terms of pathology and that the interaction between the chronic pain sufferer and the environment are important determinants of pain related behaviour. Recognition that chronic pain is a multidimensional phenomenon with important cognitive and physiological components in addition to being subject to influences predicted by learning theory, has brought about the gradual development of more broadly based approaches to pain management that incorporate treatments derived from operant, cognitive and respondent models of pain. These multi-modal treatments of chronic pain are based upon the assumption that pain is a complex and multidimensional problem that requires a multifaceted approach to

treatment.

Attempts to diagnosis chronic pain sufferers as having "functional" or "organic" pain ("real" or "not real") on the basis of psychological tests are increasingly becoming less relevant. Broad based psychological treatments for chronic pain are appropriate whether or not there is identifiable physical pathology to account for the pain. Psychological treatment will not influence physical pathology and therefore the likelihood is that in most cases, pain will be part of an ongoing process and likely to persist. This means that it is not a sensible or appropriate objective of psychological therapy to "remove" or "cure" pain.

As psychological treatment of chronic pain moves away from the diagnosis and cure of pathology, whether of psychic or physical origin, then treatment is seen in terms of attempting to help the patient "manage" or "cope" with pain and related problems more effectively. Coping with pain therefore is a central issue in the rationale and evaluation of many psychological treatments for chronic pain problems.

Despite the fact that most psychological therapies for pain aim primarily to improve coping, very little research has been conducted on the nature of coping with pain in chronic pain sufferers. To the author's knowledge, no satisfactory large scale survey of a representative group of chronic pain patients investigating coping strategies has been conducted either in North America or the United Kingdom. Because of this lack of basic research, little is known about the structure of coping with chronic pain and no satisfactory

instruments have been developed to measure coping.

Outcome studies of multi-modal pain management programmes have generally reported favourable results. Many outcome studies have been methodologically unsound on account of various factors including lack of appropriate control groups, lack of standardisation of treatment methods and lack of appropriate measures of outcome. Exploration of the literature concerned with outcome measures particularly reveals a lack of appropriate measures of subjective aspects of pain. Outcome measures that have been used have often been narrow, unstandardised and frequently developed for use on other populations (usually psychiatric). To the author's knowledge, no entirely satisfactory measures of coping with chronic pain have been developed.

The following points represent the main implications from the literature review which form the basis of the present study:-

1) Multi-modal treatments of chronic pain appear to be effective.

2) Many outcome studies have been unsatisfactory due in part to the, lack of appropriate outcome measures.

3) The aim of most pain management programmes is to improve patients abilities to cope with pain and related problems.

4) There is little understanding of the structure or nature of coping with chronic pain.

5) No satisfactory measures of coping with chronic pain have been

developed.

2.2 RATIONALE OF THE STUDY

The Walton Hospital Pain Management Programme was developed to provide psychological treatment for chronic pain sufferers based upon a cognitive-behavioural perspective. It was the first Pain Management Programme of its kind to be established in the United Kingdom. It incorporates treatments derived from the operant, respondent and cognitive perspectives and, in this respect, may be considered to be a multimodal treatment package. The aim of the treatment is to help patients "manage" or "cope" with chronic pain and related problems more effectively.

Clinical experiences on the Pain Management Programme has emphasised the need for greater understanding of the nature and structure of coping with chronic pain patients as well as the need for a suitable instrument to measure coping for treatment evaluation, selection and planning. The paucity of studies in the literature on coping with chronic pain, the lack of appropriate outcome measures and the clinical needs of the Pain Management Programme formed the background to the present study.

The major objective of the study was to investigate how people in chronic pain cope with their pain. It was hoped that this investigation would lead to a clearer understanding of attitudes and beliefs that are associated with the use of different pain coping strategies. A basic structure of coping with chronic pain could be derived and this could then form the basis of the construction and

development of a reliable, valid and appropriately standardised measure of coping with chronic pain. Such an instrument would have important applications in terms of the selection, evaluation and planning of treatment as well as increasing theoretical understanding of the nature of chronic pain phenomena.

The present study views chronic pain as a complex, multidimensional phenomenon with important behavioural, cognitive and physiological components that all can influence behaviour and experience. Coping refers to two related but distinct domains. In one respect, it refers to what people do to try and relieve distress. Pain coping strategies refers to thoughts or behaviours that are used to try and reduce discomfort associated with chronic pain. Coping also refers to how successful these actions are in reducing distress and, in this respect, can refer to general adjustment. Thus two types of responses can (and do) occur in answer to the question "How are you coping with pain?". People may respond to this question with a behaviour or strategy that is used, exemplified by the response, "I go jogging". An alternative and equally valid response could be in terms of how much distress is experienced which implies how successful the coping strategies are in reducing discomfort. The response, "not very well" to the same question, implies a degree of emotional discomfort or distress. Thus, coping is seen as actions that are used to reduce distress or discomfort associated with chronic pain. A central feature of the present study is that investigations of the structure of coping and the develoment of the questionnaire is to be based entirely upon studies of chronic pain patients directly.

2.3 OBJECTIVES OF THE STUDY

The main objectives of the study are summarised as follows:-

1) To investigate the structure of coping with chronic pain by studying the responses of a large, representative group of chronic pain patients.

2) To construct a psychometrically sound instrument that measures coping with chronic pain.

3) To standardise the instrument on an appropriate group of chronic pain patients.

4) To empirically investigate the reliability of the instrument.

5) To empirically investigate the validity of the instrument.

6) To investigate the use of the instrument as an outcome measure in the evaluation of the Pain Management Programme, Walton Hospital and thereby provide information with respect to the efficacy of this treatment.

2.4 OUTLINE OF THE THESIS

A developmental format has been adopted. The thesis consists of a series of empirical studies that trace the construction and development of a questionnaire designed to measure coping with chronic pain. Each chapter is concerned with a particular aspect in the

development of the questionnaire and comprises of a number of separate empirical studies. The chapters follow a logical progression and chart the development of the questionnaire throughout the various stages.

Chapter three is concerned with a description of the Pain Management Programme, Walton Hospital. This treatment programme represents the clinical foundation of the thesis. The need for the present investigations has emerged from the author's experiences in setting up and running this programme. A large number of chronic pain patients have been treated and the author's extensive clinical experience has provided the opportunity to clinically explore pain coping strategies and indicators of adjustment. The term "clinical experience" used in this thesis refers mainly to the author's experiences gained treating patients on the Pain Management Programme.

Chapters four and five are concerned with the development, construction and standardisation of the questionnaire. The standardisation sample, statistical analysis of responses to the original questionnaire and the construction and naming of definitive scales are described. Chapters six and seven are concerned with the psychometric development of the questionnaire and consists of a series of studies investigating reliability and validity respectively. Chapter eight is concerned with an investigation in the use of the questionnaire as a measure of change and consists of two outcome studies investigating the efficacy of the Pain Management Programme, Walton Hospital. Chapter nine is concerned with describing the main findings of the study, limitations and future applications.

CHAPTER 3

DESCRIPTION OF PAIN MANAGEMENT PROGRAMME

3.1 THEORETICAL BACKGROUND

The Centre for Pain Relief at Walton Hospital, Liverpool is a major British Pain Clinic that has developed steadily since its inception in the 1950's. It is an integral part of the Mersey Regional Department of Medical and Surgical Neurology which serves a population of some 3 million. It offers a full range of treatment for chronic pain sufferers. The Pain Management Programme was developed to broaden the range of therapeutic procedures offered by the Pain Clinic to include an intensive psychological treatment specifically for sufferers of chronic benign pain who had not been helped by other pain relieving procedures.

The Pain Management Programme is an intensive outpatient psychological treatment for chronic pain sufferers. It is based upon a multi-dimensional model of pain. This model of pain emphasises that pain has sensory, affective, cognitive and behavioural components and is conceptually closely related to Melzack and Wall's (1965) Gate Control Theory of Pain. The Pain Management Programme attempts to provide psychological therapy for chronic pain sufferers by offering treatment for cognitive, affective and behavioural components of pain in the context of a single, comprehensive and integrated treatment package. Treatment on the Pain Management Programme is derived from 3 interrelated models of pain:-

Behavioural Model

This model emphasises that in some chronic pain patients, pain behaviour occurs as a result of environmental contingencies rather than resulting from antecedent stimuli (i.e. tissue damage). Respondent pain behaviour occurs reflexively to antecedent stimuli arising from the site of tissue damage. Operant pain behaviours are controlled directly by environmental contingencies. Fordyce (1976) proposed that in some chronic pain states, behaviours that were originally respondent in nature can become operant in character through the process of learning. Positive reinforcement (e.g. attention, sympathy or medication), negative reinforcement (e.g. avoidance of unwanted responsibilities) and extinction or non-reinforcement of well behaviours are the common influences in the development of pain behaviour. Treatment involves identifying and withdrawing reinforcement for operant pain behaviours and providing reinforcement for activity or "well" behaviours. This approach to chronic pain does not attempt to modify pain directly but to modify maladaptive pain behaviours and thereby alter the patient's disability.

Cognitive Model

The assumption of this model is that the behaviour of the individual is determined not only by sensory phenomena but also by the way they construe their world and assign meaning to events. A runner who has just completed 26 miles and 385 yards without stopping will probably interpret likely nociceptive sensory input with elation. A chronic back pain sufferer half way up a long flight of stairs may interpret a similar degree of nociception with anger and despair. Sensory phenomena may be similar. The different interpretations placed upon

sensory input will influence both experience of pain and future behaviour. The runner will sign up for the next marathon. Next time, the back pain sufferer will take the lift. The aim of cognitive approaches to chronic pain treatment is to alter any maladaptive thoughts and thereby effect change in feelings and behaviour. This is achieved by educating the patient in terms of a multidimensional view of pain, identifying pain aggravating thoughts, situations and behaviours, stress management and use of coping skills such as relaxation or distraction techniques.

Respondent Model

This suggests that classical conditioning of pain and tension may occur in an acute pain state due to some form of physical damage leading to a pain-tension cycle. Pain is viewed as an antecedent and reaction to muscular hypertension. Avoidance of movement may be used to reduce pain, leading to increased immobility that may increase pain and tension more. The goal of treatment is to interrupt the pain-tension vicious cycle and replace muscular over-reaction with relaxation.

These models provide the theoretical underpinning of psychological treatment on the Pain Management Programme. Treatments derived from the models are not separate and discrete components that can be slotted in and out ot the programme at will. In relaxation training, one individual may find it helpful as a coping strategy to deal with anxiety in a context entirely unrelated to pain while another individual may benefit from the same procedure by virtue of relaxation of muscle spasm and elimination of pain. Similarly, biofeedback has important cognitive applications in graphically demonstrating to

patients that control over pain-related physiological events is possible as well as benefits due to muscular relaxation predicted by the respondent model. The models of pain upon which the Pain Management Programme are based are closely interrelated. They may be conceptualised as 3 sides of a triangle which represents a coherent and unified theory of the psychology of chronic pain which has clear treatment implications.

3.2 AIMS OF THE PAIN MANAGEMENT PROGRAMME

The purpose of the Pain Management Programme is not to reduce pain. Fordyce (1985) states:-

> "Behavioural methods do not have as their principle objective the modification of nociception... Pain treatment programmes are intended to treat excess disability and expressions of suffering."

The aim of the Pain Managment Programme is to help chronic pain sufferers manage their pain more effectively, improve psychological distress and improve ability to cope. Specific goals of the Programme are:

1) To reduce "pain behaviour"
2) To increase "well behaviour".
3) To decrease functional impairment.
4) To decrease medication.
5) To decrease unnecessary utilisation of health care system.
6) To increase knowledge and understanding of chronic pain.

7) To improve social functioning.

8) To decrease psychological disturbance.

9) To maintain improvement.

3.3 SELECTION CRITERIA

The model of pain upon which the Pain Management Programme is based does not view pain as a dichotomous split between "functional" and "organic" or "real pain" versus "imaginary pain". Pain is seen as a multidimensional phenomenon with different components. The relative contributions of the components to the "whole" depends upon a variety of factors including pathology, individual differences, pain history and environment. The programme is suitable for a wide range of patients with chronic pain and not solely for patients with large "psychological" components to their pain. This is reflected by fairly broad selection criteria.

The following selection criteria for treatment on the Pain Management Programme are used:-

1) Chronic pain for over 6 months.

2) Medical interventions have been unsuccessful and in the opinion of the Consultant in Pain Relief no further medical procedures are indicated.

3) All investigations have been completed.

4) In the opinion of the Consultant in Pain Relief the patient would benefit from thePain ManagementProgramme.

5) Identifiable functional objectives.

6) Patients are motivated to attend.

Patients are excluded from treatment on the Pain Management Programme for the following reasons:

1) Pain caused by malignant disease.
2) Organic brain disease.
3) Severe psychiatric disturbance.
4) Poor physical condition prevents participation in the programme.
5) Aged over 70 years.

3.4 STRUCTURE OF THE PROGRAMME

The Pain Management Programme is an intensive outpatient psychological treatment that involves daily attendance betwen 8.45am to 5.00pm, 4 days per week for 4 consecutive weeks.

The Pain Management Programme is situated in a modern four bedded ward located within the Mersey Regional Department of Medical and Surgical Neurology. (see Fig. 3.1). Although the ward is in close physical proximity to neurological and neurosurgical beds, the Pain Management Programme functions as a discrete unit with separate staffing and administrative arrangements. The ward has been converted to a day area with furnishings suitable for group discussion, relaxation, exercise and teaching. Most of the treatment takes place in this ward although some activities such as physiotherapy and occupational therapy take place in separate facilities close by. Occasionally other rooms in the hospital are used for other activities. Educational equipment such as blackboards, charts, noticeboards and video are available. Biofeedback devices, tape recorders, exercise apparatus and relaxation mats are alo used and housed in the Pain Management Programme ward.

Fig.3.1 The Mersey Regional Department of Medical and Surgical Neurology.

Fig.3.2 Daily physiotherapy exercises.

Patients have a degree of control over the furnishing arrangements of the room and are encouraged to produce and display creative and educational material reflecting experiences gained during the programme. Patients are responsible for all their own catering arrangements during the time on the programme.

The programme is designed to treat 8 patients at a time on a group basis. A staggered entry system into the programme operates. Two patients start the programme at the beginning of every week and 2 patients leave the programme at the end of every week. The course runs continuously. At any one time different patients are at different stages of the programme; 2 patients are in their first week, 2 in their second week, 2 in their third week and 2 in their final week. This system was adopted in order to exploit powerful social modelling effects. Several reports have emphasised the role of observational learning and modelling in the acquisition of pain problems. Craig (1978) describes how social modelling processes may inhibit, disinhibit or instigate new reactions to pain. In the Pain Management Programme there are considerable opportunities for social modelling and a staggered system of entry enables participants to gain maximum benefit from these learning processes. Patients in the final week are models for patients in their first week. Patients in their final week are also given responsibility of helping to introduce new patients to the programme. This is helpful for final week patients as well as new patients by allowing them to exercise new found control and mastery over pain further expressed by their transition from the role as "learner" to "teacher".

It is an outpatient programme. Patients are expected to continue with

normal living arrangements whilst attending the course and this is considered an important aspect of the programme. Home practice in coping skills and behavioural targets are programmed into the 3 days during the week when patients are not attending the course. Family or significant others are not included in the programme.

Sometimes patients cannot live at home while attending the programme due to the distance they would have to travel. In these cases arrangements are made with a local hotel. In some circumstances inpatient facilities are available. When they are used, the staff dealing with patients outside hours of attendance on the Pain Management Programme are the normal staff trained to deal with neurological and neurosurgical cases and although they have experience in dealing with medical aspects of chronic pain sufferers they do not have specific training in psychological management.

All treatment is conducted in a group format. No individual therapy is offered as part of the programme.

Attendance on all aspects of the course is considered "compulsory" and the full programme is to be followed. It is not acceptable for patients to attend for small parts of the programme or to pick and choose which activities to participate in. In order to emphasise continuity of attendance, patients are requested to "sign in" on arrival and "sign out" on departure. They are requested to explain reasons for absences (see appendix A1).

On completion of the course, patients attend for an extra day for introduction into the follow-up programme. The follow-up group was

set up and organised by patients who had been treated on the Pain Management Programme. The purpose of the group is to provide mutual ongoing support to help maintain and extend progress made.

3.5 STAFF REQUIREMENTS

The multidisciplinary team consists of a clinical psychologist, consultant in pain relief, nurse/co-ordinator, physiotherapist, occupational therapist and social worker. This is supplemented with voluntary workers, including dance and yoga teachers, "visiting medical experts" and "ex-Pain Management Programme graduates" who periodically contribute to the programme.

Full-time staff meet weekly to review progress of patients, plan out the week's activities and discuss prospective patients. This is also an opportunity for staff motivation, education and training in psychological principles of pain management.

3.6 THE TREATMENT PROGRAMME

An outline of the weekly timetable is shown in appendix A2 and this provides the framework for the different treatment components.

The programme consists of a series of regular daily or weekly sessions during which different activities take place. Different treatments may take place during the same session on different days. In between the timetabled sessions, patients may practice activities learned during the treatment sessions, achieve behavioural targets or simply enjoy the company of other group members. Some aspects of the

treatment are specifically focused in the timetabled slots (e.g. educational approaches) whilst others are applied continuously throughout the programme (e.g. reinforcement of "well" behaviours).

The objective of treatment is to achieve a continuous and consistent approach. As with many intensive behavioural programmes, there is blurring of roles across disciplines. The philosophy of the programme is to provide a cheerful and positive atmosphere conducive to an enjoyable learning experience.

The usual reinforcers for behaviour such as praise, attention and self achievement are used with the volume turned up. Self monitoring, recording and measurement of behaviour are integral aspects of this process and are applied in many aspects of the course (see appendix A3) A natural learning environment is promoted in order to aid generalisation. Tokens, privileges, time out or punishment are not used. Inappropriate behaviour is ignored.

The treatment "components" are as follows:-

1)Physical Therapy

a) Graded exercises are practiced every day under the supervision of a physiotherapist. Initial levels are set by the physiotherapist below tolerance and targets are steadily increased each day. A systematic series of exercises is practiced by all patients regardless of the nature or location of their pain. Details of the exercises and recording sheets are found in appendix A4. (See Fig. 3.2)

Fig.3.3 Use of exercise bike.

Fig.3.4 Behaviour target setting.

b) There is an exercise cycle in the Pain Management Programme room and patients are encouraged to use this in "free" time. A level is set below tolerance and patients record and gradually increase targets each day. See appendix A5 for record sheets for exercise cycle.(See Fig. 3.3)

c) Other physical therapies involve weekly sessions of swimming, yoga and dance. The purpose of these activities is to promote movement, physical confidence and to provide positive reinforcement for "well" behaviours.

2)Behavioural Target Setting

Target behaviours are set each week for the patients to practice and achieve. Pain behaviours are identified. Weekly and daily behavioural targets are set to reduce pain behaviour and increase activities previously avoided because of pain. Pain behaviours may included medication usage, unnecessary use of physical aids such as surgical collars, back supports, walking sticks, crutches or wheelchairs. Behaviours are modified that are considered maladaptive for coping with pain. In most cases this involves increasing activity rates. In some cases behavioural targets involve reduction in activity. See appendix A.6 for record sheets for behavioural target setting. (See Fig. 3.4)

3)Education

a) A weekly lecture by physiotherapists includes information on body mechanics, musculoskeletal system, posture, lifting and movement. (See Fig. 3.5)

Fig.3.5 Lecture on body mechanics.

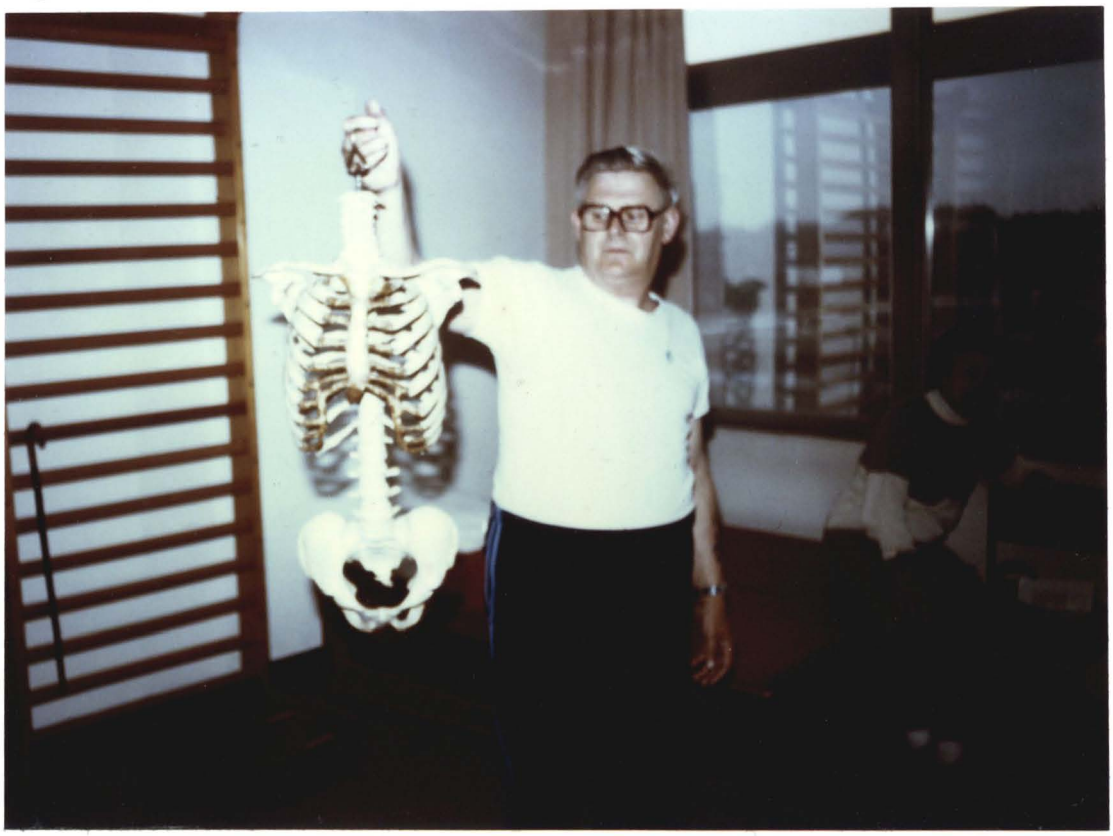


Fig.3.6 Demonstration of biofeedback.

b) A series of talks by the Consultant in Pain Relief includes information on neurophysiology and neuroanatomy of pain, drugs and pain relieving techniques. This is also an opportunity for patients to discuss freely with a doctor any medical terms or issues that they do not understand.

c) A series of talks by the Clinical Psychologist includes the psychology of pain, the Gate Control theory of pain and the multidimensional nature of pain. The influence of cognitive, affective and behavioural aspects and the rationale of treatment. Biofeedback is used as a teaching aid. The aim of these talks is to increase awareness and understanding about the relationship between psychological factors and chronic pain and to enhance self help strategies and personal control. (See Fig.3.6)

d) Talks from "visiting experts" on topics relevant to the management of chronic pain.

4)Relaxation

Progressive muscular relaxation is taught with instruction in home practice.(See Fig. 3.7). Hypnosis is used as a relxation procedure and an introduction into the use of distraction as a coping strategy for pain. It is not used in a psychodynamic context nor is it used to induce analgesia or "remove pain".

Fig.3.7 Daily relaxation session.

Fig.3.8 Daily group discussions.

5)Stress Management

Relationships between stress, anxiety, tension and pain are discussed, together with the use of relaxation techniques as a coping strategy.

6)Group Discussions

Daily meetings with the Clinical Psychologist covers review of progress, educational and experiential issues.(See Fig. 3.8).

7)Vocational/Occupational Guidance

Employment issues are discussed in relation to disability. Advice on employment, voluntary work and continuing occupational facilities.

8)Goodbye Speech

Patients leaving the course write and deliver a "goodbye speech". See appendix A7 for guidelines. The purpose is to help patients leaving the course appraise and assimilate what they have covered in the programme and plan for the future.

CHAPTER 4

CONSTRUCTION OF QUESTIONNAIRE AND STANDARDISATION SAMPLE

4.1 INTRODUCTION

The purpose of this study was to investigate the structure and nature of pain coping strategies and beliefs in chronic pain patients. It was hoped that this information would lead to both increased theoretical understanding as well as providing the basis for the constuction of an instrument to measure coping with chronic pain.

Factor analytic techniques explore and detect patterns of relationships between variables and have been widely used in studies investigating the nature and structure of beliefs and attitudes (Cattell, 1952; Gorsuch, 1974; Child, 1976). Little is known about the structure of coping with chronic pain and therefore statistical techniques that organise and reduce variables into interpretable structures would be appropriate for the present investigation. Pain coping strategies and beliefs can be suitably assessed in a self-report questionnaire format. Although self-report questionnaires inevitably limit both the type and amount of information obtainable, this method does allow a large number of subjects to be investigated and, given the preliminary nature of the investigation, this method of obtaining information was considered preferable to investigating smaller groups more intensively. For these reasons, factor analysis was considered the most appropriate method to use to analyse the data. The descision to use factor analytic techniques dictated the design of the study both with respect to sample selection and choice of

variables to include in the self-report questionnaire.

Factor analysis requires a large sample of subjects that is representative of the group for which the results are to be generalised. Estimates for the number of subjects required in factor analysis varies. A frequently applied rule of thumb is five times as many subjects as variables (Sonquist and Dunkelberg, 1977) and Comrey (1978) recommends at least 200 subjects.

There were few expectations about the likely structure of coping to guide selection of variables to include in the analysis. Preliminary conception of factor structure was based upon notions of coping strategies and beliefs derived from treatment models, exploration of literature concerned with coping with chronic pain but above all from extensive clinical investigations of coping with chronic pain conducted in the course of treatment on the Pain Management Programme, Walton Hospital (see chapter 3). A view of pain as a multi-dimensional phenomenon within a cognitive-behavioural perspective formed the theoretical basis for selection of variables. Variables were chosen to provide representative measures of categories of strategies and beliefs outlined in table 4.1. . Complex variables measuring more than one "category" of coping strategy or type of belief were avoided. A five point Likert-type category scale was used in preference to a two-choice response in order to try and make the variables as continuous as possible.

4.2 CONSTRUCTION OF QUESTIONNAIRE.

The questionnaire consisted of two sections. The first section

TABLE 4.1 Breakdown of question types for inclusion in pain questionnaire.

SUBJECT OF STATEMENTS	NO. OF QUESTIONS
CONTROL	10
PAIN COMMUNICATIONS	4
ACTIVITY/AVOIDANCE	8
USE OF DRUGS	4
DEPENDENCE/INDEPENDENCE	5
RELAXATION SKILLS	4
PSYCHOLOGICAL DISTRESS	10
SOCIAL AVOIDANCE	9
DISEASE CONVICTION	11
TOTAL	65

consisted of questions relating to demographic details and pain characteristics. Age, sex, marital status and employment were the demographic details recorded. Location of pain, duration of pain problem, pattern of pain, mode of onset and frequency were the pain characteristics recorded. In addition, attendance at the Pain Management Course was recorded together with time since course finished if appropriate.

The second section consisted of 65 statements concerned with strategies, cognitions and effects of pain. These statments were to be rated on a five point scale indicating the extent of agreement/disagreement with the statements. This format was chosen in preference to a yes/no or true/false response because it potentially provided a more sensitive measure and consequently would yield more information. Broadly, statements were chosen to represent three main areas of enquiry.

16 statements were included that were concerned with the use of specific strategies such as relaxation techniques, distraction, drugs or avoidance. These items included cognitive and behavioural strategies that are used to cope with chronic pain selected from consideration of treatment models, exploration of relevant literature and clinical experience. Thus, although detailed cognitive strategies such as relabelling or reinterpretation of noxious stimulation are applied in experimental studies, clinical experience suggested that these types of strategies are rarely used by chronic pain patients and therefore were not included in any detail.

The cognitive-behavioural perspective views cognitions and beliefs as

important determinants of behaviour and therefore 26 items were included that were primarily concerned with pain-related "cognitions" that might underly coping strategies and other pain related behaviours. These items included beliefs covering locus of control over pain, beliefs about cause of pain, the degree to which pain is viewed as a totally physical problem with consequent rejection of psychological influences, fears over illness and adoption of the sick role.

Finally, 23 items were included that were essentially concerned with the effects of pain on psychological adjustment. Items in this category included statments relating to psycho-social adjustment, interference with activities, depression, anxiety, and the extent to which social relationships may have been influenced by pain.

The statements were phrased in order to be as simple, unambiguous and short as possible. Other questionnaires, clinical experience and the need for clarity and brevity guided the choice of wording for the various items. About half of the statements were phrased such that an agree response concorded with positive characteristics whilst the remaining items where phrased in the opposite direction. This was done in order to minimize response bias. The questionnaire is to be found in appendix B.1. A detailed breakdown of the question types is shown in table 4.1.

4.3 PROCEDURE

The sample used consisted of all patients who were under treatment for chronic pain in The Centre for Pain Relief, Walton Hospital. This

is large multi-disciplinary service for patients suffering from chronic, intractable pain caused by various physical conditions. The Centre for Pain Relief was established in the 1950s and has been since its inception an integral part of The Mersey Regional Department of Medical and Surgical Neurology which serves a population of some three million. Referrals are taken fron GP's, specialists and other pain relief centers. About 15% of patients under treatment suffer from pain caused malignant disease and a proportion of these patients have limited life expectancy (Bowsher, 1987). Most patients are referred following often extensive and ineffective treatment for their pain. The group is thus not representative of patients in pain per se. It is however representative of patients suffering from longstanding pain syndromes that have proved difficult to treat. As with other such populations patients with varying degrees of psychological difficulties are well represented.

Questionnaires were sent out to all patients under treatment in the pain clinic. Subjects were either contacted by post with an explanatory letter inviting them to complete the questionnaire or invited to complete the questionaire directly before or after hospital appointment at the pain clinic. The accompanying letter providing explanation of the study and invitation to participate is found in appendix B.2. Patients who were on the waiting list were not included. All patients who were contacted were either undergoing treatment or had undergone treatment in the past at Walton Hospital Pain Relief Clinic. Although no diagnostic information was sought prior to dispatch of questionnaires, it was attempted to avoid contacting patients who may for physical or psychological reasons have found it difficult or distressing to complete the questionnaire. For

TABLE 4.2 Mean ages for sample broken down by sex.

	NUMBER	MEAN	S.D.	T-VALUE	D.F.	2-TAIL PROB.
MALES	103	52.07	14.43	-0.60	296	0.550(N.S)
FEMALES	195	53.17	15.57			
TOTAL	298	52.97	15.16			

example, when the information was available, patients with advanced cancer and limited life expectancy where not contacted.

No reminders were sent if questionnaires were not returned and no pressure was placed upon the subjects in order to increase numbers of respondents.

4.4 STANDARDISATION SAMPLE

A total of 519 questionnaires were sent out. 298 usable questionnaires were returned. 204 questionnaires were not returned. 26 questionnaires were either spoiled, filled in incorrectly or were sent to patients who had deceased and had been returned by relatives. An overall response rate of 57% was obtained. There were 103 males and 195 females in the sample. Average age for males was 52.07 years, (S.D.= 14.43 years) and for females, 53.17 years, (S.D.= 15.57 years). Average age for the total sample was 52.79 years, (S.D.= 15.16 years). There was no significant difference between the ages for males and females in the sample. Mean ages for males and females are presented in table 4.2. .

Marital status was evaluated by asking the subjects to indicate whether they conformed to one of the following categories; married, remarried, single, divorced, separated or widowed. The frequencies of responses for the various categories of marital status are presented in table 4.3. . There were no significant differencies in the proportions of responses for males and females in the various categories presented. For the sample as a whole, 67% of subjects were married, 12% were widowed, 11% were single, 5% were divorced, 3% were

TABLE 4.3 Frequencies of responses for categories of marital status for males and females.

MARITAL STATUS	MALES		FEMALES		TOTAL	
	No.	%	No.	%	No.	%
MARRIED	76	74	124	64	200	67
RE-MARRIED	3	3	6	3	9	3
SINGLE	11	11	22	11	33	11
SEPARATED	3	3	12	6	15	5
DIVORCED			4	2	4	1
WIDOWED	9	9	27	14	36	12

Chi-square = 6.06; D.F. = 5; p = 0.300. N.S.

TABLE 4.4 Frequencies of types of employment for males and females.

EMPLOYMENT	MALES		FEMALES		TOTAL	
	No.	%	No.	%	No.	%
EMPLOYED FULL-TIME	28	27	13	7	41	14
EMPLOYED PART-TIME	3	3	26	13	29	10
RETIRED	28	27	60	31	88	30
HOMEMAKER	1	1	44	23	45	15
UNEMPLOYED DUE TO PAIN	29	28	37	19	66	22
UNEMPLOYED FOR OTHER REASONS	14	14	14	7	28	9
TOTAL	103		194		297	
MISSING CASES			1		1	

Chi-square=54.67; D.F.=5; p <0.0000. Significant

remarried and 1% were separated.

Current employment status was determined by asking subjects to indicate whether they were employed full time, part time, retired, homemaker, unemployed due to pain or unemployed for other reasons. Frequencies of responses for males and females for these various categories are shown in table 4.4. There were major differences for males and females in terms of their employment status. 27% of males reported being engaged in full time employment compared with only 7 % of females . More women reported being engaged in part time employment. 13% of women reported being in part time employment compared with 3% of the male sample. Similar proportions of the male and female sample were retired. For the sample as a whole, 30% were retired with 27% of the male sample being retired compared with 31% of the female group. A much greater proportion of the female sample reported being homemakers. 23% of the female group were homemakers compared with only 1% of the male sample. 28% of the male sample reported being unemployed due to pain compared with 19% of the female sample. 14% of the sample reported being unemployed for reasons other than pain compared with 7% of the female group.

Duration of pain was estimated by asking subjects when their pain problem began and calculating duration with reference to the date the questionnaires were processed. Durations were estimated to the nearest half year. The mean duration of pain up until the questionnaires were processed for the total sample was 8.64 years, (S.D.= 8.90 years). The mean duration of pain for the male sample was 7.73 years,(S.D.= 8.54 years) and the mean duration for the female sample was 9.10 years,(S.D.= 9.06 years). There were no significant

TABLE 4.5. Mean durations of pain in years for males and females.

	NUMBER	MEAN	S.D.	T-VALUE	D.F.	2-TAIL PROB.
MALES	86	7.73	8.54	-1.16	256	0.246 (N.S)
FEMALES	172	9.10	9.06			
TOTAL	258					
MISSING CASES	40					

differences between the mean duration of pain in years for the male group compared with the female group. Mean durations of pain for males and females are presented in table 4.5. It can be seen that quite a large proportion of respondents did not complete this item. In many cases of chronic pain, the problem has a slow, insidious onset and develops over a period of time. It may therefore have beeen difficult for respondents to estimate just when the pain began and this probably accounted for the large number of missing cases for this variable.

The location of pain was assessed by asking the subjects where they suffered pain. Responses were then coded according to which group of pain locations their verbatim responses best fitted. Pain locations were simply established as back, legs, arms ,head, or face. Shoulders, chest and abdomen were classified as one area. Frequently subjects would indicate pain locations in more than one of these anatomical locations and this was considered to be a separate category. The final anatomical category was for those subjects who reported that pain was experienced all over the body. Inevitably the particular anatomical locations that were gleaned from this procedure were only very approximate. Some reported pains did not fit easily into any of the categories. Unusual pain locations such as pains in the eye balls were considered to be located in the anatomical location that was closest to the reported location. Pains in the fingers or hands were considered to be located in the arm. Using these criteria for assessing location the greatest proportion of subjects reported experiencing pain in more than one area. 55% of the total sample experienced pain in more than one area. There were no differences in the proportion of males compared with females who had pain located in

more than one area.

Of the single locations of pain, by far the commonest reported location was back pain. 20% of the total sample reported having pain located in the back. 23% of the female group had pain confined to the back compared with 14% of the male group. 15% of the male group had reported pain in the legs compared with 5% of the female group. 8% of the female group had pain in the head compared to 4% of the male group. There were no differences in the proportion of males compared with females who had pain located in shoulders,chest and abdomen, the face or all over the body. The reported locations of pain for males, females amd the total sample are shown in table 4.6. 17 observations were missing and this was probably due to difficulties in describing verbally locations of pain in subjects who were either not verbally proficient or who had complicated patterns or distribution of pain that were not easily described in verbal terms.

Onset of pain was assessed by asking subjects to indicate which of seven categories best corresponded to the circumstances of onset of their pain problem. These categories were accident at work, accident at home, road accident, following illness, following surgery, pain "just began" or other injury. In some cases subjects indicated more than one category if for example their pain had been origionally caused by an accident but subsequently aggravated by attempts at surgical treatment. In cases such as these the initial or primary cause of the pain was recorded. Only one category was recorded for each subject. The categories "pain began following illness" and "pain just began" are not mutually exclusive. The latter category was included in order to try and differentiate those subjects who

TABLE 4.6. Reported location of pain.

LOCATION	MALES		FEMALES		TOTAL	
	No.	%	No.	%	No.	%
BACK	14	14	42	23	56	20
LEGS	15	15	9	5	24	8
ARMS	3	3	4	2	7	2
HEAD	4	4	14	8	18	6
SHOULDERS, CHEST, ABDOMEN	1	1	1		2	1
FACE	3	3	8	4	11	4
MORE THAN ONE AREA	55	57	101	55	156	55
ALL OVER	2	2	5	3	7	2
TOTAL	97		184		281	
MISSING CASES	6		11		17	

Chi-square=12.59; D.F.=7; p=0.0827(N.S.)

TABLE 4.7. Circumstances of onset of pain.

	MALES		FEMALES		TOTAL	
	No.	%	No.	%	No.	%
ACCIDENT AT HOME	2	2	20	10	22	7
ACCIDENT AT WORK	21	20	23	12	44	15
ROAD ACCIDENT	7	7	10	5	17	6
FOLLOWING ILLNESS	8	8	23	12	31	10
FOLLOWING SURGERY	14	14	20	10	34	12
PAIN 'JUST BEGAN'	36	35	65	34	101	34
OTHER INJURY	15	15	30	16	45	15
TOTAL	103		191		294	
MISSING CASES			4		4	

Chi-square=11.69; D.F.=6; p=0.069; N.S.

considered that their pain was precipitated by a known event and those that did not.

The commonest category of onset for the group as a whole was "pain just began" with 34% of the sample indicating this category of onset. There were no differences between males and females for this category with 34% for females and 35% for males. 15% of the male sample and 16% of the female sample reported that the pain followed "other injury". This category was followed by an invitation to explain further although the verbatim responses were not formally recorded. 12% of the total sample reported that pain had begun following surgery with similar proportions for males and females. 12% of the female subjects reported the pain had begun following illness with 8% of the male sample reporting this category of pain onset. 7% of the male sample and 5% of the female sample reported the pain had begun as a result of a road traffic accident. A greater proportion of the male sample reported their pain followed an accident at work compared with the female sample. 20% of males reported this category of onset compared with only 12% of the female group. This pattern was reversed with the category of pain following an accident at home with 10% of the female group and only 2% of the male group reporting this mode of pain onset. The unequal numbers for these two groups most probably reflects the finding that a much greater proportion of males were at work compared with the females and consequently had greater chances of suffering an accident. The numbers and proportions of males, females and total sample reporting the seven categories of pain onset are presented in table 4.7.. Only four observations were missing for this variable.

Frequency of pain was assessed by asking the subjects which of seven possible patterns of pain corresponded to their experience of pain. The seven possible categories were continuously, several times a day, once a day, several times a week, several times a month, once a month or less frequent than once a month. 71% of the sample reported that their pain occured continuously. 18% reported pain occuring several times a day. 2% reported pain occuring once a day. 5% reported pain occuring several times a week. 1% reported pain occuring several times a month. 2% reported pain occuring once a month or less frequent. There were no differences in the pattern of reported pain for males and females. Pattern of pain for males, females and total sample is shown in table 4.8. Five observations were missing for this variable.

Change in pain over time was assessed by asking subjects to indicate whether intensity of pain had increased, decreased or remained the same throughout the time the pain had been experienced. 50% of the total sample reported that the pain had inceased over time. A slightly larger proportion of the female group compared with the male group reported pain increase over time with 55% of the female sample compared with 41% of the male sample reporting that the pain had increased. 18% of the female sample reported that the pain had decreased over time compared with 19% of the male sample. A slightly greater proportion of the male sample reported that the pain had remained the same than the female sample. Change in pain over time for the males, females and total sample is shown in table 4.9.. There were 14 missing observations for this variable. This is quite large compared to other measures and may reflect difficulty in estimating when pain began and consequently how it has changed. Some pain

TABLE 4.8. Frequency of reported pain.

FREQUENCY	MALES		FEMALES		TOTAL	
	No.	%	No.	%	No.	%
CONTINUOUSLY	70	70	140	72	210	72
SEVERAL TIMES A DAY	19	19	34	18	53	18
ONCE A DAY	2	2	3	2	5	2
SEVERAL TIMES A WEEK	6	6	8	4	14	5
SEVERAL TIMES A MONTH	2	2	2	1	4	1
ONCE A MONTH	1	1	5	3	6	2
LESS FREQUENT			1		1	
TOTAL	100		193		293	
MISSING CASES	3		2		5	

Chi-square=2.46; D.F.=6; p=0.8729(N.S.)

TABLE 4.9. Pattern of pain change over time.

	MALES		FEMALES		TOTAL	
	No.	%	No.	%	No.	%
INCREASED	41	41	101	55	142	50
DECREASED	19	19	33	18	52	18
STAYED THE SAME	41	40	49	27	90	32
TOTAL	101		183		284	
MISSING CASES	2		12		14	

Chi-square=7.28; D.F.=3; p=0.0636 (N.S.)

syndromes may fluctuate from day to day and a simple three point scale may not cover the possible patterns of change over time for all syndromes.

4.5 DISCUSSION

The unequal numbers of males and females in the sample broadly conforms to findings of many treatment and epidemiological studies that generally report that about 2/3 of chronic pain sufferers are women (Fordyce, 1984; Linton, 1986; Crook et al., 1984; Bowsher et al., 1987). Bowsher et al. (1987) in a retrospective survey of 1056 cases who were treated in The Centre for Pain Relief, Walton Hospital in the 1970s, reported that 60% of the chronic pain patients investigated were women. Crook et al. (1984) investigated the prevalence of pain complaints in a general population in Canada. 500 randomly selected households were intensively studied with respect to presence, nature and severity of pain problems. They found that women accounted for 65% of the group reporting persistent pain and 57% of the group reporting temporary pain. Overall, 2/3 of respondents who reported pain whether persistent or temporary, were women. The greater proportion of women with chronic pain seems to be a consistent and stable finding. There is evidence to suggest that this is not simply a reflection of referral patterns.

In general, few consistent differences have been reported between males and females in terms of pain tolerance and threshold with respect to experimental pain. Notermans & Tophoff,(1967) noted wide disagreement in studies examining the relationship between pain sensitivity to experimental pain and gender. They cited five publications which stated that sensitivity to pain is greater in women

than in men, and five publications which reported no differences between the sexes in pain sensitivity. There seems to be no experimental evidence to back the widely held and popular notion that women are more tolerant of pain than men. Assuming that male and female physiology have equal propensity for pathology that may be associated with chronic pain, then the reasons for the greater representation of women than men in chronic pain groups are likely to be psycho-social and a reflection of current social mores and practices.

Many studies have reported the important influences that social and cultural factors have upon pain experience and behaviour (Sternbach et al., 1965; Stevens, 1977; Craig, 1978). The feminist perspective has argued that women are subject to social influences that encourage adoption of a generally subservient role in society that is associated with less aggression, greater passivity and generally less environmental reactivity compared with males. In some respects, society has fostered the female role as that of the "weaker sex". Expressions of pain and suffering may be seen as confirming this "female" stereotype and hence more likely to solicit attention, sympathy and social approval. The "male" stereotype on the other hand is associated with more aggression, activity and reactivity on the environment and hence expressions of pain in males are less likely to be tolerated and reacted to with social approval. Thus social conditioning based on social models of "male" and "female" stereotypes may result in relatively greater reinforcement of pain related behaviours in females compared with males. Because it may be socially more acceptable for females to actually complain of pain they are more likely to come to the attention of professionals than males. Doctors

may be more likely to treat females sympathetically with advice to rest and avoid and this may exacerbate or prolong the problem by encouraging the adoption of inappropriate stategies to cope with pain. Males may be treated less sympathetically and more aggressively by doctors and this may help to prevent pain from reaching the chronic phase by encouraging the patient to adopt more active and self-relient strategies for dealing with pain. Whatever the precise explanation of the disproportionate representation of chronic pain in males and females, the consistency and stability of these findings powerfully emphasise the crucial role that psycho-social influences have upon chronic pain phenomena.

The sample is well represented in the older age groups. This concords with other studies and reflects the fact that many of the physical conditions that are associated with chronic pain are also associated with advancing age (Crook et al, 1984; Bowsher et al.,1987). One may also speculate that psycho-social characteristics that tend to be associated with advancing years such as decreasing activity levels, retirement, reduced social contacts amd reduction in responsibilities may also provide a suitable psychological setting for chronic pain problems.

Only 24% of the sample were engaged in any type of employment whether full or part time. A significant proportion of the sample were retired and some considered themselves to be homemakers. If the respondents who were either retired or homemakers are excluded from the sample then the proportion of respondents available for work but unable to work because of pain rises to 40%. This is indicative of a considerable degree of disability both in terms of psycho-social

disruption and the economic cost to society.

Most respondents (71%) reported experiencing pain on a continuous basis. This is a common and characteristic feature of chronic pain and is frequently reported in the literature (Sternbach,1974). Most respondents (82%) reported that the pain had either increased or remained the same over time. Over 75% of the sample reported suffering from pain for over five years.

It was not possible to arrive at any likely diagnosis from the information available from the questionnaire. 20% reported back pain but the majority reported pain in quite widespread anatomical locations. This is consistent with other findings demonstrating that people who suffer from intractable pain often experience increasing amounts of pain spreading over wide areas as the pain lingers into chronicity. It is questionable how much importance to attach to the reported circumstances of onset of the pain. It was interesting that 28% of the sample reported experiencing pain following some sort of accident with most of this group reporting that the pain was caused following an accident at work.

There were no differences between males and females in terms of pain duration, onset, location, pattern or frequency. Demographic characteristics were also very similar for males and females with the exception of employment status. The proportion of people available for work but unable to work because of pain is equivalent for males and females. This means that both goups have similar pain characteristics and levels of disability and can therefore be treated as equivalent in subsequent analysis.

CHAPTER 5

FACTOR ANALYSIS OF QUESTIONNAIRE AND CONSTRUCTION OF DEFINITIVE SCALES

5.1 ITEM ANALYSIS

Proper variables for factor analytic purposes should ideally be relatively continuous with many possible categories of responses and reasonably normal distribution. It has been suggested that for inclusion in factor analysis an item should be endorsed by between 15-85% of the population (Comrey, 1978). Frequency distributions of scores from the 65 items from the questionnaire were inspected to establish criteria for exclusion from factor analysis items that were either endorsed by too few or too many respondents. A criterion was adopted that erred on the side of inclusion rather than exclusion of items given the exploratory nature of the investigation and the risk of losing valuable information. To determine which items were rejected from the analysis the two "agree" statements ("strongly agree" and "agree") and the two "disagree" statements were collapsed and the data was interpreted as a dichotomous split between "agree" and "disagree" statements. Items were rejected if less than 15% or more than 85% of the sample responded with either "agree" or "disagree" statements. Items that were endorsed with "uncertain" response by more than 85% of the sample were also considered to be inappropriate to include in the analysis on the grounds of likely low comprehensibility of the item. Adoption of these rules resulted in the rejection of three items shown in table 5.1. . The range of responses on the remaining 62 items were considered to be sufficiently

TABLE 5.1 Variables rejected from factor analysis following item analysis.

	Item	% "agree"	% "disagree"
B4	Most of my family and friends know that I have a pain problem	94.6	2.7
G7	My pain makes me feel tense and frustrated	84.9	14.1
H3	It is always better not to let my pain stop me from mixing with other people	81.6	9.4

represented to include in the factor analysis.

5.2 FACTOR ANALYSIS

Factor analytic techniques have a number of applications (Gorsuch,1974). In this investigation, the technique was used to explore and detect patterning of variables and to discover dimensions to form the basis of construction of psychologically meaningful scales with adequate internal consistency. Although variables were selected for inclusion in the inital questionnaire with a tentative conceptual framework in mind, the basis for selection of variables was not a central issue and therefore confirmatory factor analytic techniques were not appropriate. Principal components factor analysis was used because the investigation was exploratory with few assumptions about underlying structure. This is a method of forming linear composites (factors) based on the correlations among the variables. The correlation of each variable with each composite yields factor loadings which may then be transformed (rotated) to maximise separation among factors. High factor loadings indicate the variables which are most associated with a particular factor. Each factor is derived to explain as much of the variance in the data set as possible; the first factor will always explain the largest percentage of the variance, the second and subsequent factors accounting for additional and independent variance.

62 variables were entered into the analysis. Variables were scored according to a 5-point scale with "strongly agree"=5 ;"agree"=4 ;"uncertain"=3; "disagree=2"; "strongly disagree"=1. Orthogonal analysis was chosen in preference to oblique analysis in order that

independent factors could be identified. Varimax rotation was used (Child, 1976).

Several lines of converging evidence were considered in determining how many factors to extract. Kaiser's criterion extracts all factors with latent roots greater than one. Cattell (1952) has suggested that Kaiser's criterion is probably most reliable when the number of variables is between 20 and 50. When the number of variables exceeds 50, too many factors are extracted. Because the number of variables exceeded 50, this criterion was considered to be unsuitable. The scree test (Cattell,1952) was used to determine the number of factors extracted for the initial analysis. In this method, a graph is plotted of latent roots against the factor number (order of extraction) and the shape of the resulting curve employed to judge the cut-off point. The scree plot for the latent roots (eigen values) against factors is shown in figure 5.1. The point at which the curve straightens out is taken as the maximum number of factors to be extracted. This method yielded nine factors which were further subjected to scrutiny when additional criteria were applied. It was considered important that each factor should have at least four or more items. Perhaps most importantly a simple solution was sought which had psychological meaning. • Items were selected for inclusion in a factor if a) loadings were .4 or above and b) where a variable loaded on two factors the highest loadings were selected. These criteria for number of factors extracted and significance of factor loadings resulted in a five factor solution. Factors 6,7,8 and 9 had too few items and were uninterpretable. Rotated factor loadings for the first five factors are shown in table 5.2. . The correlation matrix of the 65 variables entered into the analysis is found in

Plot of the latent roots (eigenvalues) against factors

FACTOR ANALYSIS

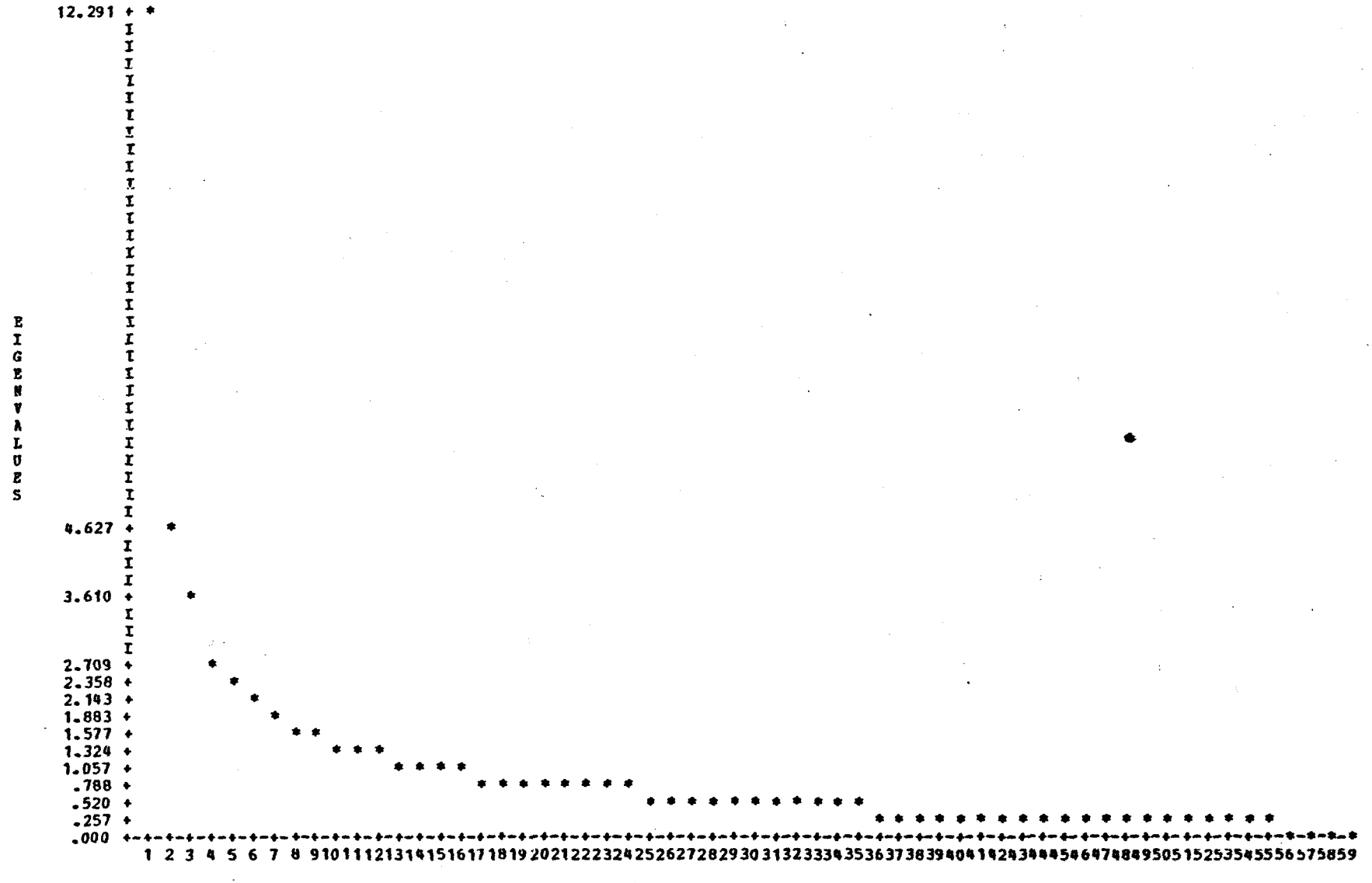


TABLE 5.2 Principal components factor analysis of 65 item questionnaire for 298 chronic pain patients. Factor loadings from varimax rotation.

FACTOR	ITEMS	FACTOR LOADINGS				
		1	2	3	4	5
1.	H4	**.79**	-.16	.19	.02	.03
	H5	**.76**	-.09	.11	.09	.09
	G9	**.72**	.03	.05	.09	-.08
	H8	**.69**	.00	.05	.04	.07
	G8	**.69**	-.01	.11	.13	.01
	G4	**.66**	-.17	.14	.12	.01
	H6	**.66**	-.13	.15	.08	.02
	H9	**.65**	.00	.06	.11	.11
	G5	**.61**	-.12	.20	.04	-.01
	G3	**-.61**	-.02	.16	.03	.13
	G1	**-.60**	.02	.10	.05	.20
	H1	**.58**	-.03	.26	.08	.33
	G2	**-.57**	.02	.08	-.11	.27
	H7	**.53**	-.11	.34	.07	-.04
	G6	**-.53**	.09	-.08	.00	.05
	F2	**.52**	-.10	-.06	.11	.10
	I5	**.46**	-.06	.16	.00	.17
	I4	**.46**	.12	.00	.18	-.24
	E4	**.45**	.00	.20	.17	.17
2.	F4	-.12	**.68**	.32	-.00	.00
	F3	-.08	**.66**	.34	-.04	-.05
	A9	-.18	**.62**	-.02	-.12	.06
	I7	.24	**.62**	-.16	-.07	-.03
	C6	-.12	**.58**	.00	-.11	.08
	I10	.14	**.56**	.00	.05	-.09
	C4	-.15	**.52**	-.25	-.12	.13
	F1	.21	**-.50**	-.05	.03	-.01
	A3	.35	**-.48**	.26	.11	-.02
	A2	-.33	**.48**	.07	.18	.16
	H2	-.08	**.44**	.00	.08	-.30
	A4	-.21	**-.43**	.31	.06	.15
3.	C1	.16	.07	**.68**	.21	-.12
	C8	.38	.13	**.49**	.23	-.07
	C3	.19	-.13	**.42**	.21	-.16
	C5	.22	.25	**.40**	-.10	-.09
4.	D1	.09	-.05	.08	**.82**	.04
	D3	.21	-.10	.06	**.81**	-.07
	D2	-.22	.12	.00	**-.72**	.07
	D4	.08	.00	**.40**	**.69**	-.06
5.	B1	.09	-.00	-.08	.10	**.72**
	B3	.01	.04	.12	-.00	**.62**
	E2	.08	-.13	-.04	-.02	**.53**
	B2	.06	-.06	.24	.15	**-.48**
	E3	-.03	.16	-.19	-.09	**.48**

TABLE 5.3. Eigenvalues and percentage variance explained from factor analysis of 298 chronic pain patients.

Factor Variance	Eigenvalue	% Variance	Cumulative % Variance
1	12.34	19	19
2	4.67	7.2	26.2
3	3.52	5.4	31.6
4	2.76	4.3	35.9
5	2.32	3.6	39.4

Appendix C.1.

This solution offered the clearest interpretation of the data. The solution was unique in that only two items loaded on two factors. This suggests the factors represent interpretable dimensions and this proved to be the case when items loading on the factors were considered in psychological terms. The percentage variance explained by the five factors is shown in table 5.3. . The five factors were constructed into scales to allow further statistical and psychological examination.

5.3 CONSTRUCTION OF SCALES

Scores for items making up the five scales were adjusted such that positive and negative responses were scaled in the same direction. To determine the internal consistancy of the five scales suggested by factor analysis, Cronbach's alpha was computed using all items in each scale. Cronbach's alpha is the average correlation of all possible split-halves and is a measure of extent to which each scale is internally reliable (Cronbach, 1951). It can be considered to be a measure of the extent to which individual items in a given scale are measuring the same dimension. The higher the correlation , the greater the argument that the scale is measuring a single dimension and the greater the likelihood that the putative scale may have psychological meaning and utility. As a rule of thumb, scales with coefficient alphas of above .8 can be considered to have sufficiently high internal consistency to merit clinical use whilst scales with alphas of above .6 may be used for research purposes (Sonquist and Dunkelberg, 1977). As can be seen in table 5.4. coefficient alphas

were above .6 on all scales and above .8 on scales 1,2 and 4. This provides further substantiation that the scales are measuring single dimensions with sufficient internal consistancy to warrent further investigation.

5.4 NAMING OF THE SCALES

The first scale consisted of 19 items and accounted for 18.9% of the total variance. The internal consistency as measured by Cronbach's alpha was very high (.93) suggesting that the scale was measuring a single dimension. Items that make up this scale are shown in table 5.5. Inspection of items making up this scale reveals strong affective components. Items concerned with depression, anxiety, loss of confidence, and social isolation are well represented. Other items are concerned with adverse effects of pain on social functioning. Overall, items on this scale relate to the effect that pain has on psycho-social functioning and resulting psychological distress and disruption. This scale can therfore be considered to be measuring psychological distress caused by pain. It is a general measure of coping with pain concerned with feelings rather than beliefs or actions. Low scores on this scale may be considered to reflect poor coping, psychological distress, loss of confidence, fear of illness, anxiety and depression. The fact that these various facets seem to coexist under a single dimension suggests that there is a single measure of "coping". The scale is called General Coping Measure.

The second scale consisted of 12 items and accounted for 7.1% of the total variance. The coefficient alpha was high (.81) suggesting good internal consistency. Items in this scale contrasted with scale 1 in

TABLE 5.4. Internal consistency of scales. Cronbach's Alpha for 298 chronic pain patients.

Scale	Coefficient alpha
1	.93
2	.81
3	.62
4	.83
5	.62
6	.61

TABLE 5.5. Items from Scale 1: General Coping Measure.

H4	My pain makes it difficult for me to socialise with other people
H5	I feel my pain cuts me off from other people
G9	I have lost my confidence
H8	My pain affects the way I get on with my family and friends a great deal.
G8	My pain makes me feel useless and not needed
H6	My pain stops me from going to places
G5	My pain stops me from leading a normal life
G4	My pain makes me feel miserable most of the time
H9	I never go out because people do not want to know you when you have pain
G3	I feel happy about my life in general
G1	I am coping well with my pain
G6	I manage to do most things in life that I want to.
H7	My pain makes me opt out of things
G2	I do not let my pain get me down
F2	I find it very difficult to relax
H1	I try to avoid other people when I have pain
I5	All my problems are caused by my pain
I4	I sometimes worry that I have a serious illness
F4	I have to rely on other people a great deal because of pain

TABLE 5.6. Items from Scale 2: Active Coping Strategies.

F4	Relaxation helps me to cope with pain
F3	When I am in pain it helps if I try to relax
A9	In my day to day life, I can influence my pain to some degree
C6	When I have pain I can control it to some extent by thinking certain thoughts
I10	It is possible that my pain can be made worse by what I am thinking of doing
I7	I think my pain can be affected by my state of mind
F1	Relaxation does not have any effect on my pain
A2	When I experience pain I am usually able to do something to reduce it
H2	Talking to other people about how I feel can help my pain
A3	I feel I have no control over my pain whatsoever
C4	I think that regular physical exercise is important in helping me to control my pain
A4	My pain is usually associated with doing certain things

TABLE 5.7. Items from Scale 3: Avoidance.

C1	When I have pain it is best to stop what I am doing and rest
C3	It is always better to avoid anything that causes more pain
C5	I cannot distract myself from pain even if I keep busy
C8	I often have to lie down and rest because of pain

that the statements were all concerned with positive actions and stategies that were adopted to control pain. Other items from this scale were concerned with beliefs over sense of control over pain. High scores on this scale indicate use of positive coping strategies such as exercise, relaxation, distraction and the belief in control over pain. This scale is called Active Coping Strategies. In terms of coping with chronic pain it is a measure of what positive actions sufferers take in attempting to control pain. Items from scale 2 are shown in table 5.6. .

The third scale is made up of four items and accounted for 5.6% of the total variance. Internal consistency was lower than scales 1 and 2 although acceptable for research purposes (.62). As with scale 2, items were concerned with strategies for coping with pain although in contrast were negative or passive rather than positive actions. This scale seems to be measuring the use strategies such as rest, avoidance of activity associated with beliefs in lack of personal control over pain and rejection of psychological influences. This scale is called Avoidance. Items making up this scale are shown in table 5.7. .

The fourth scale consisted of four items and accounted for only 4.2% of the total variance. Internal consistency was high with coefficient alpha of .83 despite the relatively small number of items making up the scale. All items in this scale were concerned with beliefs in the use and helpfulness of drugs and pain medication. This scale is called Use of Drugs. The fact that only a limited range of items appeared on this scale and the similar wording of the various items suggests that this scale may not be psychologically useful. The similar wording of the items may explain why the coefficient alpha is high.

The importance of attitudes and beliefs towards drugs in this patient group particularly when psychological treatment is instigated with its emphasis on greater personal control and less reliance on medication, warrants further analysis of this scale and its relationship with other variables. Items from this scale are shown in table 5.8.

The fifth scale consisted of five items and accounted for only 3.6% of the variance. Internal consistency was a little low but acceptable for research purposes with coefficient alpha of .62. Items from this scale seemed to measure willingness to communicate pain experiences to others coupled with beliefs that attention and sympathy arising from such interactions are helpful. This scale is called Pain Communication. It is questionable whether these items form a psychologically meaningful dimension. Wording of some of the items was similar and the amount of total variance explained by the factor assumed to underly the scale was low. It was included for further analysis on the grounds that beliefs about pain communication and behaviour are likely to be central issues in the development and assessment of techniques to modify pain behaviour. Items from this scale are shown in table 5.9.

5.5 SUMMARY STATISTICS OF SCALES

Mean scores, standard deviations and maximum and minimum scores from the scales derived from the total sample are shown in table 5.10. Frequency histograms of scores for the five scales are shown in figures 5.2-5.6 . Inspection of the histograms reveals relatively normal distribution for scales 1,2,3 and 5. In contrast scale 4 clearly does not conform to this pattern and seems to be best

TABLE 5.8. Items from Scale 4: Use of Drugs.

D1	Painkilling tablets are the only way that I can control my pain
D2	I can manage without the help of drugs
D3	I always take painkillers when I have pain
D4	When I have pain I usually take painkillers and rest

TABLE 5.9. Items from Scale 5: Pain Communication.

B1	It is best not to talk about my pain to other people
B3	I always try to hide the fact that I am in pain
E2	It is not helpful when people are sympathetic because of my pain
B2	It is always better to let other people know when I am in pain
E3	It is not helpful when people do too much for me because of my pain

TABLE 5.10. Means, S.D's, and ranges for scales based upon responses of 298 chronic pain patients.

Scale	N	Missing	Mean	S.D.	Max.	Min.
1	293	5	58.08	14.26	91	24
2	293	5	38.03	7.46	55	13
3	296	3	9.91	3.02	20	4
4	296	3	11.57	3.95	20	4
5	297	1	17.35	3.22	24	8

Fig.5.2 Distribution of scores on " General Coping Measure " scale for 298 patients with chronic pain.

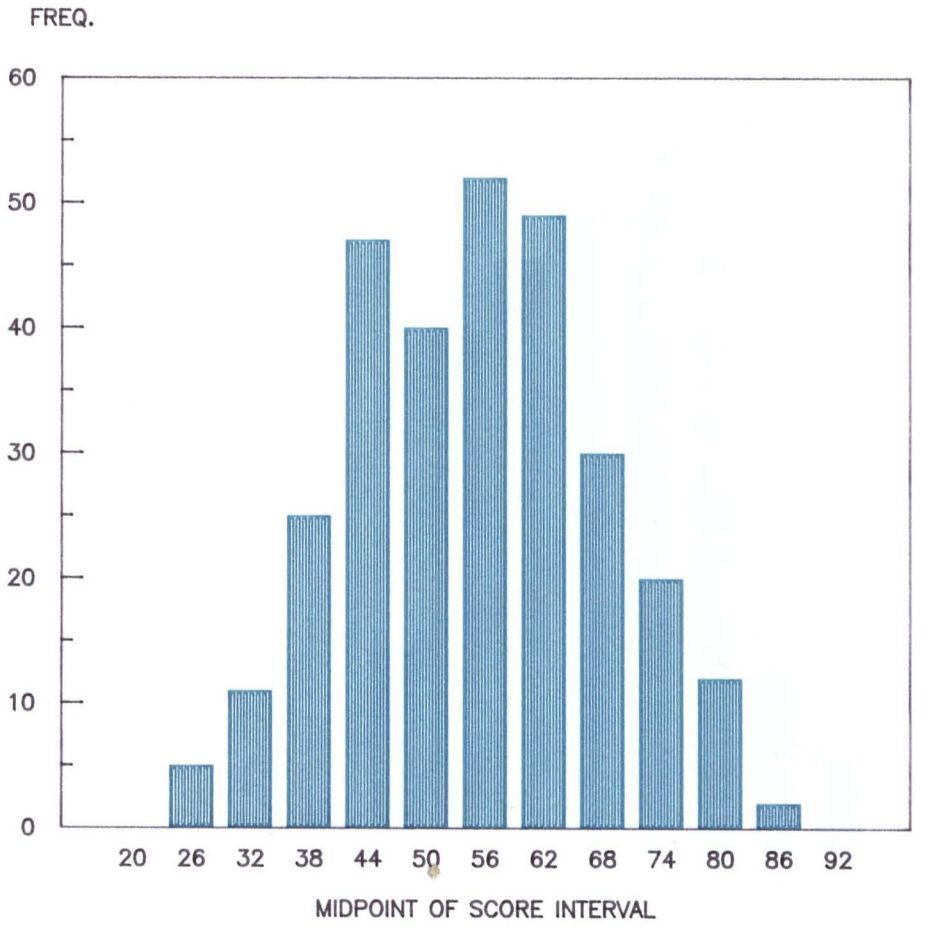


Fig.5.3 Distribution of scores on "Active Coping Strategy " scale for 298 patients with chronic pain.

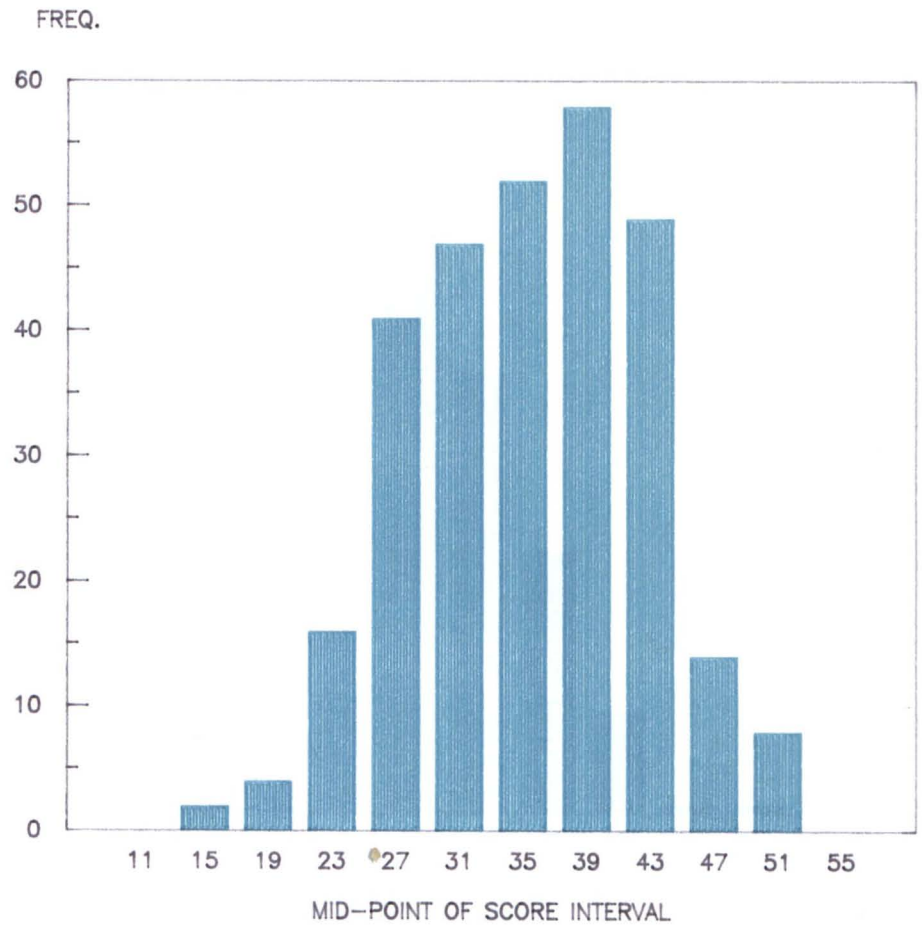


Fig.5.4 Distribution of scores on " Avoidance " scale for 298 patients with chronic pain.

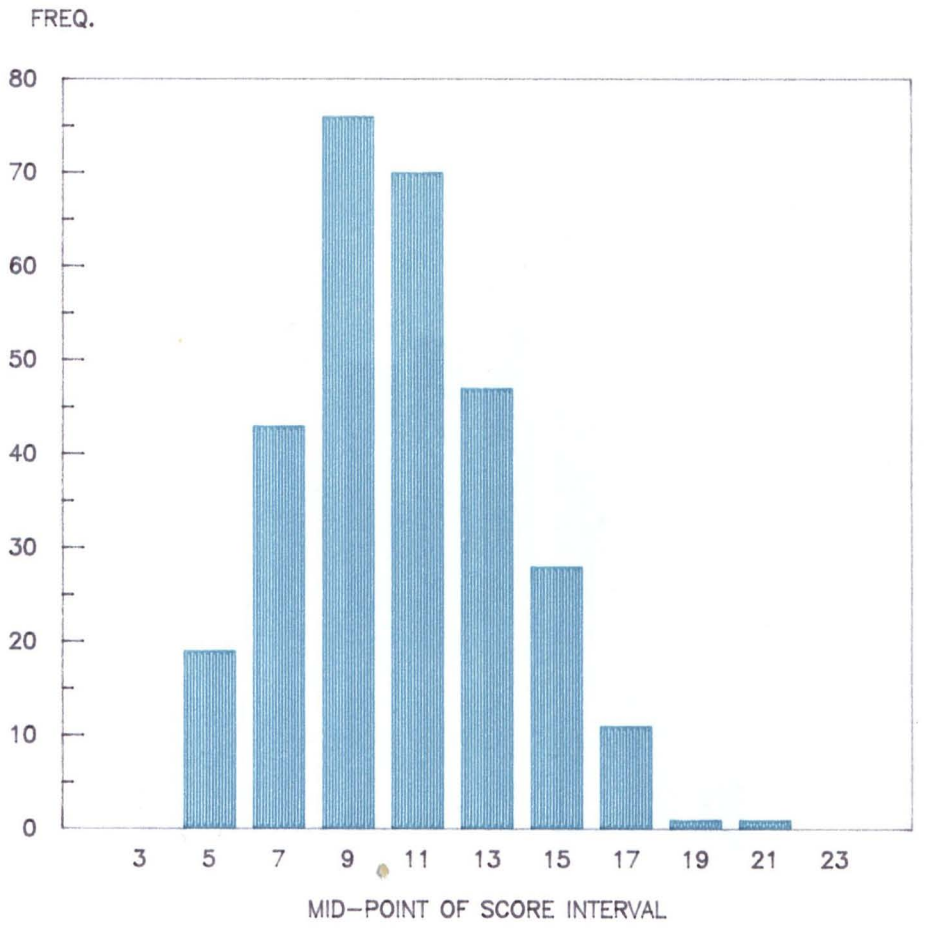


Fig.5.5 Distribution of scores on " Use of Drugs " scale for 298 patients with chronic pain.

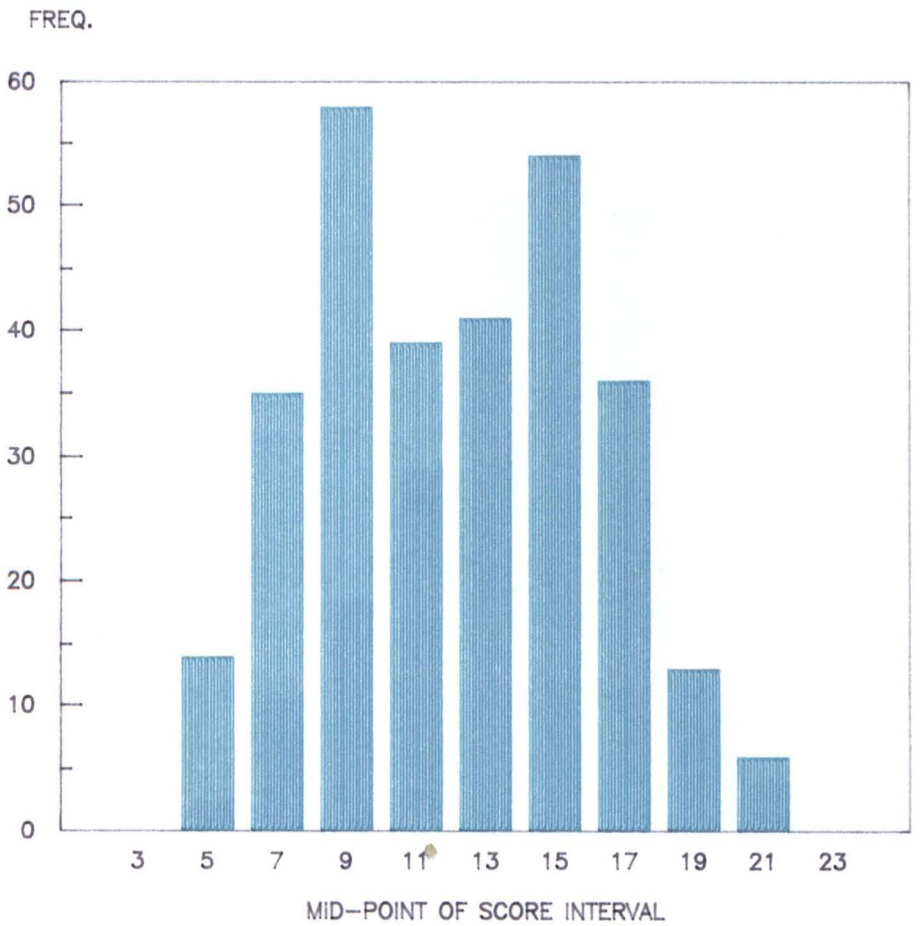
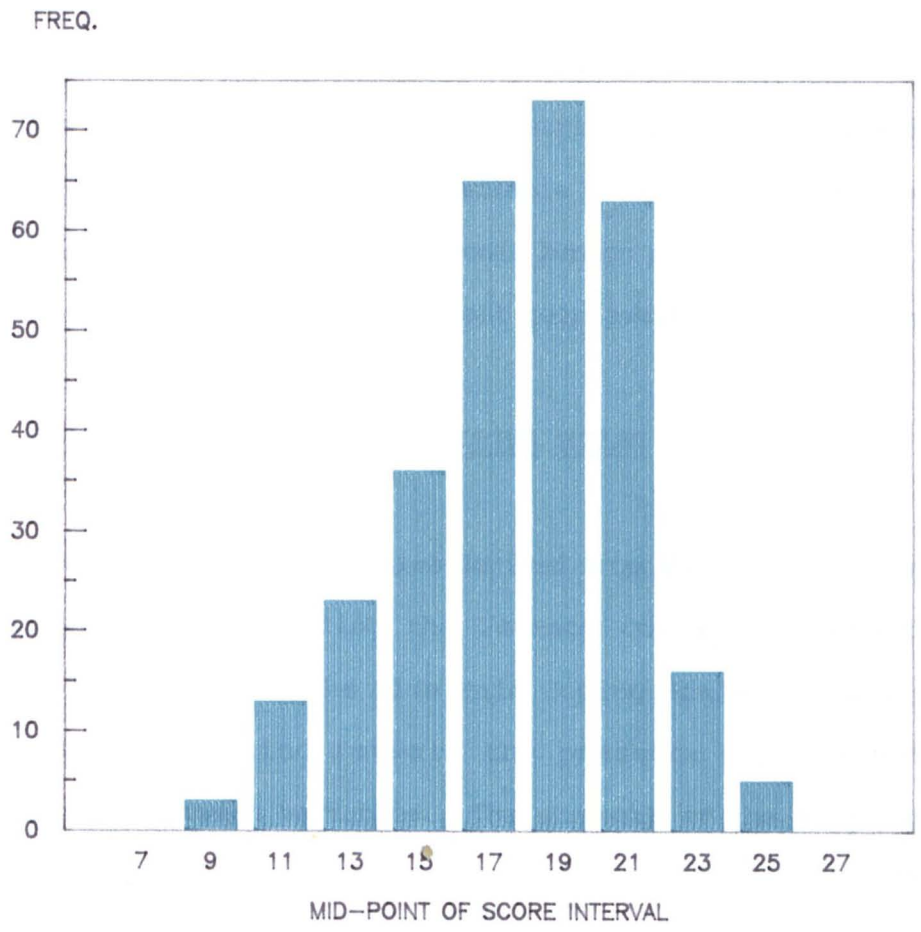


Fig.5.6 Distribution of scores on " Pain Communications " scale for 298 patients with chronic pain.



described by a bimodal distribution. The reasons for this are unclear. The population under study consists of patients in chronic pain who were being treated in a large, multidisciplinary, regional pain clinic. The respondents to the questionnaire are likely to have included both patients with chronic benign pain in whom drug treatments may be relatively unsuccessful and patients with malignant pain in whom drug treatments could be a central aspect of treatment either for the pain or the underlying physical condition causing the pain. One might therefore expect some differences in attitudes towards drugs and pain medication between these two groups of patients and this may explain the bimodal distribution. No information with respect to pain syndromes was available from the present study. The prediction that patients with chronic benign pain would score lower on scale 4 than patients with malignant pain awaits investigation.

5.6 RELATIONSHIPS BETWEEN PAIN COPING SCALES

Relationships between the scales derived from the factor analysis were investigated by inspecting the Pearson correlation coefficients between the scores on the five Pain Coping Scales. Correlational analysis of this kind reveals the presence and strength of a relationship between variables. The strength of the relationship is reflected by the magnitude of the correlation coefficient. This type of analysis does not reveal the nature of the relationship. It does not indicate that one variable has caused a change in another when a statistically significant correlation occurs. Nevertheless, such an analysis reveals important information in the preliminary investigation of the putative psychological dimensions and provides a basis for further investigation. The Pearson correlation coefficient

matrix of the five scales is shown in Table 5.11..

Inspection of the correlation matrix reveals a strong relationship between the General Coping Measure and Active Coping Strategies ($R=0.272$; $p<0.001$). This suggests that patients who adopt positive strategies for dealing with pain, who have beliefs in control over pain and who acknowledge the influence of psychological factors in pain have less psychological distress and generally cope better with their pain. The significant negative correlations ($p<0.001$) between General Coping Measure and Avoidance and Use of Drugs suggests that patients who adopt negative strategies for coping with pain such as avoidance, excessive reliance on medication and rest tend to have greater degrees of psychological distress and emotionally cope with their problems less well. There are significant negative correlations ($p<0.005$) between Active Coping Strategies and Avoidance and Use of Drugs.

The Pain Coping Scale appears to measure a readiness to communicate pain experience to other people and belief that attention and sympathy are important and helpful responses to expressions of pain. There is no relationship between this variable and General Coping Measure or Active Coping Strategies. This implies that a readiness to communicate pain experience to other people is not directly related to psychological distress or coping with pain from an emotional point of view . There are, however, significant correlations between Pain Communication and Avoidance ($p<0.001$)and between pain communication and Use of Drugs ($p<0.05$).

Avoidance and Use of Drugs may be seen to be measuring what are

TABLE 5.11 Correlation matrix of scales derived from factor analysis. Pearson correlation coefficients; two-tailed test. N=298

	ACTIVE COPING STRATEGIES	AVOIDANCE	USE OF DRUGS	PAIN COMMUN-ICATION
GENERAL COPING MEASURE	*** .272	*** - .502	*** - .338	- .017
ACTIVE COPING STRATEGIES	I	** - .165	** - .167	.00
AVOIDANCE		I	*** .458	*** .194
USE OF DRUGS			I	* .120
PAIN COMMUNICATION				I

$p < .05^{*}$ $p < .005^{**}$ $p < .001^{***}$

generally considered to be negative ways of coping with pain. These scales probably measure beliefs and attitudes that are likely to underlie illness behaviour (Mechanic, 1962). The fact that Pain Communication is related to these measures suggest that this dimension also measures an aspect of illness behaviour. This is consistent with clinical experience that patients who exhibit excessive illness behaviour also often demonstrate a readiness to communicate pain experience to others. It is interesting that this aspect of illness behaviour (if that is what it is) is not directly related to psychological distress by virtue of non significant correlation with General Coping Measure. This finding is consistent with clinical experience and reports in the literature that excessive illness behaviour characterised by avoidance, rest, excessive medication is not always associated with psychological distress (Sternbach, 1974). When the pattern of excessive illness behaviour in the presence of little psychological distress emerges, it is sometimes considered to reflect satisfaction with the invalid role (Sternbach, 1974; Fordyce, 1976). This clinical picture is characterised on the Minnesota Multiphasic Personality Inventory (M.M.P.I.) by elevated scores on Hypochondriasis and Hysteria scales with Depression in normal ranges. It would be interesting to see if patients who have this profile on the M.M.P.I., show a pattern of elevated scores on Avoidance, Use of Drugs and Pain Communication in the presence of normal coping on the General Coping Measure on the present questionnaire.

To summarise, examination of intercorrelations of Pain Coping Scales reveals:-

1. Belief in the use of positive coping strategies (reflected by high scores on Active Coping Strategies) is associated with good

psychological adjustments (reflected by high scores on General Coping Measure).

2. Belief in the use of negative coping strategies (reflected by high scores on Avoidance, Use of Drugs) is associated with poor psychological adjustment (reflected by lower scores on General Coping Measure).

3. Avoidance, Use of Drugs and Pain Communication scales are related and may be measuring attitudes and beliefs that underlie illness and behaviour. The finding that Pain Communication is not directly related with distress (General Coping Measure) suggests that it may be helpful in distinguishing patients whose illness behaviour is motivated by psyco-social benefits from patients whose illness behaviour is caused by other reasons.

This analysis does not provide evidence of a causal relationship between the variables. Physical aspects of pain such as pain intensity, disability and limitation of function have not been addressed in the present study and are important variables in contributing to psychological adjustment to chronic pain. Whilst the relative contribution of psychological beliefs and physical aspects of pain to psychological adjustment is not clear, the present results are certainly suggestive of an important link between attitudes and beliefs in the use in pain coping behaviours and psychological adjustment.

5.7 RELATIONSHIPS BETWEEN PAIN COPING SCALES AND OTHER PATIENT VARIABLES

Inspection of items making up the scales and the results from correlational analysis suggests that the scales may be measuring important dimensions in coping with chronic pain. Further information about the nature of the Pain Coping Scales can be obtained by examining the relationships between these scales and other patient variables. Continuous variables such as age and duration of pain were analysed by inspecting Pearson correlation coefficients. Categorical variables were examined by T-tests.

Pearson correlation coefficients between Pain Coping Scales and age are shown in Table 5.12. There is no relationship between age and psychological adjustment as measured by General Coping Measure. Perhaps contrary to popular belief, ability to cope with chronic pain from an emotional point of view does not appear to diminish with advancing age. Interestingly, beliefs underlying coping strategies, as measured by Active Coping Strategies, Avoidance, and Use of Drugs scales are all correlated with age. With advancing age, individuals are more likely to adopt negative strategies such as rest, avoidance, and less likely to adopt positive strategies such as increasing activity levels or distraction. There are likely to be psycho-social and physical reasons for these relationships. Pain syndromes that tend to occur in older individuals are often associated with degenerative physical changes and these may make it more difficult for patients to peform "active" coping strategies. With advancing age there may be less opportunity to engage in more active behaviour involving distraction, exercise and social activities. Advancing years are often associated with important social changes such as retirement, changes in family responsibility, and frequently

TABLE 5.12 Pearson correlation coefficients of scales derived from factor analysis with age (years) and duration of pain (years); two-tailed test. N=298.

	AGE	DURATION OF PAIN
GENERAL COPING MEASURE	- .05	.01
ACTIVE COPING STRATEGIES	- .25***	.09
AVOIDANCE	.19**	.02
USE OF DRUGS	.21***	.06
PAIN COMMUNICATION	.00	.11

$p < .05^{*}$ $p < .005^{**}$ $p < .001^{***}$

increasing social isolation. These psycho-social changes may limit the opportunity and motivation people have for coping with chronic pain in a more positive way.

Correlations between duration of pain and Pain Coping Scales are shown in Table 5.12. No significant correlations emerge. There are no relationships between duration of pain problem and level of psychological adjustment or beliefs in positive or negative Pain Coping Strategies. This finding is qualified by the fact that in the population under study, most respondents have had pain for a long time. People with chronic problems of long durations are well represented with patients with pain for short duration being under-represented. This means that the lack of relationship between coping with pain and duration of pain should be interpreted with caution. On clinical grounds one might have expected some relationship between psychological adjustment and duration in that one might expect psychological adjustment to deteriorate as the pain problem lingers into chronicity and the impact of the important psycho-social and physical changes becomes increasingly relevant.

Mean scores for Pain Coping Scales for males and females are shown in Table 5.13. There are no significant differences in terms of psychological adjustment or pain coping strategies between males and females in the present sample. This is consistent with the general findings in the sample of no differences between males and females in terms of duration, pain or demographic characteristics.

With respect to pattern of pain, one might expect individuals whose pain has decreased since it began to have better psychological

TABLE 5.13 Mean scores of pain coping scales for males and females.

VARIABLE		NO. OF CASES	MEAN	S.D	t	D.F	2-TAIL PROB.
GENERAL COPING MEASURE	Male	101	57.80	14.35	-0.25	291	0.806
	Female	192	58.23	14.25			
ACTIVE COPING STRATEGIES	Male	101	34.97	7.78	-0.11	291	0.916
	Female	192	35.06	7.31			
AVOIDANCE	Male	102	9.66	2.94	-1.01	294	0.311
	Female	194	10.04	3.06			
USE OF DRUGS	Male	102	11.94	4.05	1.16	294	0.247
	Female	194	11.38	3.88			
PAIN COMMUN-ICATION	Male	103	16.94	3.69	-1.6	295	0.112
	Female	194	17.56	2.92			

adjustment than individuals whose pain has either remained the same or deteriorated. One might also expect a difference in coping styles with patients whose pain has decreased adopting more active coping styles and patients whose pain has decreased to have adopted a more negative coping strategies.

Table 5.14 shows mean scores on the Pain Coping Scales for patients whose pain has decreased since onset and patients whose pain has increased since onset. There is a large difference in mean scores for General Coping Measure between the two groups although it just fails to reach statistical significance ($p=.067$). The difference is in the direction predicted with individuals whose pain has decreased showing better coping and adjustment when compared to individuals whose pain has deteriorated. With respect to pain coping strategies, there is a large difference between mean scores on the Active Coping Strategies scale between the two groups. This again just fails to reach statistical significance ($p = 0.058$). The difference is in the direction predicted with patients whose pain has decreased scoring higher on Active Coping Strategies scale than did patients whose pain has increased. There are no differences between the two groups in mean scores on Avoidance, Use of drugs or Pain Communication scales.

Overall, these results reveal a trend towards significance of individuals whose pain has decreased since onset showing better psychological adjustment and greater beliefs in the use of active measures to cope with pain. This finding, to some extent, validates the scales in question in demonstrating that there are differences in certain patient groups in the direction predicted on clinical grounds. It is not of course clear whether the beliefs in Active Coping

TABLE 5.14 Mean scores of pain coping scales for patients whose pain has increased and those whose pain has decreased over time.

VARIABLE		NO. OF CASES	MEAN	S.D	t	D.F	2-TAIL TEST
GENERAL COPING MEASURE	Increase	140	57.4	14.51	-1.84	189	0.067
	Decrease	51	61.64	12.84			
ACTIVE COPING STRATEGIES	Increase	140	35.11	7.24	-1.91	189	0.058
	Decrease	51	37.43	7.94			
AVOIDANCE	Increase	142	10.03	3.07	-0.47	192	0.641
	Decrease	52	10.26	3.13			
USE OF DRUGS	Increase	141	11.53	3.86	-0.44	190	0.663
	Decrease	51	11.80	3.67			
PAIN COMMUN-ICATION	Increase	141	17.07	3.30	0.60	191	0.550
	Decrease	52	16.75	3.3			

Strategies has actually caused the pain to decrease or whether some other factors have lead to pain reduction and this has then enabled the individual to engage in more active strategies. Pain characteristics such as remission of illness, physical and treatment variables have not been addressed in the present study. These variables may have wholly or partly contributed to the differences in pain coping scores. Studies where physical and treatment variables are held constant and a change in Active Coping Strategies is effected by some form of psychological intervention are required to further investigate the relationship between Coping Strategies and psychological adjustment.

Relationships between Pain Coping Scales and location of pain was investigated by comparing mean scores on the Coping Scales between patients with "focal" pain and patients with "diffuse" or widespread pain. It has frequently been observed that patients with chronic pain syndrome often have widespread pain distributions, frequently anatomically unrelated, that increase over time (Sternbach, 1974). It might be predicted that patients with widespread pain distribution would show more psychological disturbance reflected by lower scores on General Coping Measure, less use of Active Coping Strategies and greater reliance on negative strategies, such as rest, avoidance and medication usage. From the very limited information available, patients were characterised into two groups. Patients who reported having pain in one anatomical location were allocated to the "focal" pain group. Patients were allocated to the "diffuse" pain group if they reported pain in more than one location or reported pain as being all over the body.

Mean scores for the Pain Coping Scales for these two groups are shown in Table 5.15. No significant differences between mean scores on General Coping Measure, Active Coping Strategies, Avoidance or Use of Drugs were found between the two groups. There was a difference in terms of Pain Communication with patients with "focal" pain showing a greater readiness to communicate pain to others when compared with patients with "diffuse" pain. The reasons for this difference are difficult to interpret. A major problem with the present data is that it is very difficult to rationally assign patients to "focal" or "diffuse" pain groups on the basis of limited information available. For example, individuals with sciatic pain would have pain in back and legs and would therefore be considered to have "diffuse" pain although this syndrome is usually to be considered anatomically consistent and better described as a "focal" pain problem. Individuals with "diffuse" pains in the shoulders, chest or abdomen would in the terms of the present questionnaire be considered to have a "focal" pain. Clearly the questionable validity of the two groups makes this particular comparison difficult to interpret.

Comparison of patients who have undergone psychological treatment with patients who have not received psychological treatment provides a further opportunity to validate the Pain Coping Scales. In general, one would expect that patients who have received psychological treatment to show better adjustment reflected by higher scores on General Coping Measure, greater use of positive coping strategies and less reliance on negative strategies such as avoidance or medication. Naturally, this prediction assumes that psychological intervention is effective.

TABLE 5.15 Mean scores of pain coping scales comparing patients with "focal" pain and patients with "diffuse" pain.

VARIABLE		NO. OF CASES	MEAN	S.D	t	D.F	2-TAIL PROB.
GENERAL COPING MEASURE	Focal	117	58.50	14.20	0.74	274	0.458
	Diffuse	159	57.20	14.40			
ACTIVE COPING STRATEGIES	Focal	117	35.22	7.65	0.18	274	0.857
	Diffuse	159	35.05	7.47			
AVOIDANCE	Focal	117	10.06	3.33	0.74	277	0.462
	Diffuse	162	9.79	2.82			
USE OF DRUGS	Focal	117	11.72	3.61	0.32	277	0.746
	Diffuse	161	11.56	4.17			
PAIN COMMUN-ICATION	Focal	118	16.75	3.55	-2.56	278	0.01
	Diffuse	162	17.75	3.12			

A proportion of the present sample have undergone psychological treatment by virtue of attendance on Pain Management Programme (PMP)and this is shown in figure 5.7. Mean scores on the Pain Coping Scales were compared between patients who had attended the PMP and patients who had not attended. Mean scores for the two groups are shown in Table 5.16. There are important differences in mean scores on all Pain Coping Scales between the two groups. Individuals who have attended PMP show better psychological adjustment reflected by high scores on the General Coping Measure, although the difference just fails to reach statistical significance ($p=0.06$). There are statistically significant differences on all other scales. This suggests that patients who have attended PMP show greater use of active coping strategies, less reliance on drugs, rest or avoidance, and less tendency to communicate pain experience to others. These findings are highly significant and provide strong evidence that the Pain Coping Scales are measuring important dimensions of psychological adjustment to chronic pain.

The present findings are not evidence of the efficacy of PMP. These data demonstrate that there are important psychological differences between patients who have received psychological treatment and those who have not in the direction predicted upon clinical grounds. There are several possible reasons for these differences. It is possible that only relatively well adjusted patients are selected for treatment and this may explain the differences found rather than the effects of treatment. Physical constraints, type of pain syndrome and other physical characteristics may also influence selection to psychological treatment. It is possible also that some combination of treatment and selection effects explain the differences.

Fig.5.7 Proportion of total sample who have attended Pain Management Course.

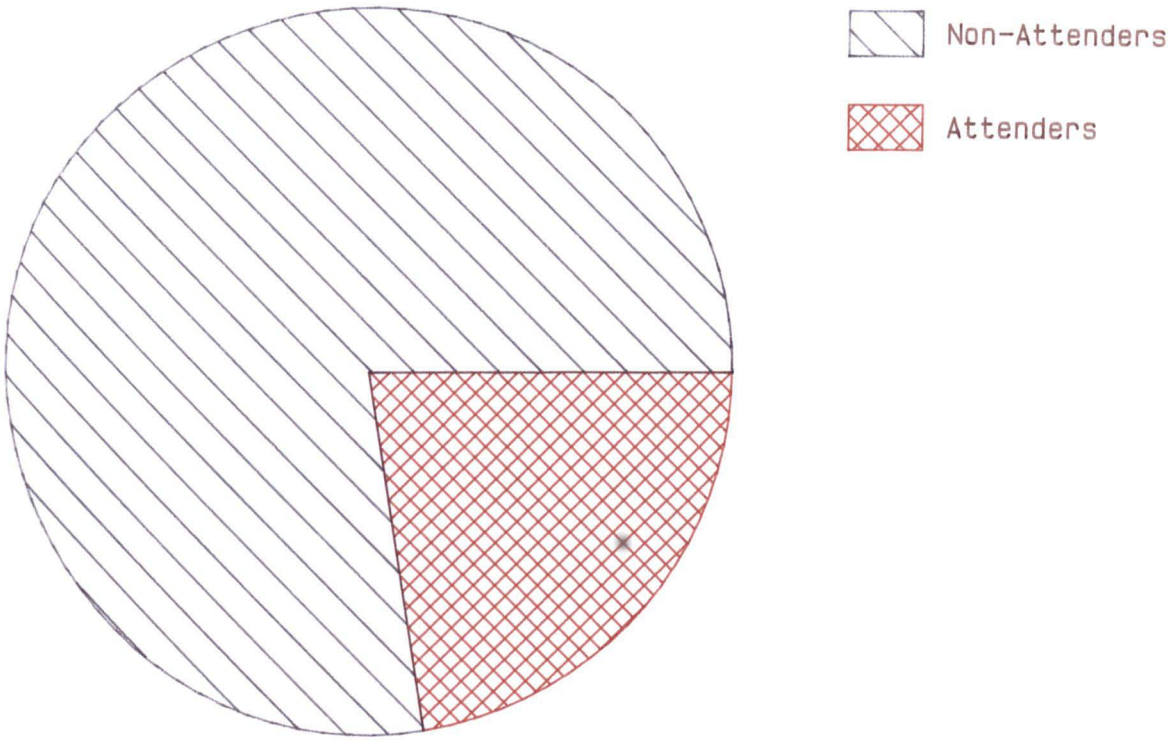


TABLE 5.16 Mean scores of pain coping scales comparing patients who have attended the Pain Management Course (PMC) and patients who have not attended the Pain Management Course (NA/PMC).

VARIABLE		NO. OF CASES	MEAN	S.D	t	D.F	2-TAIL PROB.
GENERAL COPING MEASURE	PMC	65	61.15	13.94	1.88	288	0.06
	NA/PMC	225	57.42	14.15			
ACTIVE COPING STRATEGIES	PMC	65	37.67	8.09	3.17	288	0.002
	NA/PMC	225	34.40	7.07			
AVOIDANCE	PMC	65	11.21	3.43	3.96	291	0.000
	NA/PMC	228	9.57	2.80			
USE OF DRUGS	PMC	66	12.84	3.90	3.01	291	0.003
	NA/PMC	227	11.21	3.88			
PAIN COMMUN-ICATION	PMC	66	18.22	2.90	2.59	292	0.01
	NA/PMC	228	17.07	3.27			

5.8 DISCUSSION

Factor analysis was used to develop scales that would measure important dimensions in coping with pain. The principle behind interpreting the solution was to find a simple solution that made psychological sense and that could be used to form the basis for scale construction. Five scales were derived from this analysis that had psychological meaning and sufficient internal consistency to merit further analysis and investigation.

The factor that accounted for the largest percentage of the variance of the total sample (19%) appeared to be a measure of psycho-social adjustment. The scale derived from this factor was called General Coping Measure. It consisted of items relating to depression, social isolation and dysfunction, lowered confidence, and anxiety. The finding of such a dimension in this investigation is consistent with many reports in the literature of the importance of depression, psychological distress and adjustment in chronic pain (Main and Waddell, 1982; Waddell et al, 1984; Fordyce, 1976; Sternbach, 1974). Depression has been observed to be a frequent accompaniment to chronic pain syndrome (Fordyce, 1976; Sternbach, 1974). It has also been considered to be an important factor in the development and continuation of chronic pain problems (Turner and Chapman, 1982; Fordyce, 1976). Sternbach and Timmermans, (1975) have reported that chronic somatic pain usually results in reactive depression and that the relief of chronic pain alleviates this depression. The successful treatment of depression has been associated with reduction in pain report (Bradley, 1963). Recent studies have indicated that depression

may be a predictor of poor response to treatment for chronic pain (Blanchard et al, 1982).

In a study designed to develop a comprehensive functional evaluation for patients with chronic low back pain, a general psychological adjustment factor emerged from factor analysis of the evaluation measures (Naliboff, 1985). This factor was made up of questions designed for use on a general population and consisted of measures of depression, anxiety and social isolation. The General Coping Measure derived from the present study is likely to be measuring a similar dimension, although it has the advantage that it has been developed and standardised on the population for which it is intended to be used.

Examination of the relationship between General Coping Measure and other patient variables revealed that it was not related to sex, duration of pain, or age. This finding is consistent with findings in a recent study reported by Heaton et al, (1982). These authors reported the development and standardisation of a system to evaluate psycho-social factors in chronic pain. The authors reported that psycho-social adjustment as measured by the Psycho-social Pain Inventory was not related to age, sex or duration of pain problem. In the present study, a relationship was found between General Coping Measure and pattern of pain (i.e. whether the pain has increased or decreased since onset) rather than simply duration of pain. A relationship was also found between General Coping Measure and psychological treatment variables. These findings provide evidence that the scale is measuring a "real" psychological dimension concerned with psychological adjustment to chronic pain. Internal consistency

of the scale is high and this further suggests that the scale is measuring a single dimension. Further studies of the reliability and validity of this scale are required and these are the subject of Chapters 6 and 7.

The second factor accounted for 7.2% of the total variance in the sample. Unlike factor 1 which was concerned with the emotional consequences of pain, factor 2 seen to be a measure of beliefs and attitudes that might underly pain coping behaviours. It appeared to be a measure of what people think and do in attempting to cope with pain. Beliefs in the helpfulness of exercise, distraction, relaxation coupled with a sense of control over pain characterise this factor which was labelled Active Coping Strategies. It was interesting that items to do with controllability over pain emerged within this factor, closely associated with items relating to specific pain coping strategies such as the use of distraction. This supports the notion that "controllability" does not exist as a discreet psychological dimension separate from other domains, but is closely linked with the effectiveness of specific coping behaviours.

Whilst the second factor appeared to measure active or positive strategies and beliefs, factors 3, 4 and 5 appeared to measure passive or negative strategies and beliefs. These factors were called Avoidance, Use of Drugs and Pain Communication and appear to be measuring beliefs that underly illness behaviour. They were related and it is possible that they represent a single dimension. There were some differences between the scales in terms of distribution of Use of Drugs scale and the uncertain nature of Pain Communication scale. These scales require further psychometric evaluation to help determine

whether they represent separate dimensions.

The finding in the present study of separate dimensions that appear to be measuring specific pain coping strategies is consistent with some thoughts in the literature. Copp (1974) interviewed over 100 patients dealing with various painful experiences and found that most had developed coping strategies; ways to tolerate, minimise or reduce their pain. Rosenstiel and Keefe (1983) developed a questionnaire (Coping Strategies Questionnaire) that measured the use of cognitive or behavioural strategies in 61 chronic low back pain patients. Factor analysis of the questionnaire responses revealed three factors; a) Cognitive coping and suppression; b) Helplessness and c) Diverting Attention or Praying. The results suggested that certain coping strategies were maladaptive and that avoiding the use of these strategies may improve adjustment to chronic low back pain. The present study similarly reveals strategies that may be positive and negative. There are some similarities between the Pain Coping Scales and some of the measures from the Rosenstiel and Keefe (1983) study. The "Cognitive coping" dimension is likely to be related to Active Coping Strategies scales by virtue of items related to more active coping strategies. Avoidance is probably similar to the "Helplessness" dimension in that both are passive strategies for coping with pain.

There are important differences between the Pain Coping Scales and between scales derived from previous studies of coping strategies (Rosenstiel and Keefe, 1983). In the present study the dimensions appear to be primarily measuring the belief in the use of strategies rather than measuring how frequently patients report using particular

strategies. This difference may well be important when one considers that as Fordyce (1976) emphasises, there is often a discrepancy between what chronic pain patients say about how they are coping and what they actually do. Sanders (1980) found that chronic low back pain patients consistently distorted their reports of activity in a negative direction. Kremer et al (1980) found that compensation patients with chronic pain under-recorded activity levels. It is not clear whether reports of a mis-match between what chronic pain patients say and do also applies to measures of attitudes, beliefs and other psychological dimensions measured on questionnaires. These studies highlight the need for further investigation of reliability and validity of the Pain Coping Scales.

A central question is, do coping strategies predict behavioural and emotional adjustment beyond what can be predicted on the basis of variables already known to be related to adjustment to a chronic pain problem? To rephrase the question in terms of the present study, do scores on scales measuring coping behaviours (Active Coping Strategies, Avoidance, Use of Drugs, Pain Communication) predict scores on the scale measuring psychological adjustment (General Coping Measure). From the present study there are clear associations between General Coping Measure and the scales measuring Coping Strategies. There are also significant differences in Coping Strategies between patients whose pain has decreased and patients whose pain has increased. Patients whose pain has decreased show greater belief in active coping strategies. Patients who have received psychological treatment also show greater use of active coping strategies and better psychological adjustment.

Overall, present findings are suggestive of an important relationship between belief and use of certain types of coping strategies and psychological adjustment. These findings of a relationship between coping styles and psychological adjustment are consistent with recent reports in the literature. There is growing recognition that coping strategies may be an important factor determining how patients adjust to chronic pain (Copp, 1974; Tan, 1982; Turk, 1976). Studies in clinical settings have suggested the effectiveness of coping skills training in reducing pain and distress associated with medical and surgical procedures (Kendall et al, 1979; Pickett and Clum, 1982; Wernick et al, 1981) and in decreasing pain ratings of chronic pain patients (Engstrom, 1983; Moore and Chaney, 1985; Turner, 1982).

Rosenstiel and Keefe (1983) found that the use of certain cognitive coping strategies were predictive of behavioural and emotional adjustment to chronic pain beyond what may have been predicted by patient variables such as lengths of continuous pain, disability status, number of surgeries, and tendency of patients to somatisise. In a second study using the Coping Strategies Questionnaire, Rosenstiel (1982) found that acute back pain patients undergoing their first surgery who rated their ability to use coping strategies to decrease pain as high had significantly better post surgical adjustment than individuals who rated their ability to decrease pain as low. As with the Rosenstiel and Keefe (1983) study results were found after controlling for that portion of the variance that could be attributed to factors known to effect outcome such as disability, pre-treatment pain level, duration of pain and somatosisation. In a further study investigating Coping Strategy Questionnaire Turner and Clancy (1986) found that coping styles were associated with average pain, downtime,

functional impairment and depression.

Clinical experience, previous research and present analysis of Pain Coping Scales suggest that coping strategies are predictive of psychological adjustment. Further studies are needed where patient, illness and treatment variables are held constant whilst coping strategies are "changed". Such studies would help to clarify the relationship between coping strategies and adjustment.

CHAPTER 6

RELIABILITY OF PAIN COPING SCALES

6.1 INTRODUCTION

Reliability is a central issue in the development of any measurement instrument. If the Pain Coping Questionnaire is to be clinically useful then it must be demonstrated to have adequate reliability. This means that if changes in scores are obtained then one needs to be reasonably certain that they represent real changes in whatever dimensions they are measuring rather than simply being due to error associated with an unreliable measurement instrument. The question as to what the scales are measuring refers to the validity of the Questionnaire and this is the topic of Chapter 7. This chapter is concerned with a series of four studies designed to investigate and measure the reliability of the Pain Coping Questionnaire.

Reliability concerns the degree of repeatability and consistency of empirical measures. A reliable measure is one that is repeatable and consistent, whereas an unreliable measure provides results that are unrepeatable and inconsistent. Statistically, reliability is equal to the non random components of the observed variance. In reliability assessments, the focus of attention is on random error. The greater the random error involved in the measure the less reliable will be the measure. The definition of reliability centres on the degree of repeatability and consistency of empirical measurements. These two terms correspond to the two basic strategies used to assess reliability. These strategies are referred to as "stability" and "equivalence" respectively.

The most typical measure used to evaluate the stability of measurements is the test - re-test reliability correlation. If the measurement is reliable then one would expect high test - re-test correlations assuming that nothing occurs during the interval between test and re-test to change or influence the dimension being measured.

There are a number of problems and limitations associated with test re-test measures of reliability and these need to be taken into account when interpreting test/re-test correlations. A low test - re-test correlation, for example, may not be an indication that the reliability of the measure is low but may signify that the dimension being measured has changed. In general, one might expect the longer the time interval between measurements the more likely that the dimension has actually changed. This problem is particularly relevant when investigating new scales and dimensions about which little is known, such as in the present study.

There is little theoretical understanding about how the dimensions being measured might change with time or what other variables might interact with them. This means that low test - re-test correlations are difficult to interpret and emphasises the need for multiple measures of reliability in such a preliminary investigation of this kind.

A further problem associated with test - re-test correlations is reactivity. This refers to the fact that sometimes measuring a phenomenon can induce a change in the phenomenon itself. To illustrate in terms of the present study, a patient completing the

Pain Coping Questionnaire for the first time may discover ideas on coping with pain that they have never been exposed to, such as, for example, the notion of responding to pain with increased activity rather than rest. They may subsequently change their behaviour and attitudes and this may be reflected by a change in scores when re-tested on the same questionnaire at a later date. In this case, the test - re-test correlation will be lower than it would be otherwise because of reactivity.

Another problem that may occur with test - re-test correlations is that if the test - re-test interval is too short, respondents may remember their earlier responses and will appear to be more consistent than they actually are. "Memory" effects can lead to inflated reliability estimates.

Caution is needed in interpreting test - re-test measures of reliability. Despite this, a basic assumption of any measurement instrument is that it is repeatable and a measure of stability is required. Measures of stability of the Pain Coping Questionnaire form the background to two studies of reliability of the Questionnaire. The scales from the Pain Coping Questionnaire were developed from a large scale factor analysis study on a heterogenous group of chronic pain patients. An underlying assumption is that these scales represent real dimensions and are not simply due to chance. This means that the factor structure should remain stable over time and be repeatable. The first study is concerned with testing this assumption by a confirmatory factor analysis . The second study of the stability of the Pain Coping Questionnaire is concerned with measuring test - re-test correlations of the individual scales.

The second broad strategy for assessing reliability focuses on multiple indicators of a concept measured at a single point in time. Each indicator of a concept (item on a scale) is considered a separate but equivalent measure of the underlying dimension. This is a basis for split-half methods of measuring reliability. In these methods the total number of items making up the scale is arbitrarily divided into two halves and the correlation calculated between the two halves to provide an estimate of the reliability of the scale. Cronbach's Alpha (Cronbach, 1951) is an extension of this method and is equal to the average of all possible split-half correlations for a composite scale. It is a measure of the internal consistency of the scale. It can be considered broadly as a measure of the extent that the items comprising a scale are measuring a single dimension. There are some limitations of Cronbach's Alpha. It has been shown by Novick and Lewis (1967) that Alpha equals reliability only if the items are strictly parallel or, at least essentially tau-equivalent. If this is not the case, the value of alpha merely sets the lower bound on reliability. This means that alpha will not provide an optimal estimate of reliability when the items measure the dimension unequally or the items measure more than one dimension equally or unequally. Despite these limitations Cronbach's Alpha remains an important measure of internal consistency of scales particularly in a preliminary analysis of the present kind.

Cronbach's Alpha was calculated for the Pain Coping Scales in the initial development of the questionnaire (see Chapter 5). The value of alpha exceeded .8 on three of the scales and exceeded .6 on the remaining two scales. This is considered to reflect an acceptable

level of internal consistency for the scales, at least for research purposes (Sonquist and Dunkelberg, 1977). The third reliability study was concerned with repeat measures of internal consistency of the Pain Coping Scales at another point in time. One would expect there to be a close correspondence between the two measures. In this case the measure of reliability would be unaffected by any change in the dimension over time as alpha is based upon the properties of the scale measured at a single point in time.

A further measure of the reliability of the Pain Coping Scales with reference to stability of measures is whether the scales relate to other variables in the same way on repeat testing at a second point in time. This concept in measuring reliability is closely related to construct validity. Cronbach and Meehl (1955) observed that :-

> "Construct validation takes place when an investigator believes his instrument reflects a particular construct, to which are attached certain meanings. The proposed interpretation generates specific testable hypotheses, which are a means of confirming or disconfirming the claim".

Construct validity is assessed within a given theoretical context. It focuses on the assessment of whether a particular measure relates to other measures consistent with theoretically derived hypotheses concerning the concepts that are being measured. It was shown in the initial development study (Chapter 5) that the scale from the Pain Coping Questionnaire had certain relationships with other variables. These relationships to some extent can be seen as a measure of construct validity in that they broadly confirm theoretical notions about what the scales are measuring. This means that they appear to relate to other variables in a way that would be predicted on the

basis of what is known about the psychological aspects of chronic pain. With respect to reliability, one would expect the relationships between the Pain Coping Scales and other variables to remain stable and hence be repeatable over time. The extent to which these relationships do remain stable over time is then a further indication of the reliability of the measures. The fourth reliability study is concerned with investigating whether the relationship between the Pain Coping Scales and other variables remain stable over time.

From the preceding discussion, it is clear that all measures of reliability have certain limitations and problems associated with interpretation. No single measure of reliability is likely to be sufficient in providing an evaluation of the Pain Coping Questionnaire. Because reliability is such a basic pre-requisite in the development of any measurement instrument, it was assessed by using as many different types of reliability measures as possible. Four studies were conducted to measure reliability:-

1. Confirmatory Factor Analysis.
2. Test Re-test Correlations of the Pain Coping Scales.
3. Repeat measures of internal consistency of Pain Coping Scales.
4. Construct Validity - repeat measures of the stability of relationship with other variables.

6.2 RELIABILITY STUDY 1. CONFIRMATORY FACTOR ANALYSIS

6.2a Introduction

The purpose of this study was to determine whether the factor structure derived from the initial study (Chapter 5) could be

replicated on the same subjects over a period of time. If the original factor structure represents real dimensions then one would expect a similar solution to emerge on repeat testing at a different point in time. This is of course subject to the same limitations as any test - re-test measure of stability, in that one is assuming that nothing is occurring between test and re-test interval to influence the relationships between the dimensions under study. Assuming then that these changes do not occur, any differences in the factor solution are likely to be due to random error rather than actual changes in the dimension. If the original factor structure did emerge through chance, then a different factor structure would occur at repeat testing.

The test - re-test interval is subject to a number of constraints. If the interval is too close then "memory" effects may contaminate the results. If the interval is too long, change in dimensions may occur and this may obscure interpretation. In addition, there are practical considerations in organising and conducting such a large scale survey. As far as theoretical considerations are concerned, little is known about the dimensions being measured by the Pain Coping Scales or how they are likely to change over time or for other reasons. As far as clinical findings are concerned, the population under study represents a disabled group who have longstanding pain problems (see Chapter 4). Chronic pain patients frequently report high levels of constant pain that tends not to fluctuate over time (Sternbach, 1974). Their coping mechanisms and psychological adjustment similarly tends not to fluctuate and there is frequently a consistency in psychological presentation. This suggests that psychological dimensions that are related to some aspects of coping with chronic pain are also likely to

remain fairly stable over time. It was demonstrated in the initial development study (Chapter 5) that none of the Pain Coping Scales are correlated with duration of pain. On the basis of the information available, it is reasonable to assume for the present purposes that the Pain Coping Scales will remain stable over time, and that as long as the test - re-test interval is not excessive, one would expect the factor structure to remain broadly similar on repeat testing. A test - re-test interval of between 9-12 months was used.

6.2b Methods

Subjects

All subjects who participated in the original standardisation sample of the Pain Coping Questionnaire were contacted by post 9-12 months after completing the original questionnaire and asked to complete the Pain Coping Questionnaire for the second time (see Chapter 4 for details of the standardisation sample). Of the 298 patients contacted, 171 patients completed and returned the questionnaire. Thus a 57% response rate was obtained. This was identical to the response rate (57%) obtained in the original standardisation study. There are 112 females (65%) and 59 males (34%) in the present study. The mean age of the sample was 54.9 years (SD =14.7 years) with mean duration of pain being 8.8 years (SD =8.8 years).

Procedures and Measures

All subjects were contacted by post 9-12 months after completing the initial questionnaire (see appendix D for details of letter and questionnaire). In addition to being asked to complete the Pain

Fig.6.1 Proportion of patients attending Pain Management Course :
First and Second Waves.

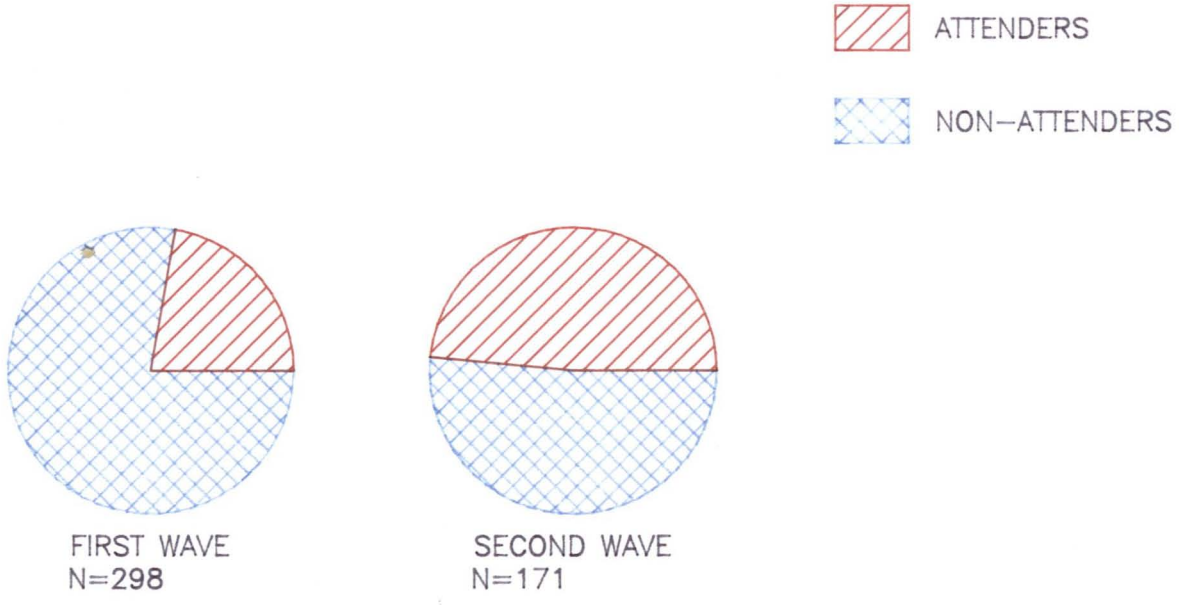


TABLE 6.1 Mean ages and duration of pain for first wave and second wave samples.

	FIRST WAVE (N=298)		SECOND WAVE (N=171)	
	MEAN	(S.D)	MEAN	(S.D)
AGE (years)	53.0	15.2	54.9	14.7
DURATION OF PAIN (years)	8.64	8.9	8.8	8.8

Coping Questionnaire for a second time, subjects were asked to complete a measure of severity of pain on a 10 point rating scale with verbal descriptives. Subjects were also asked to complete a number of other questionnaires not relevant to the current study.

6.2c Results

Mean ages and durations of pain for the first wave (N=298) and second wave (N=171) samples are shown in Table 6.1. There are no differences in age or duration of pain between first wave and second wave samples. Comparisons between first and second wave samples for frequencies of responses for sex distribution, marital status, employment, location of pain, pattern of pain, onset of pain, and frequency of pain are shown in appendix F There are no significant differences on any of these measures between the two samples. Figure 6.1 shows that the proportion of patients who have attended the Pain Management Course is greater in the second wave compared with the first wave.

Replication of Pain Coping Questionnaire factor structure

A principal components analysis using orthogonal rotation was performed. Patients' scores on all items from the Pain Coping Questionnaire were entered into the analysis. Correlation matrix of items from the questionnaire is shown in appendix E. Of the factors emerging from this analysis only those having eigenvalues of 1 or greater were considered. An item was included in a factor if it correlated with the factor at a level >0.4 and it had its highest loading on that factor. This analysis produced five factors as shown in Table 6.2. These five factors accounted for 52.1% of the total

TABLE 6.2 Confirmatory Factor Analysis of Pain Coping Questionnaire for 171 chronic pain patients.

FACTOR	ITEMS	FACTOR LOADINGS				
		1	2	3	4	5
1	A1	**.82**	.16	.07	-.04	.07
	A7	**.82**	-.11	.02	-.15	-.01
	A2	**.80**	-.14	.13	.14	.01
	A5	**.79**	.00	.18	.01	-.01
	A4	**.77**	-.05	-.03	.11	.04
	A3	**.72**	-.09	.17	-.02	-.05
	A10	**-.70**	.02	.03	.10	.00
	A6	**.70**	-.03	.17	-.20	.02
	A8	**.66**	-.27	.22	.01	-.02
	A17	**.66**	.01	.06	.07	.18
	A14	**-.65**	.07	-.16	-.05	.01
	A11	**-.64**	.27	-.06	.03	-.09
	A12	**-.63**	.09	.05	.32	-.04
	A13	**.62**	-.03	.16	-.21	.04
	A15	**.61**	-.26	.12	.30	.02
	A9	**.60**	.06	.16	-.05	.06
	A19	**.58**	.02	.09	-.01	-.01
	A18	**.54**	.05	.10	-.26	.00
	C4	**.46**	.16	.28	-.30	-.02
2	B2	.00	**.77**	-.06	.17	.06
	B1	-.14	**.76**	-.05	.27	.05
	B7	.15	**-.63**	.23	-.24	-.03
	B8	-.20	**.58**	.06	.25	-.05
	B12	.13	**.56**	.09	-.01	-.14
	A16	.36	**-.48**	.23	.30	.23
	B3	-.17	**.46**	.22	**.45**	-.11
	B10	.36	**-.36**	.29	-.24	.08
3	D1	-.01	-.03	**.81**	.03	.05
	D3	.22	-.15	**.78**	-.04	-.01
	D4	.15	.16	**.77**	-.16	-.01
	D2	-.21	.27	**-.62**	.12	.03
	C1	.33	.36	**.44**	-.38	.05
	C2	.17	-.09	**.40**	-.17	-.08
4	B6	.15	.24	-.08	**.64**	.06
	B5	.10	.21	.05	**.60**	-.01
	B4	-.13	.36	-.15	**.56**	-.12
	B11	-.17	**.40**	-.25	**.52**	-.02
	B9	-.10	.25	-.00	**.47**	**-.42**
	E5	-.08	-.05	-.23	**.42**	.11
	C3	.21	-.15	.35	**-.38**	-.00
5	E4	.15	.05	.21	-.01	**-.75**
	E1	.08	.00	-.01	.03	**.72**
	E3	.10	-.09	-.02	-.08	**.65**
	E2	.05	.07	.14	.06	**.62**

TABLE 6.3 Eigenvalues and percetage of variance explaine from confirmatory factor analysis on Pain Coping Questionnaire.

FACTOR	EIGEN VALUE	% OF VARIANCE	CUMULATIVE %
1	11.505	26.1	26.1
2	4.509	10.2	36.4
3	2.920	6.6	43.0
4	2.146	4.9	47.9
5	1.843	4.2	52.1

variance. The proportion of variance explained by the individual factors is shown in Table 6.3.

Table 6.2 shows the factor loading for items from the confirmatory factor analysis of the Pain Coping Questionnaire. The letter on the item indicates which items made up the scales derived from the original solution (see chapter 5). Items labelled A referred to items making up the "General Coping Measure" scale, items labelled B make up the "Active Coping Strategy" scale, items labelled C make up "Avoidance" scale, items labelled D make up "Use of Drugs" scale and items labelled E make up "Pain Communication" scale. The number following the letter refers to the rank order of magnitude of loading correlating with the factor found in the original solution. Thus item A1 had the highest correlation with the factor labelled General Coping Measure and item A19 had the lowest correlation with that factor out of the items making up the scale. A perfect replication of the factor structure would consist of perfect separation of items according to letters in rank order.

The first factor accounted for 26.1% of the total variance. Items making up this factor are shown in Table 6.4. This factor is virtually identical to the "General Coping Measure" factor found in the original solution. In addition, the extent to which the individual items are correlated with the factor is very similar to that found in the original solution. It can be seen in Table 6.4 that items with low numbers are towards the beginning of the scale and items with high numbers are towards the end of the scale. All items making up the "General Coping Measure" scale are also found in this factor.

TABLE 6.4 Items from factor 1. Confirmatory factor analysis (N=171).

A1.	My pain makes it difficult for me to socialise with other people.
A7.	My pain stops me from leading a normal life.
A2.	I feel my pain cuts me off from other people.
A5.	My pain makes me feel useless and not needed.
A4.	My pain affects the way I get on with my family and friends a great deal.
A3.	I have lost my confidence.
A10.	I feel happy about my life in general.
A6.	My pain stops me from going to places.
A8.	My pain makes me feel miserable most of the time.
A17.	I try to avoid people when I have pain.
A14.	I do not let my pain get me down.
A11.	I am coping well with my pain.
A12.	I manage to do most things in life that I want to.
A13.	My pain makes me opt out of things.
A15.	My pain makes me feel tense and frustrated.
A9.	I never go out because people do not want to know you when you have pain.
A19.	I sometimes worry that I have a serious illness.
A18.	All my problems are caused by my pain.

The second factor accounted for 10.2% of the variance. Items making up this factor are shown in Table 6.5. These items seem to be concerned with the use of relaxation as a way of coping with pain and a sense of control over pain. With one exception, all items are included in the "Active Coping Strategies" scale.

The third factor accounted for 6.6% of the variance. Items making up this factor are shown in Table 6.6. The items making up this factor are concerned with the use of drugs, rest and avoidance as ways of coping with pain. Items making up the "Avoidance" and "Use of Drugs" scales derived from the original solution make up this factor. It can be seen as a measure of negative pain coping strategies.

The fourth factor accounted for 4.9% of the variance. Items making up this factor are shown in Table 6.7. With one exception all of the items making up this factor were found in the "Active coping Strategies" scales in the original solution. This factor seems to be concerned with the use of distraction over pain and coping with pain using mental and physical activity. Broadly speaking, this factor seems to be measuring distraction as a way of coping with pain.

The fifth factor accounted for 4.3% of the variance. Items from this factor are shown in Table 6.8. Items making up this factor were concerned with beliefs in communicating pain experience to other people and helpfulness of sympathy in coping with pain. With one exception all items making up this factor are identical with that found in the "Pain Communication Scale" derived from the original solution.

TABLE 6.5 Items from factor 2. Confirmatory factor analysis (N=171).

B2.	When I am in pain it helps if I try to relax.
B1.	Relaxation helps me cope with pain.
B7.	Relaxation does not have any effect on my pain.
B8.	When I experience pain, I am usually able to do something to reduce it.
B12.	My pain is usually associated with doing certain things.
A16.	I find it very difficult to relax.
B3.	In my day to day life, I can influence my pain to some degree.

TABLE 6.6 Items from factor 3. Confirmatory factor analysis (N=171).

D1.	Pain killing tablets are the only way that I can control my pain.
D3.	I always take pain killers when I have pain.
D4.	When I have pain I usually take pain killers and rest.
D2.	I can manage without the help of drugs.
C1.	When I have pain it is best to stop what I am doing and rest.
C2.	It is always better to avoid anything that causes more pain.

TABLE 6.7 Items from factor 4. Confirmatory factor analysis (N=171).

B6.	I think my pain can be affected by my state of mind.
B5.	It is possible that my pain can be made worse by what I am thinking or doing.
B4.	When I have pain I can control it to some extent by thinking certain thoughts.
B11.	I think that regular physical exercise is important in helping me to control my pain.
B9.	Talking to other people about how I feel can help my pain.
E5.	It is not helpful when people do too much for me because of my pain.

TABLE 6.8 Items from factor 5. Confirmatory factor analysis (N=171).

E4.	It is always better to let other people know when I am in pain.
E1.	It is best not to talk about my pain to other people.
E3.	It is not helpul when people are sympathetic because of my pain.
E2.	I always try to hide the fact that I am in pain.

6.2d Discussion

Confirmatory factor analysis was consistent with the original solution. In both cases five factors were obtained accounting for similar proportions of the variance in item responses. The finding that "General Coping Measure" emerged as a virtually identical factor in the replication study suggest that this scale is measuring an important, discrete and repeatable dimension relevant to the psychology of coping with pain. The remaining four factors were similar to those found in the original solution in that they were all concerned with beliefs in different types of strategies in coping with pain.

There was an interesting difference in terms of factors measuring Coping Strategies between the original and confirmatory studies. In the original study, one factor, "Active Coping Strategy" emerged as a measure of positive pain coping strategies and two factors, "Avoidance" and "Use of Drugs" emerged as measures of negative pain coping strategies. In the replication study, however, the reverse situation occurred. Two factors, "relaxation" and "distraction", emerged as measures of positive coping behaviours while only one factor measured the use of negative pain coping behaviours. The "Pain Communication" scale was very similar for both studies. There was more separation on dimensions of negative pain coping behaviours in the first sample and relatively more separation on dimensions of positive coping behaviours in the second sample.

There are a number of possible reasons for this difference. One

possible explanation is that the smaller number of subjects in the confirmatory factor analysis study compared with the original study may have "weakened" the solution. With respect to the number of variables to include in a factor analysis, one rule of thumb is that there should be five times as many subjects as variables (Comrey, 1978). In the confirmatory factor analytical study there were fewer subjects. Lawley and Maxwell, (1971) suggest that for confirmatory factor analysis it is appropriate if the sample contained at least 51 more patients than the number of variables under consideration. This condition was met for the sample in the confirmatory factor analysis study. In addition, the fact that the solution was quite interpretable in psychological terms suggests that the structure has meaning and is not due to chance. This means that any differences in factor structure between the original solution and the confirmatory factor analysis are most likely to be due to changes in the sample brought about either by differences in selection or by change in dimensions over time.

There were no differences in pain or demographic characteristics between the first and second wave samples (see appendix F). It is, however, possible that there were differences between the samples not revealed by the questionnaire. It is very likely that the second wave sample was less "ill" than the first wave sample. Almost certainly a proportion of patients in the first wave sample were suffering from cancer or other serious illnesses causing chronic pain. It is also very likely that some of the patients who completed the original questionnaire would have either died or been unable by virtue of their deteriorating physical condition to have completed the second questionnaire. The greater proportion of illness in the first wave

sample may have accounted for the greater separation of negative pain coping behaviours found in the initial analysis. Indeed, the behaviours such as taking drugs, rest and avoidance of activity are only "negative" in the context of a benign chronic pain with little pathology and normal life expectancy. Such behaviours would not be considered negative in an individual suffering chronic pain caused by advanced cancer.

Another possible reason for the greater separation in factor structure on positive coping behaviours in the second wave sample is that patients who were more motivated and orientated towards positive coping behaviours may have been more likely to have completed the second set of questionnaires. Patients who were orientated toward more negative coping strategies may have been less motivated, less interested in the study and simply been "fed up" with filling in more questionnaires. It is relevant that a much greater proportion of patients in the second wave had received psychological treatment by virtue of their attendance on the Pain Management Course. 48.5% of the respondents from the second wave had attended the Pain Management Course compared with 22.4% of the first wave sample. It is reasonable to conclude that a greater proportion of the second wave sample had knowledge, experience and practice in the use of positive pain coping strategies and this may have accounted for greater separation on the factors measuring positive coping strategies compared with the original sample.

The present results suggest that the factor structure from which the Pain Coping Questionnaire was derived is reliable and repeatable. A similar solution emerged on repeat analysis at a different point in

time. There were slight differences in some of the factors. These differences were probably accounted for by slight differences in the populations under study. These differences were explainable in terms of the dimensions under study and do not detract from the basic stability of the factor structure. The Pain Coping Questionnaire is essentially based upon dimensions that measure the emotional consequences of pain, beliefs that underly positive and negative pain coping behaviours, and a dimension that measures the beliefs in communicating pain experience to others. The present results suggest that these dimensions are "real" and not simply derived from chance association. The Pain Coping Questionnaire was derived from analysis of a large and representative sample of chronic pain patients. It is for this reason that the scales based upon the original standardisation sample are likely to be the most valid when considered with scales based upon the second wave sample.

6.3 RELIABILITY STUDY 2. TEST - RE-TEST CORRELATIONS OF PAIN COPING SCALES

6.3a Introduction

The previous study demonstrated that the factor structure from which the Pain Coping Questionnaire was based remained stable over time and is by implication a reflection of "real" dimensions rather than based upon chance findings. The purpose of the present study was to investigate the stability (repeatability) of the Pain Coping Scales by examination of test - re-test correlations.

The problems in using test - re-test correlations as a measure of

reliability has been previously discussed. Assuming that "memory" effects are not influencing the results, high test - re-test correlation would be good evidence of the stability of the scales. The central assumption of this method of assessing reliability is that the dimensions the test is measuring do not change during the test - re-test interval and that any changes that do occur in scores are attributable to random error which is then used as an estimate of reliability. It is clearly important to try and minimise the chance of changes in dimensions occurring during the test - re-test interval. As discussed in paragraph 6.2, little is known about how the dimensions the Pain Coping Questionnaire is measuring change over time or what other variables may be influential. From the information that is available and on the basis of clinical findings it is reasonable to assume that the dimensions will not change simply as a function of time.

There were important differences in the Pain Coping Scales between patients who had received psychological treatment and patients who had not received psychological treatment found in the standardisation sample (Chapter 5). These differences may have been due to selection effects, treatment effects or a combination of both. Whatever the reason for these differences, it is likely that psychological treatment might influence the dimension under study and therefore it is reasonable to exclude subjects who have received psychological treatment from the present analysis.

For the purposes of the present study, it was assumed that the dimensions under study would remain stable as long as the test - re-test interval was not too long and no psychological treatment had been

received. These considerations, together with practical constraints resulted in a test - re-test interval of between 9-12 months.

6.3b Methods

Subjects were a sub-section of 88 chronic pain patients of the 171 chronic pain patients described in paragraph 6.2. None of the subjects had received psychological treatment. There were 61 females (69%) and 27 males (31%). Average age was 56.1 years (SD=13.4 years). Average duration of pain was 9.1 years (SD=9.7 years). All subjects were contacted by post with a test - re-test interval of between 9-12 months. See appendix D for letter and questionnaire.

6.3c Results

Pain and demographic characteristics of subjects are shown in appendix G. There are no differences in frequencies of responses between patients who have had psychological treatment and those who have not received psychological treatment on sex distribution, marital status, employment, location of pain, pattern of pain, onset of pain, frequency or severity of pain, as measured by a 10 point rating scale. Table 6.9 shows test - re-test Pearson correlation coefficients for the Pain Coping Scales. All correlations are significant beyond the 0.0001 level.

6.3d Discussion

The results show that the Pain Coping Scales are reliable measures that remain stable over time. All scales had test - re-test

TABLE 6.9 Test-Retest correlation coefficient for Pain Coping Scales. Test-Retest interval of 9-12 months (Pearson Product Moment Correlation Coefficient: r)

SCALE	r	N	P
GENERAL COPING MEASURE	.818	81	< 0.0001
ACTIVE COPING STRATEGIES	.673	80	< 0.0001
AVOIDANCE	.639	85	< 0.0001
USE OF DRUGS	.754	85	< 0.0001
PAIN COMMUNICATION	.648	85	< 0.0001

correlations of above .639 (n = 88) with a test - re-test interval of between 9 to 12 months. This is an acceptable level of reliability given the likelihood that this estimate probably represents the lower bounds of reliability. The "General Coping Measure" was the most reliable scale with a test - re-test correlation coefficient of 0.818 (n = 81). This scale has the most items (19) and this is likely to have improved its reliability in comparison to scales with fewer items (Zeller and Carmines, 1980). The number of items in a scale did not solely account for the reliability of the scales. It is interesting that the "Use of Drugs" scale with four items had higher reliability (.754, n=85) than the "Active Coping Strategies" scale which had twelve items and a test - re-test correlation coefficient of 0.673 (n=80).

In general the "General Coping Measure" had higher reliability than the scales measuring coping strategies, whether positive or negative, and "pain communication". Given the limitations of test - re-test measures of reliability, it is difficult to evaluate whether this finding reflects the lower reliabilities of the measures or the possibility that the dimension measured by the "General Coping Measure" remains more stable over time than the dimensions measured by "Active Coping Strategies", "Avoidance" and "Pain Communication" scales. This emphasises the need for other complementary measures of reliability. If the dimensions have changed over time then one would expect the scales to be equivalent in terms of reliability on other reliability estimates taken at a single point in time. If the dimensions in question have not changed and the differences in scores

are due to lower reliability of the scales, then one would expect a similar pattern of results to that found in the present study.

The test - re-test interval was comparatively long and one might expect any psychological dimension to change over such a period of time. Despite this, there was a surprising degree of stability on all scales. It seems unlikely that memory effects could have influenced the results.

The present results were obtained on a group of patients who had not received psychological treatment. There is no evidence that this group differed from other chronic pain patients in terms of pain or demographic characteristics (see appendix G). This means that the present findings can be generalised to a wider population of chronic pain patients. Reliability estimates of the Pain Coping Questionnaire obtained from the present sample can be considered to be valid when the Pain Coping Questionnaire is used with chronic pain patients in general.

6.4 RELIABILITY STUDY 3. INTERNAL CONSISTENCY OF PAIN COPING SCALES

6.4a Introduction

The previous studies were concerned with measuring the stability of the factor structure and Pain Coping Scales over a period of time. The present study is concerned with the second major approach in assessing reliability - examination of the "consistency" of the scales.

The purpose of the present study was to assess the reliability of the Pain Coping Questionnaire by evaluating the internal consistency of the scales. Cronbach's alpha is a measure of internal consistency and may be considered to be measuring the extent to which items making up a scale are equivalent and measuring a single dimension (Cronbach, 1951). Alpha provides an estimate of reliability taken at a single point in time and hence it is not subject to difficulties inherrent in test - re-test approaches to reliability estimation of interpreting changes in scores over time. Previous estimates of reliability based upon alpha has been presented in the original standardisation sample (see Chapter 5). All scales had alpha values exceeding .6 and this is an acceptable level of internal consistency (Sonquist and Dunkelberg, 1977). The present study extends this analysis examining alpha for the Pain Coping Scales at a second point in time. If the scales are reliable, then one would expect a close correspondence between the two reliability estimates. Unlike test - re-test correlations, one would still expect close correspondence between the two values of alpha even if the dimensions the scale is measuring has actually changed. Alpha is a measure of the properties of the scale itself and should be unaffected by any changes in the dimensions being measured. This means that the test - re-test interval is not crucial as long as "memory" effects are not contaminating the results.

The second aspect of this reliability study was to examine the mean scores, standard deviations, ranges and distribution of scores from the Pain Coping Scales. If the scales are reliable, one would expect a similar pattern of results to emerge on repeat testing of the same group of subjects at a second point in time.

6.4b Methods

All patients from the original standardisation sample (see Chapter 4) were contacted by post 9-12 months after completing the initial questionnaire and asked to complete the Pain Coping Questionnaire for a second time. See appendix D for letter and questionnaire. See section 6.2b (Method) for further details of procedure.

Subjects were 171 chronic pain patients who completed the questionnaire on a second occasion. There were 59 males (34.9%) and 112 females (65%) in the samples. Mean age was 54.9 years (SD 14.7 years) with mean duration of pain 8.8 years (SD 8.8 years). See appendix C for pain and demographic characteristics of the sample. There were no differences in pain or demographic characteristics between the present sample and the original standardisation sample. A greater proportion of the present sample had received psychological treatment (48%) compared with the standardisation sample (22%). See Figure 6.1.

6.4c Results

Values of alpha for Pain Coping Scales for first and second wave samples are shown in Table 6.10. Means, SD's and ranges of Pain Coping Scales for second wave are shown in Table 6.11. Distribution of scores from Pain Coping Scales for second wave are shown in Figures 6.2 to figures 6.6.

TABLE 6.10 Internal consistency (Cronbach's Alpha) of Pain Coping Scales for 1st and 2nd wave.

SCALES	ALPHA	
	1st WAVE (N=298)	2nd WAVE (N=171)
GENERAL COPING MEASURE	.923	.939
ACTIVE COPING STRATEGIES	.814	.853
AVOIDANCE	.616	.649
USE OF DRUGS	.834	.831
PAIN COMMUNICATION	.627	.591

TABLE 6.11 Means, S.D's and ranges for pain coping scales for 1st and second wave.

SCALE	1ST WAVE (N=298) MEAN	S.D	MIN	MAX	2ND WAVE (N=171) MEAN	S.D	MIN	MAX
GENERAL COPING MEASURE	56.93	14.1	24	88	57.81	14.96	22	92
ACTIVE COPING STRATEGIES	35.03	7.46	13	55	34.39	8.31	7	20
AVOIDANCE	14.08	3.02	4	20	13.91	3.11	7	20
USE OF DRUGS	12.42	3.94	4	20	12.19	4.01	4	20
PAIN COMMUN-ICATION	12.65	3.22	6	22	12.77	3.24	6	21

Fig.6.2 Distribution of scores on " General Coping Measure " scale for 171 patients with chronic pain.

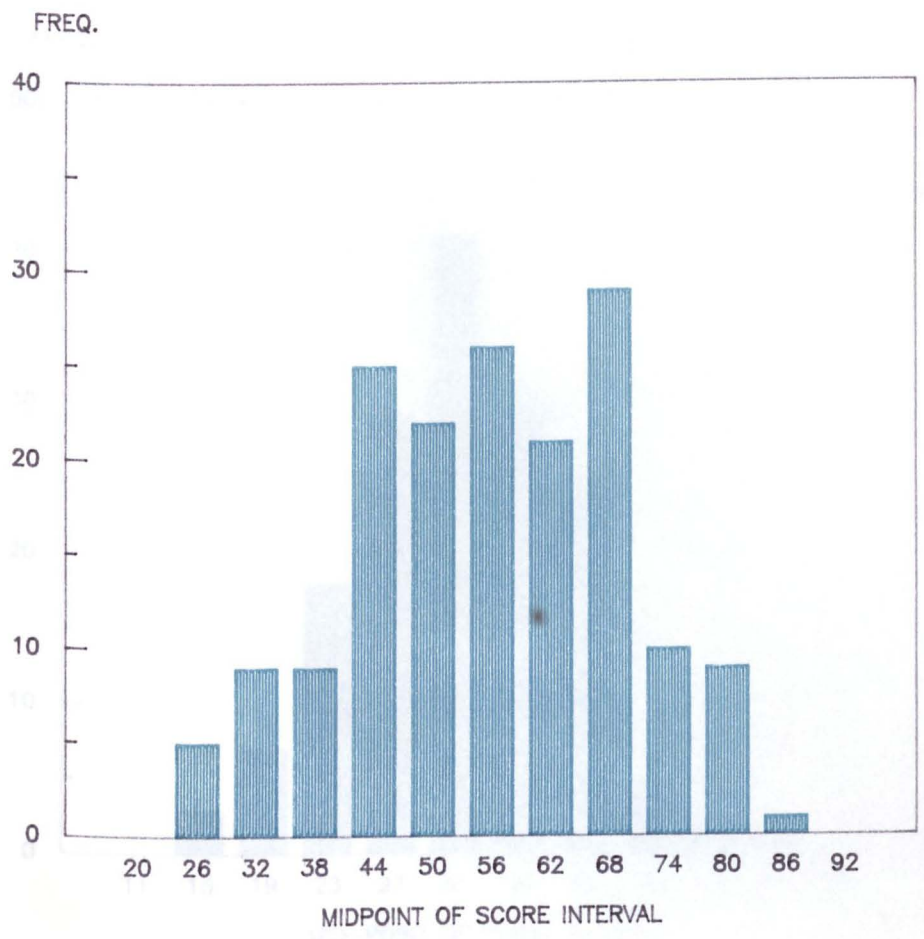


Fig.6.3 Distribution of scores on " Active Coping Strategy " scale for 171 patients with chronic pain.

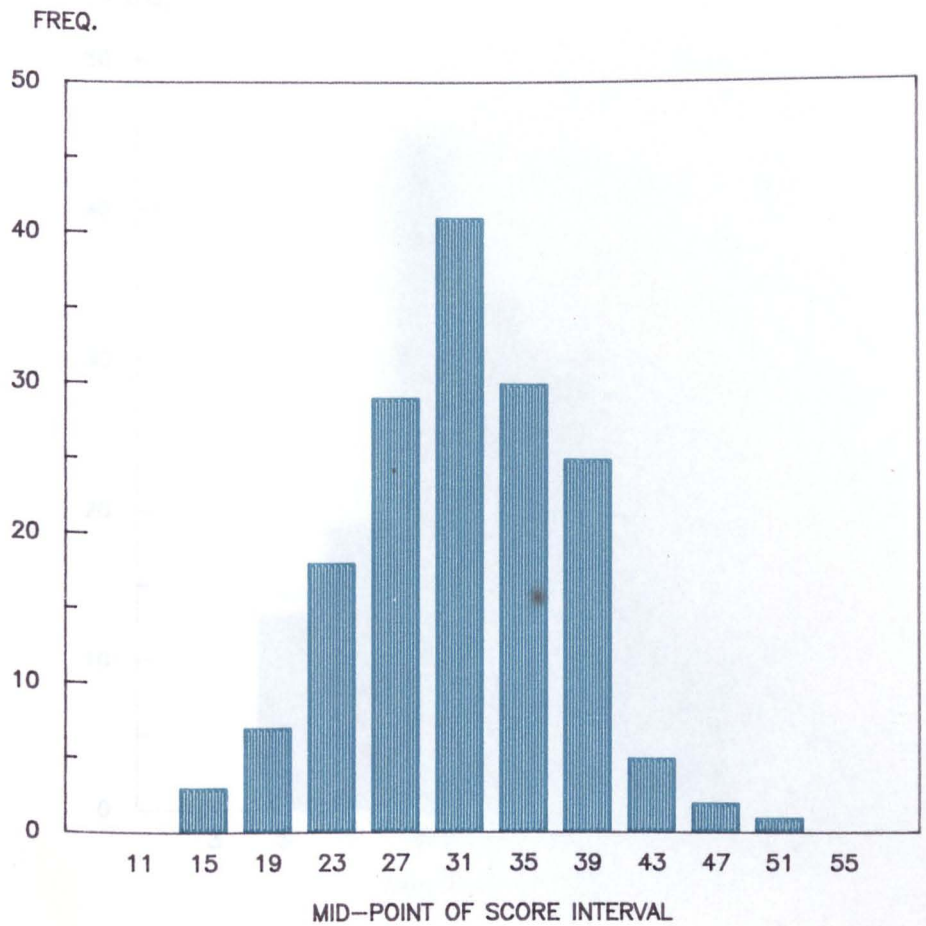


Fig.6.4 Distribution of scores on " Avoidance " scale for 171 patients with chronic pain.

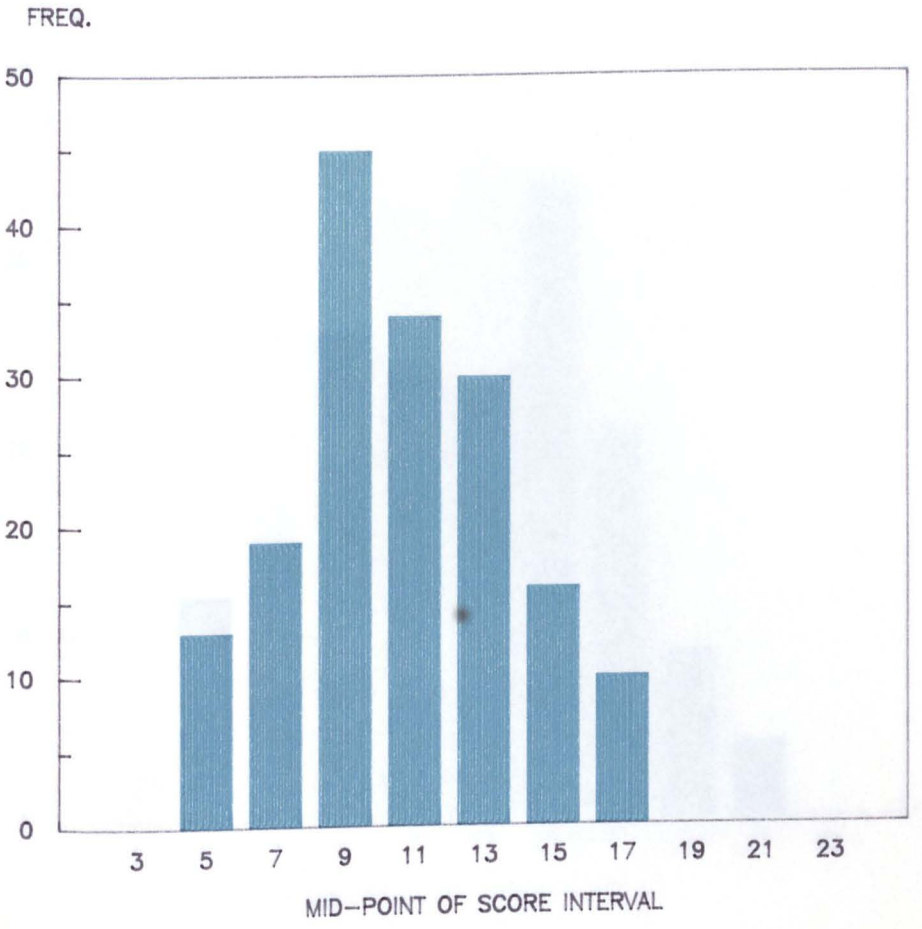


Fig.6.5 Distribution of scores on "Use of Drugs " scale for 171 patients with chronic pain.

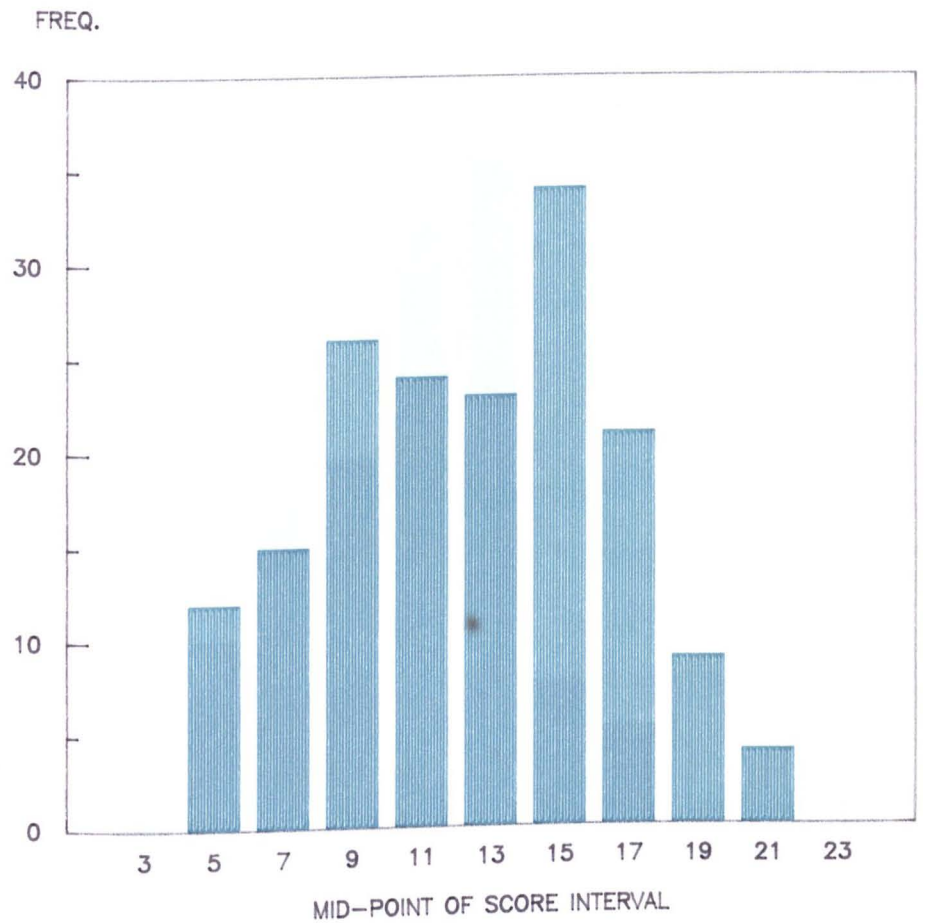
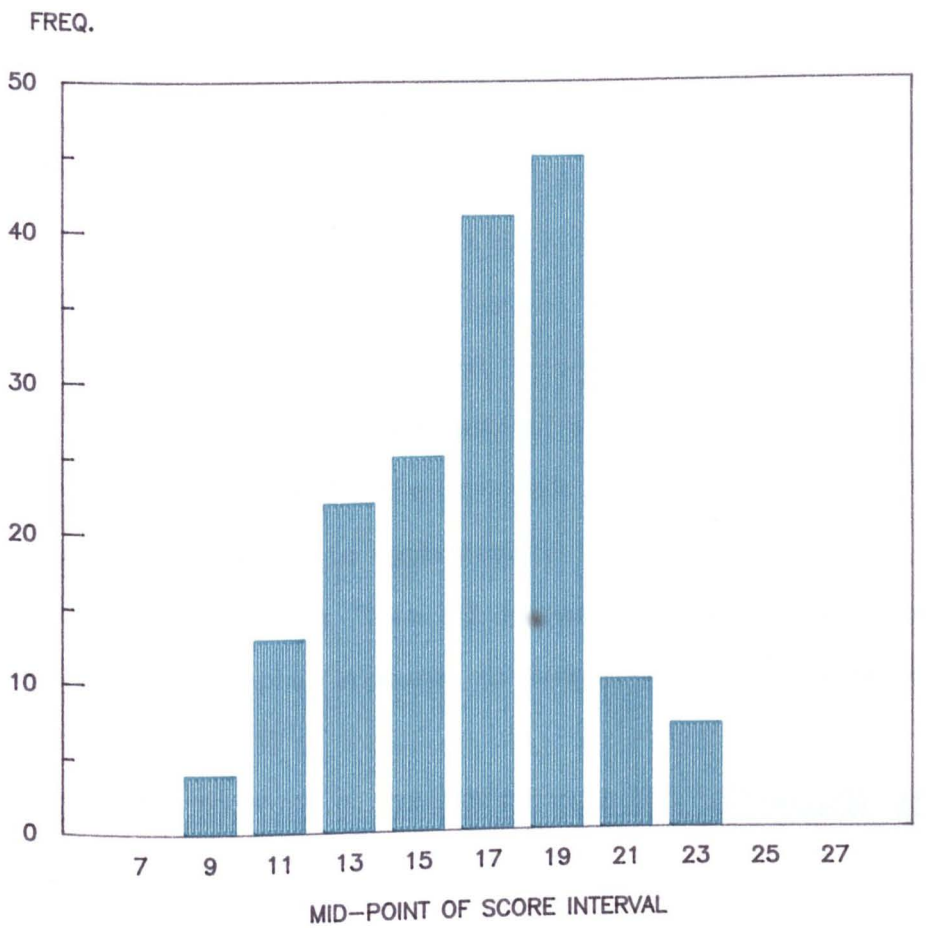


Fig.6.6 Distribution of scores on " Pain Communications " scale for 171 patients with chronic pain.



6.4d Discussion

All scales had acceptable internal consistency as measured by alpha. "General Coping Measure", "Active Coping Strategies" and "Use of Drugs" had sufficient internal consistency necessary for clinical use of the scales (Sonquist and Dunkelberg, 1977). "Pain Communication" had the lowest alpha and is probably of doubtful reliability with respect to consistency.

The present results are very similar to those found in the original standardisation study. The reliability estimates from the individual scales in relationship to each other were identical to those found in the original standardisation. It is also very similar to those found in Reliability Study Two, which was an examination of reliability of Pain Coping Scales based upon test - re-test correlation coefficients. Means, ranges and distribution scores on Pain Coping Scales were very similar to those found in the original sample (see Chapter 5). All distributions appeared to approximate to a normal distribution with the exception of the "Use of Drugs" scale which, as in the standardisation sample, appeared to have a bimodal distribution.

6.5; RELIABILITY STUDY 4. CONSTRUCT VALIDITY; STABILITY OF RELATIONSHIPS WITH OTHER VARIABLES

6.5a Introduction

The previous reliability studies have been concerned with the stability and consistency of the factor analysis and scales from the Pain Coping Questionnaire. A further measure of reliability is concerned with how the Pain Coping Scales relate to other variables. If the Pain Coping Scales are reliable measures then one would expect

that the relationships between Pain Coping Scales and other variables should be repeatable and remain stable over time. Whilst this concept is closely related to construct validity of the scales, it is a relevant way of examining the reliability of the scales given the developmental nature of the study and the lack of theoretical understanding as to how the dimensions or constructs being measured by the scales should relate to other variables.

In the standardisation sample, the Pain Coping Scales had certain relationships with other variables (see Chapter 5). The present study is concerned with retesting a proportion of this sample at a second point in time and investigating whether the relationships with other variables remain stable. The extent to which these relationships remain stable is a further indication of the reliability of the Pain Coping Questionnaire. As with measures of internal consistency, and unlike test - re-test correlations, this approach to reliability estimation should be relatively unaffected by changes in dimensions being measured occurring during a test - re-test interval. It is assumed that the relationships with other variables in some ways define the construct under study and that these should remain stable.

On the basis of relationships between Pain Coping Scales and other variables identified in the standardisation sample (Chapter 5) the following are predicted:-

Prediction 1:

General Coping Measure is positively correlated with Active Coping Strategies and negatively correlated with Avoidance and Use of Drugs Scales.

Prediction 2:

Avoidance, Use of Drugs and Pain Communication are positively correlated.

Prediction 3:

The Pain Coping Scales are unrelated to duration of pain, sex or location of pain with respect to whether pain is "focal" or "diffuse".

Prediction 4:

The General Coping Measure is not related to age. Active Coping Strategies is negatively correlated with age. Avoidance and Use of Drugs scales are positively correlated with age.

Prediction 5:

Subjects who have received psychological treatment by virtue of attendance on the Pain Management Course should show a trend towards significantly higher mean scores on the General Coping Measure,significantly higher mean scores on Active Coping Strategies,and significantly lower mean scoes on Use of Drugs, Avoidance, and Pain Communication Scales compared with patients who have not received psychological treatment.

Prediction 6:

Subjects who report pain as decreased since onset should show a trend towards significance with higher mean scores on General Coping Measure and Active Coping Strategies compared with patients who report the pain has increased since onset.

6.5b Method

All patients from the original standardisation sample were approached 9-12 months after completing the initial questionnaire and asked to complete the Pain Coping Questionnaire for a second time. Subjects were 171 chronic pain patients. There were 59 males (34.9%) and 112 females (65%) in the sample. The mean age was 54.9 years (SD=14.7 years) with mean duration of pain 8.8 years (SD=8.8 years). See section 6.2 (method) for further details of procedure. See appendix A for letter and questionnaire. See appendix G for description of pain and demographic characteristics of the sample. There were no differences in pain or demographic characteristics between the present sample and the original standardisation sample. A greater proportion of the present sample had received psychological treatment compared with the standardisation sample. See Figure 6.1.

6.5c Results

The intercorrelations of the Pain Coping Scales are shown in Table 6.12. Pearson correlation coefficients for Pain Coping Scales with age and duration of pain are shown in Table 6.13. Mean scores for Pain Coping Scales for males and females are shown in Table 6.14. Mean scores for Pain Coping Scales for "diffuse" and "focal" pain are shown in Table 6.15. Mean scores for Pain Coping Scales for patients who have attended the Pain Management Course and patients who have not attended the Pain Management Course are shown in Table 6.16. Mean scores for Pain Coping Scales for patients whose pain has increased since onset and patients whose pain has decreased are shown in Table 6.17.

TABLE 6.12 Intercorrelation of Pain Coping Scales. N=171
(Pearson Product Moment Correlation Coefficient: r)

	ACTIVE COPING STRATEGIES	AVOIDANCE	USE OF DRUGS	PAIN COMMUN-ICATION
GENERAL COPING MEASURE	0.269**	-0.476***	-0.341***	0.047
ACTIVE COPING STRATEGIES		-0.286***	-0.248**	0.027
AVOIDANCE			0.456***	0.126
USE OF DRUGS				0.067

$p < 0.05^{*}$ $p < 0.005^{**}$ $p < 0.001^{***}$

TABLE 6.13 Pearson Correlation Coefficients for Pain Coping Scales with age and duration of pain. N=171.

	AGE	DURATION OF PAIN
GENERAL COPING MEASURE	-0.148	-0.142
ACTIVE COPING STRATEGIES	-0.351***	-0.029
AVOIDANCE	0.203**	0.594***
USE OF DRUGS	0.235**	0.118
PAIN COMMUNICATION	0.101	0.075

$p < 0.05^{*}$ $p < 0.005^{**}$ $p < 0.001^{***}$

TABLE 6.14 Mean scores for pain coping scales for males and females. 2nd wave.

VARIABLE		NO. OF CASES	MEAN	S.D	t	D.F	2-TAIL PROB.
GENERAL COPING MEASURE	Male	56	57.73	16.56	-0.05	163	0.961 (NS)
	Female	109	57.85	14.15			
ACTIVE COPING STRATEGIES	Male	56	33.37	8.93	1.09	159	0.277 (NS)
	Female	105	33.87	7.95			
AVOIDANCE	Male	57	14.42	3.22	1.53	665	0.127 (NS)
	Female	110	13.64	3.03			
USE OF DRUGS	Male	57	11.89	4.05	-0.70	166	0.487 (NS)
	Female	111	12.35	3.99			
PAIN COMMUN-ICATION	Male	56	12.88	3.84	0.22	165	0.824 (NS)
	Female	111	12.74	2.90			

TABLE 6.15 Mean scores of coping scales for "diffuse" and "focal" pain. 2nd wave.

VARIABLE		NO. OF CASES	MEAN	S.D	t	D.F	2-TAIL PROB.
GENERAL COPING MEASURE	Diffuse	80	58.57	16.28	0.65	162	0.520 (NS)
	Focal	84	57.06	13.74			
ACTIVE COPING STRATEGIES	Diffuse	80	34.07	8.92	-0.49	158	0.623 (NS)
	Focal	80	34.72	7.75			
AVOIDANCE	Diffuse	81	13.59	3.37	-1.23	164	0.22 (NS)
	Focal	85	14.18	2.84			
USE OF DRUGS	Diffuse	82	12.06	4.55	-0.34	165	0.757 (NS)
	Focal	85	12.27	3.42			
PAIN COMMUN-ICATION	Diffuse	80	12.98	3.43	0.95	165	0.342 (NS)
	Focal	86	12.51	2.99			

TABLE 6.16 Mean scores of "coping" scales comparing patients who have attended the Pain Management Course (PMC) and patients who have not attended the Pain Management Course (NA/PMC). Second wave.

VARIABLE		NO. OF CASES	MEAN	S.D	t	D.F	2-TAIL PROB.
GENERAL COPING MEASURE	PMC	81	59.44	14.64	1.38	163	0.169 (NS)
	NA/PMC	84	56.23	15.18			
ACTIVE COPING STRATEGIES	PMC	78	36.51	8.74	3.22	159	0.002**
	NA/PMC	83	32.40	7.39			
AVOIDANCE	PMC	81	13.02	3.24	-3.70	165	0.000***
	NA/PMC	86	14.74	2.75			
USE OF DRUGS	PMC	81	10.75	3.76	-4.78	166	0.000***
	NA/PMC	87	13.54	3.78			
PAIN COMMUN-ICATION	PMC	81	12.07	3.04	-2.78	165	0.006**
	NA/PMC	86	13.44	3.29			

$p < 0.005^{**}$ $p < 0.001^{**}$

TABLE 6.17 Mean scores for pain coping scales for patients who report pain increase since onset and patients who report pain has decreased since onset.

VARIABLE		NO. OF CASES	MEAN	S.D	t	D.F	2-TAIL TEST
GENERAL COPING MEASURE	Increase	91	55.85	14.96	-1.64	111	0.106 (NS)
	Decrease	22	61.63	14.81			
ACTIVE COPING STRATEGIES	Increase	87	34.27	8.09	-1.04	109	0.310 (NS)
	Decrease	24	36.16	7.82			
AVOIDANCE	Increase	92	13.84	3.22	-1.03	114	0.306 (NS)
	Decrease	24	14.58	2.65			
USE OF DRUGS	Increase	92	12.58	3.94	-1.26	114	0.209 (NS)
	Decrease	24	11.45	3.73			
PAIN COMMUN-ICATION	Increase	92	12.989	3.01	-1.22	112	0.225 (NS)
	Decrease	22	13.909	3.80			

6.5d Discussion

Inspection of the intercorrelations of the Pain Coping Scales confirms prediction 1. The General Coping Measure was positively correlated with Active Coping Strategies ($r=.296$; $p<.005$) and negatively correlated with Avoidance ($r = -.476$; $p < .001$) and Use of drugs ($r = -.341$; $p < .001$). See Table 6.12. These findings confirm that the relationship between the major scales remained stable over time and provides further evidence that the type of strategy adopted to cope with pain influences emotional adjustment. As in the standardisation sample, active behavioural and cognitive strategies seem to be associated with better adjustment and passive strategies seem to be associated with poorer adjustment.

The second prediction that Avoidance, Use of Drugs and Pain Communication were related was not fully confirmed. Although there was a significant positive correlation between Avoidance and Use of Drugs ($r = .465$; $p < .001$), no significant relationship was found with Pain Communications scales. These results then partly confirm the patterns found in the standardisation sample and provide further evidence that Avoidance and Use of Drugs are very similar dimensions, that both represent common features of illness behaviour. The fact that Pain Communication was not related to this dimension was an interesting finding and casts further doubt on the reliability of the Pain Communication scale. The present findings are consistent with previous reliability studies which failed to establish Pain Communication as an unequivocally reliable scale.

The third prediction was that there would be no significant relationship between the Pain Coping scale and sex, location of pain in terms of whether it was "diffuse" or "focal" or duration of pain. See Tables 6.13, 6.14 and 6.15. No signifiant relationships were found between these variables and the Pain Coping scales with the exception of a strong positive correlation between Avoidance and duration of pain ($r = .594$; $p < .001$) This was a surprising finding given the lack of any such relationship in the standardisation sample and the level of significance of this finding making it highly unlikely to be a chance occurrence.

In many respects, a positive correlation with Avoidance and duration of pain would be expected from many psychological models of pain (Fordyce,1973; Slade et al.,1983). If maladaptive strategies such as Avoidance are adopted, then this may eventually lead to poorer coping and prolong the pain. This would mean that people who use Avoidance strategies have longer durations of pain. People who do not use Avoidance may tend to cope better with their pain and hence have shorter durations of pain.

It is interesting to speculate why this association was not found in the standardisation sample. It has previously been discussed (see section 6.2) that the second wave sample may have contained relatively fewer subjects who had serious physical illnesses such as cancer that were causing their pain compared to the first wave (standardisation sample). These suggested differences in the two populations may explain why an association between avoidance and duration of pain was found in the second wave but not in the first wave. In most cases of

pain caused by cancer and other serious life-shortening diseases associated with chronic pain, psychological strategies such as Avoidance are not considered the prime determinant of duration of pain. In these cases, it is the ongoing active disease process that determines duration of pain and not the strategies used to cope with the pain. This means that one would therefore not expect to find a relationship between avoidance and duration of pain in patients with this type of pain. In contrast, it would be expected that strategies such as Avoidance could influence the duration of pain in patients with chronic benign pain with no active or life-threatening disease process. In other words, a relationship between Avoidance and duration of pain would be expected in patients with chronic benign pain but not in patients with pain caused by cancer. The suggestion that the second wave sample contained a relatively greater proportion of patients with chronic benign pain may explain why an association between avoidance and duration of pain was found in the second wave but not in the first wave sample.

The fourth prediction that the General Coping Measure would be unrelated to age, Active Coping Strategies negatively correlated with age and Avoidance and Use of Drugs positively correlated with age was confirmed. See Table 6.16. An identical pattern of relationships between the major Pain Coping Scales and age was found in the second wave sample compared with the first wave.

The fifth prediction that there would be a trend towards higher scores on the General Coping Measure and significant differences on the Coping Strategy scales between patients who had attended the Pain Management Programme and patients who had not attended the Pain

Management Programme was confirmed. Patients who had attended the Pain Management Programme scored significantly higher on the Active Coping Strategy scale and lower on the Avoidance, Use of Drugs and Pain Communication scales. As in the standardisation sample, no significant differences were found on the General Coping Measure between the two groups although there was a trend towards better coping in the group who had attended the Pain Management Programme.

The sixth prediction that subjects who reported pain had decreased over time should show a trend towards higher scores on the General Coping Measure and Active Coping Strategies compared with patients who reported pain had increased over time was partly confirmed. Non-significant differences did occur on the scales concerned in the directions predicted although the magnitude of the differences was somewhat less convincing than in the standardisation sample.

Overall, the predictions concerning the relationships between Pain Coping Scales and other variables derived from the standardisation sample have been confirmed. This has important implications in further establishing the reliability of the scales and the stability of the concepts being measured by the scales. To some extent, these findings add further weight to the contention that the scales are measuring psychologically meaningful dimensions. Although this study is related to construct validity, it is presented primarily as another measure of reliability. It is limited as a measure contruct validity by the fact that the same sample was studied on different occasions. An investigation of construct validity using the relationships established in the standardisation sample would require investigation of a different population of chronic pain patients who had not

previously been exposed to the measures used in the present study.

6.6 CONCLUSIONS

The reliability of the Pain Coping Questionnaire was extensively investigated with reference to stability of factor structure, test - re-test correlations, repeat measures of internal consistency and repeat examination of contruct validity. The factor structure was confirmed, although with slight differences in some of the scales. The individual scales were found to be reliable measures. The variation in reliability estimates between the different scales was consistent across the different measures used.

The "General Coping Measure" was the most reliable scale in terms of stability of structure, repeatability and consistency. "Active Coping Strategies" was a reliable scale in terms of consistency although it had somewhat lower reliability as assessed by test - re-test correlation. The slight difference between these two measures is probably accounted for by the fact that the dimension changed during the 9-12 months test - re-test interval. The "Use of drugs" scale was reliable both on measures of consistency and test - re-test correlation. The slight differences between measures of consistency and stability on some of the scales may reveal something about the nature of the dimensions being measured. It could be concluded that the emotional consequences of chronic pain and belief in the use of drugs as a way of coping with pain, remain more stable over time whereas patients beliefs in the use of different types of strategies to cope with pain, either negative or positive, varies to a greater extent. The "Pain Communication" scale is probably of questionable

reliability. It explained the lowest percentage of the variance on confirmatory factor analysis and had lowest reliability estimates on measures of stability and consistency. Its inclusion in the Pain Coping Questionnaire for clinical use is doubtful. The fact that it still posesses adequate reliability for research purposes (Sonquist and Dunkelberg, 1977) and the importance of beliefs in the communication of pain experience in a study of the psychology of coping with chronic pain warrants its inclusion in further investigations of the Pain Coping Questionnaire.

The present reliability estimates were based upon re-examination of the same population at a second point in time. Consistent results emerged from several different methods of assessing reliability and this adds weight to the validity of the present findings. There are limitations to the present study and these are mainly concerned with how generalisable the present findings are to chronic pain patients in general. Although there are strong indications from the present results that the reliability of the scales are generalisable, further reliability studies on different populations would be informative. It would be relevant to explore whether the factor structure could be replicated on a different population of chronic pain patients together with further examination of consistency and repeatability of scales. Predictions of relationships with other variables would also be relevant although, unlike the present study, this approach would be more to do with predictive validity of the scales rather than reliability given the fact that predictions would be made with respect to a population about which no information is available concerning the dimensions under study. These studies are beyond the scope of this thesis.

CHAPTER 7

VALIDITY OF PAIN COPING QUESTIONNAIRE

7.1 INTRODUCTION

Validity is concerned with the extent to which a test or scale measures what it is supposed to measure. The Pain Coping Questionnaire was developed to measure the psychology of coping with chronic pain. Five scales emerged from factor analysis of a large group of chronic pain patients (see chapter 5) that appear to be measuring meaningful psychological dimensions related to coping with chronic pain. These scales have been shown to be reliable measures (see chapter 6). The present chapter is concerned with an investigation of the validity of the scales. An attempt will be made to answer the question as to what the scales are measuring in psychological terms.

There are different kinds of approaches to assessing the validity of a measure. The particular approach adopted depends upon the nature, purpose and stage of development of the scales together with a domain of enquiry. This chapter consists of a brief account of the different types of validity with particular reference to the Pain Coping Questionnaire followed by a description of two empirical studies designed to explore the validity of the scales.

7.1a Face Validity

Face validity refers to the extent that a test appears as if it is measuring what it is supposed to measure. A test of coping with pain

that was a measure of how many magazines a patient had read in hospital waiting rooms might not appear to be measuring coping with pain even though it might be an accurate predictor of it. Such a test would be considered to have low face validity. The Pain Coping Questionnaire appears to be measuring coping with pain. A 57% return rate was obtained from the standardisation sample and in the reliability study. This is a comparatively high return rate and suggests that it is an acceptable and relevant questionnaire pertinent to the concerns of chronic pain patients. If the Pain Coping Questionnaire had had low face validity then one might have expected a lower return rate.

7.1b Content Validity

Content validity concerns the extent to which a set of items tap the content of some domain of interest. The degree to which the items reflect the full domain of content is a measure of content validity. There are some problems with this approach to validity in that there is often no agreed upon criteria for establishing whether a measure has attained content validity. Nunnally (1967) has noted:-

> "inevitably content validity rests mainly on appeals to reason regarding the adequacy with which important content has been sampled and on the adequacy with which the content has been cast in the form of test items."

Exploration of the relevant literature and clinical experience provided the background for establishing the content for items making up the Pain Coping Questionnaire (Chapter 4). A comprehensive range of beliefs and attitudes were included in the questionnaire that cover most important areas in coping with pain. In this respect, the Pain

Coping Questionnaire posesses adequate content validity.

7.1c Criterion Related Validity

Criterion related validity concerns the correlation between a measure and some criterion variables of interest. Criterion related validity is solely determined by the degree of correspondence between the measure and its criterion. If the correlation is high, the measure is valid for that criterion. There is no single criterion related validity coefficient. There are as many coefficients as there are criteria for a particular measure. In concurrent validity the relationship between a test and a currently available criterion is assessed while in predictive validity the criterion does not become available until a later date.

Typically, coping with pain refers to thoughts and behaviours people use to manage their pain or their emotional reaction to the pain so as to reduce emotional stress. Cohen and Lazarus (1979) conceptualise coping as:-

> "efforts, both action orientated and intrapsychic, to manage environmental stresses and/or to regulate the emotion aroused by this stress".

By its very nature coping with pain is a multi-dimensional concept. This means that there will not be a single criterion against which to validate various scales from the Pain Coping Questionnaire.

The General Coping Measure appears to be a measure of emotional distress caused by chronic pain. One would expect a high correlation

between this scale and other scales measuring emotional distress and disturbance such as measures of depression, psycho-social distress and anxiety. Scales measuring these dimensions would be appropriate criteria against which to validate the General Coping Measure.

Active Coping Strategies, Avoidance, Use of Drugs and Pain Communication scales from the Pain Coping Questionnaire purport to measure attitudes and beliefs that underly pain coping behaviours rather than affective components. An obvious criterion against which to evaluate these scales would be behavioural observations and measurements. There are a number of studies that have investigated the objective measurement of pain related behaviour in the clinical context (Fordyce, 1976; Jacox, 1980). Commonly reported variables are activity, activity diaries, measures of time spent standing, reclining or sitting, sleep, sexual activity, medication, normal household activities and engagement in recreational activities. These behaviours can be assessed by self report (Skevington, 1985), direct observation (Frederickson et al, 1978; Keefe and Block, 1982) or automated devices (Sanders, 1983). In general, one would expect activity levels to be positively correlated with Active Coping Strategies and negatively correlated with Avoidance scales.

There are limitations however associated with behavioural measurement. It is sometimes difficult to separate behavioural measures from the context in which they are selected and this limits the generalisability of findings. An individual with a very high score on the Avoidance scale may have demonstrated clear avoidance behaviour with reduced activity when observed in the domestic setting. If this behaviour is used as a criterion then the scale would have high

concurrent validity for that particular measure. The same individual with the same score on the Avoidance scale may show high levels of activity on all behavioural measures taken while being filmed by a documentary t.v. company making a film about the therapeutic effects of exercise on chronic pain. In this case, the concurrent validity would be low. Problems also exist with self - report measures of activity as there is often a discrepancy between what chronic pain patients say they do and what they actually do (Fordyce, 1976).

Another problem with using behavioural measures as a criterion against which to validate the Pain Coping Questionnaire, is that in some cases no clear behavioural indicators may be relevant. It would be hard to devise a reliable and objective criterion that would be a behavioural correlate of cognitive strategies such as mental distraction. Four of the five Pain Coping Scales appear to be measures of attitudes and beliefs rather than affective components of pain and it is not clear just how or in what way these beliefs may be related to behaviour.

Cognitive Coping Strategies have received attention in pain management programmes. Fernandez (1986) has proposed a classification scheme in which strategies are grouped into three broad categories comprising of imagary, self statements and attentional diversion. There is as yet however little indication as to what type of behaviour could be used to provide a criterion against which to validate measures and the use of these strategies.

Whilst the logic of criterion related validity is straightforward,

there are limitations. Certain criterion measures are appropriate and these are investigated in Validity Study One. It would be difficult to find adequate criteria against which to validate all the Pain Coping Scales. In general, the more abstract the concept the less likely one is to be able to discover appropriate criteria for assessing the nature of it (Nunnally, 1967).

7.1d Construct Validity

Construct Validity focuses on the assessment of whether a particular measure relates to other measures consistent with theoretically derived hypotheses concerning the concepts that are being measured. Cronbach and Meehl (1955) state:-

> "Construct validity must be investigated whenever no criterion or universe of content is accepted as entirely adequate to define the quality being measured. Construct validation takes place when an investigator believes his instrument reflects a particular construct to which are attached certain meanings. The proposed interpretation generates specific testable hypotheses which are a means of confirming or disconfirming the claim".

It has been suggested that criterion measures of validity are unlikely to be adequate or sufficient for validating the Pain Coping Questionnaire and for this reason construct validity will be important. Construct validation is impossible to evaluate unless there exists a theoretical network that surrounds the concept. Without this network, it is impossible to generate theoretical predictions which lead to empirical tests involving measures of the concept.

Until fairly recently theoretical understanding of chronic pain has been largely influenced by Specificity theory (Hardy et al.,1952) and this has resulted in a narrow view of pain as an essentially unitary phenomenon that varies only in intensity. Measurement devices such as Visual Analogue Scales (Sriwatonakul et al, 1983) and Category Scales (Mather and Mackie, 1983; Keele, 1948) have followed from this simple analysis. Such a view of pain over-simplifies the complex human experience of pain and is inadequate. The Gate Control Theory of pain (Melzack and Wall, 1965; Melzack and Casey, 1968) highlights the fact that pain is a multi-dimensional experience and is influenced in complex ways by central processes. This theory of pain has prompted many reports in the literature relating to experience of pain (Melzack, 1961), assessment and treatment of pain (Fordyce, 1976; Turk and Flor, 1984; Tan, 1982; Turner and Chapman, 1982). Melzack developed a multi-dimensional assessment instrument, the McGill Pain Questionnaire that was theoretically derived from the gate control theory of pain (Melzack, 1975; Melzack and Torgerson, 1971). It was specifically designed to separate and quantify three inter-related but distinct components of pain; sensory - discriminitive, motivational - affective and cognitive - evaluative. Fordyce (1976) further emphasises a behavioural component of chronic pain which may be independent of the sensory, evaluative and affective components. It is against this theoretical background that the construct validity of the Pain Coping Questionnaire may be examined.

The Pain Coping Questionnaire should be consistent with the multi-dimensional nature of pain which consists of discrete components of affective, sensory, cognitive and behavioural aspects. The Pain Coping Scales should correspond in meaningful ways to these separate

components. The Pain Coping Questionnaire purports to be a measure of psychological dimensions of coping with pain. It should therefore be relatively independent of sensory - discriminitive aspects of pain. It should be related to other measures and indicators of affective, cognitive and behavioural components. Specifically the General Coping Measure appears to be a measure of the affective component and should therefore relate to other measures of affect such as depression, anxiety and the affective scale on the McGill Pain Questionnaire. It should be less related to measures of cognitive aspects of pain. The scales Active Coping Strategies, Avoidance, Use of Drugs and Pain Communication appear to be measuring attitudes and beliefs and hence seem to be tapping cognitive rather than affective components and this should be reflected by their relationship with other measures of cognitive dimensions.

The following two studies are concerned with empirical examination of the concurrent and construct validation of the Pain Coping Questionnaire.

7.2 VALIDITY STUDY 1. INVESTIGATION OF THE CONSTRUCT VALIDITY OF THE PAIN COPING QUESTIONNAIRE

7.2a Introduction

The aim of this study was to examine the relationship between the Pain Coping Questionnaire and other measures likely to be relevant to the psychology of pain. The theoretical background against which the Pain Coping Questionnaire was validated stems from the Gate Control Theory of Pain (Melzack and Wall, 1965). This theory views pain as a multi-dimensional phenomenon with discrete components corresponding to

sensory, affective, cognitive and behavioural dimensions. Validation measures were selected on the basis that:-

a) they specifically measured sensory, affective, cognitive or behavioural components of chronic pain,

b) there are indications in the literature that they are valid when used with chronic pain patients,and

c) were suitable for administration with a postal questionnaire format.

Although this to some extent limits the measures available, particularly with reference to behavioural indices, this format was adopted in order that a large number of subjects could be investigated. This approach was considered suitable given the preliminary nature of the investigation and the importance of obtaining general indicators as to what the Pain Coping Scales may be measuring.

The McGill Pain Questionnaire (Melzack, 1975) is a pencil and paper instrument designed to quantify three dimensions of pain experience; sensory, affective and evaluative. Twenty sets of word descriptors are shown to the patient who is asked to select the word sets that are relevant. The most appropriate word in each word set is circled. Each set contains up to six words in ascending order of severity described by the set. Since the words within each word set have been assigned rank orders, a total rank score of all the words can be calculated. This is called the Pain Rating Index - Total (PRI-T). Scores from the separate dimensions can also be calculated. These are

referred to as the Pain Rating Index - Sensory (PRI-S), the Pain Rating Index - Affective (PRI-A) and the Pain Rating Index - Evaluative (PRI-E). The total number of words chosen (NWC) can also be calculated to represent an overall measure of pain intensity. To further assess pain intensity, patients were asked to rate pain on a 0-100 scale with six verbal descriptors consisting of "no pain", "very mild pain", "fairly mild pain", "fairly severe pain", "very severe pain", "worst imaginable pain".

To assess the affective components of pain, the Leeds Scale for the Self Assessment of Anxiety and Depression was used (Snaith et al, 1977). This is a 15 item self report questionnaire that provides separate measures for anxiety and depression. Scores above 7 on either scales have been considered to be cut off points for depression and anxiety. It has been shown to be a reliable and valid instrument for use in research and clinical practice (Snaith et al, 1976).

It has been reported that perceived controllability (Bowers, 1968; Girodo and Wood, 1979;) exerts a significant influence on the experience of pain. Attributions pain patients make about the ability to control events in their lives are important cognitive variables that one would expect to be related to beliefs in the use of certain coping strategies and psychological adjustment to chronic pain (Felton and Revenson, 1984). The Multi-Dimensional Health Locus of Control Scale was used to assess locus of control (Wallston and Wallston, 1978). This is based upon Levenson's development of Rotters (1966) original locus of control scale. Levenson (1974) argued that internal beliefs are orthogonal to external belief but that understanding could be further improved by studying fate and chance expectations

separately from external control by powerful others. Wallston (1978) developed these dimensions to specifically tap belief about the sources of reinforcement for health related behaviours. The Multi-Dimensional Health Locus of Control Scale yields three scales that measure beliefs about successful internal control (I), attribution about the extent to which events are controlled by powerful others (PO) and attribution about the control of events by chance (C).

An attempt to assess behaviour was made by including a self-report behavioural measure. Skevington (1983) required pain patients to describe activities related to pain, and these are reduced to 11 categories and indicators of activity level. Pain patients were compared to controls and it was determined that self reported activity level was a potentially valuable index for pain patient assessment. A self-report activity questionnaire developed by Grimshaw (1986) was used for the present study. This consisted of two behavioural rating scales assessing the difficulty pain patients experienced in performing everyday activities and the frequency with which they performed these activities. Specific hypotheses concerned with the relationships between the Pain Coping Questionnaire and the validation measures are found in appendix P.

7.2b Methods

Subjects

Subjects were 47 chronic pain patients who were on the waiting list for treatment at the Pain Clinic, Walton Hospital, Liverpool. As with all patients on the waiting list most had received some form of physical intervention for their pain. No patients had received any form of formal psychological therapy. By implication all treatments had proven ineffective. No patients had been subjects of any previous

psychological investigation.

There were 29 females and 18 males in the sample. Average age was 47 years (SD = 11.07 years) and average duration of pain was 11.72 years (SD = 11.67 years).

Procedures

A total of 80 chronic pain patients were contacted and asked to participate in the study. Forty chronic pain patients who were on the waiting list were contacted by post and asked to participate in the study by completing and returning the questionnaires. Another forty patients were contacted at their first appointment in the Pain Clinic and asked to complete the questionnaires before any treatment had been given. Overall a 58% response rate was obtained. This is comparable to the response rate of 57% found in the standardisation study (Chapter 5) and 57% found in the reliability study (Chapter 6).

Measures

All patients were asked to complete a bundle of questionnaires. See appendix H for details of the questionnaires. The following data were collected;-

1. Age, Sex, Marital Status, Employment Status.
2. Pain History, Duration, Onset, Location of Pain, Pattern of Pain.
3. The Pain Coping Questionnaire.
4. The McGill Pain Questionnaire (Melzack, 1975).
5. The Leeds Scale for the Self Assessment of Anxiety and Depression (Snaith et al, 1976).

6. The Multi-Dimensional Health Locus of Control Scale (Wallston and Wallston, 1978).
7. Self Report Activity Questionnaire (Grimshaw, 1986).
8. Pain Intensity Rating, 0 - 100 with verbal descriptors.

7.2c Results

Demographic and Pain Characteristics

Frequency of responses on marital status, employment status, location of pain, onset of pain and pattern of pain change over time are shown in Tables 7.1 to 7.5.

Summary Statistics

Mean scores, standard deviations, ranges and standard scores for Pain Coping Scales are shown in Table 7.6. Standard scores were based upon a mean of 100 and standard deviation of 15. They were derived from standardisation samples (Chapter 5) to allow comparison. See appendix J for method of calculating standard scores. Mean scores, standard deviations and ranges for McGill Pain Questionnaire, Leeds Depression and Anxiety Scales, Locus of Control Scales and Activity Scales are shown in Table 7.7 to 7.10. Frequency distributions of scores from Leeds Depression and Anxiety Scales, Locus of Control Scales and Activity Scales are shown in Appendix K.

Relationship of Pain Coping Scales with Other Variables

Correlations between Pain Coping Scales and the measures from the McGill Pain Questionnaire are shown in Table 7.11. Variables from the McGill Pain Questionnaire are not strictly interval level data and

TABLE 7.1 Marital status.

	FREQ.	%
MARRIED	27	57
REMARRIED	6	13
SINGLE	6	13
DIVORCED	5	11
SEPARATED	2	4
WIDOWED	1	2
TOTAL	47	

TABLE 7.2 Employment Status.

	FREQ.	%
EMPLOYED FULL TIME	6	13
EMPLOYED PART TIME	2	4
HOMEMAKER	8	17
RETIRED	8	17
UNEMPLOYED DUE TO PAIN	20	42
UNEMPLOYED FOR OTHER REASONS	3	6
TOTAL	47	

TABLE 7.3 Location of pain.

	FREQ.	%
BACK	29	62
HEAD	6	13
FACE	2	4
NECK, SHOULDERS, ARMS	2	4
CHEST, ABDOMEN	3	6
LEGS	5	11
TOTAL	47	

TABLE 7.4 Onset of pain.

	FREQ.	%
ACCIDENT AT HOME	3	7
ACCIDENT AT WORK	9	19
ROAD ACCIDENT	1	2
FOLLOWING ILLNESS	1	2
FOLLOWING SURGERY	7	15
PAIN "JUST BEGAN"	20	43
OTHER	6	13
TOTAL	47	

TABLE 7.5 Pattern of pain.

	FREQ.	%
INCREASED	29	63
DECREASED	2	4
STAYED THE SAME	15	33
TOTAL	47	

TABLE 7.6 Summary of statistics for pain coping scales. Means, S.D's, ranges and standard score. Standard scores based on mean of 100 and S.D of 15. N=47.

	RAW SCORES				STANDARD SCORES
	MEAN	S.D	MIN	MAX	MEAN
GENERAL COPING MEASURE	52.8	14.4	31	84	95.7
ACTIVE COPING STRATEGIES	36.3	7.2	22	54	102.7
AVOIDANCE	14.8	3.1	8	20	103.5
USE OF DRUGS	12.8	4.1	4	20	101.6
PAIN COMMUN-ICATION	12.9	2.7	6	19	101.5

TABLE 7.7 Summary statistics for McGill Pain Questionnaire. Means, S.D's and ranges. N=47.

	MEAN	S.D	MIN	MAX
NUMBER OF WORDS CHOSEN	8.7	5.2	1	20
PAIN RATING INDEX-SENSORY	12.4	7.6	0	30
PAIN RATING INDEX-AFFECTIVE	2.4	2.5	0	11
PAIN RATING INDEX-EVALUATIVE	2.1	1.7	0	5
PAIN RATING INDEX-TOTAL	20.9	12.2	1	53

TABLE 7.8 Summary statistics for Leeds depression and anxiety scale. N=47.

	MEAN	S.D	MIN	MAX
DEPRESSION	9.8	3.9	1	18
ANXIETY	8.0	4.3	0	17

TABLE 7.9 Summary statistics for Multidimensional Locus of Control. Means, S.D's and ranges. N=47.

	MEAN	S.D	MIN	MAX
INTERNAL	20.8	4.8	11	31
POWERFUL OTHERS	16.6	5.3	6	32
CHANCE	18.7	5.4	8	30

TABLE 7.10 Summary statistics for Self-Report Activity Questionnaire. Means, S.D's and ranges. N=47.

	MEAN	S.D	MIN	MAX
ACTIVITY-DIFFICULTY	62.4	24.7	19	104
ACTIVITY-FREQUENCY	56.8	37.1	1	136

therefore non-parametric analysis (Spearman's Correlation Coefficient - R_s) was appropriate to examine relationships. There was no significant relationship between the General Coping Measure and any of the measures from the McGill Pain Questionnaire. There were significant positive correlations between Active Coping Strategies and Number of Words Chosen, Pain Rating Index - Sensory and Pain Rating Index - Total. The strongest relationship was with the Pain Rating Index - Sensory ($P < .01$; $R_s = .37$). There was a weak negative correlation between Avoidance and the Pain Rating Index - Sensory ($P<0.5$; $R_s = .24$). Pain Communication was weakly related to the Pain Rating Index - Evaluative ($P<.05$; $R_s=.25$) but not to any of the other scales. Use of Drugs Scale was not related to any measures of the McGill Pain Questionnaire.

The correlations beween Pain Coping Scales and Leeds Depression and Anxiety Scales are shown in Table 7.12. Inspection of scores from the Leeds Depression and Anxiety Scales reveals a distribution that approaches normality (see appendix K1). The scores are interval level data and therefore Pearson's correlation coefficient (R) is a suitable measure to examine relationships between variables. There is a strong relationship between the General Coping Measure and Depression Scales ($P<.001$; $R=-.75$). There is also a significant relationship between the General Coping Measure and Anxiety Scale ($P<.01$; $R = -.39$). These relationships were negative in that high scores on depression and anxiety scales predicted low scores on the General Coping Measure. The strength and direction of these relationships were consistent with predictions. There was also a significant positive relationship between Depression and the Avoidance scale ($P<005$; $R = .46$). High scores on the depression scale predicted high scores on the Avoidance

TABLE 7.11 Correlations of Pain Coping Scales with number of words chosen (NWC), Pain Rating Index-Sensory (PRI-S), Pain Rating Index-Affective (PRI-A), Pain Rating Index-Evaluative (PRI-E) and Pain Rating Index-Total (PRI-T). Spearman's Correlation Coefficient (r_s). N=47.

	N.W.C	PRI-S	PRI-A	PRI-E	PRI-T
GENERAL COPING MEASURE	-.03	.09	-.15	-.08	.01
ACTIVE COPING STRATEGIES	.26*	.37**	.10	-.14	.26*
AVOIDANCE	-.12	-.24*	-.02	-.03	-.15
USE OF DRUGS	-.14	-.11	-.11	.03	-.15
PAIN COMMUNICATION	.24	.21	.14	.14*	.23

$p < .05^{*}$ $p < .01^{**}$

TABLE 7.12 Correlation of Pain Coping Scale with Leeds depression and anxiety scales. Pearson correlation coefficient (r). N=47.

	DEPRESSION r	ANXIETY r
GENERAL COPING MEASURE	-0.75***	-0.39**
ACTIVE COPING STRATEGIES	-0.26*	0.00
AVOIDANCE	0.46**	0.26*
USE OF DRUGS	0.28*	0.14
PAIN COMMUNICATION	-0.05	0.09

$p < 0.01^{*}$ $p < 0.005^{**}$ $p < 0.001^{***}$

Scale. There were no significant relationships between depression and anxiety and Active Coping Strategies, Use of Drugs or Pain Communication Scales.

Correlations between Pain Coping Scales and the multi-dimensional locus of control scales are shown in Table 7.13. Distribution of scores from locus of control scales appeared to approach normality (see appendix K2). Because of uncertainties over distribution, Pearson's(R) and Spearmans's(R_s) correlation coefficients were calculated. There was close correspondence between the two measures. There was no relationship between the General Coping Measure or Pain Communication and any of the locus of control scales. There was a significant, although weak, negative correlation ($P<0.05$; $R_s = -.27$) between active coping strategies and scales measuring internal control and control by powerful others. Avoidance and Use of Drugs scales both had significant positive correlations with the control scale measuring "powerful others" although they had no relationship with the other control scales. The locus of control scale measuring attributions of control by chance had no relationships with any of the Pain Coping Scales.

Correlations between Pain Coping Scales and Self report activity measures are shown in Table 7.14. Inspection of summary statistics and distributions of activity measures (see appendix K3) reveals a wide dispersion about the mean with a distribution that clearly does not approach normality. The data are ordinal in that scores represent a formation of rank ordered variables. Spearman's correlation coefficient is appropriate for this type of data. There is a significant negative correlation between the General Coping Measure

TABLE 7.13 Correlation of Pain Coping Scales with Multidimensional Locus of Central Scales. Pearson (r) and Spearmans (r_s) Correlation Coefficients . N=47

	INTERNAL		POWERFUL OTHERS		CHANCE	
	r	r_s	r	r_s	r	r_s
GENERAL COPING MEASURE	-.10	-.12	-.17	-.07	-.15	-.14
ACTIVE COPING STRATEGIES	-.27	-.27*	-.27	-.26*	-.10	-.10
AVOIDANCE	.20	.14	.38**	.33*	-.08	-.10
USE OF DRUGS	.29	.22	.30*	.32*	.16	-.10
PAIN COMMUNICATION	.19	.17	.06	.03	-.09	-.08

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

TABLE 7.14 Correlation of Pain Coping Scales with self-report activity questionnaire. Spearman's Correlation Coefficient (r_s). N=47.

	ACTIVITY DIFFICULTY r_s	ACTIVITY FREQUENCY r_s
GENERAL COPING MEASURE	-.35**	.21
ACTIVE COPING STRATEGIES	-.11	.27*
AVOIDANCE	.27*	-.43***
USE OF DRUGS	.30*	-.23
PAIN COMMUNICATION	-.19	.12

$p < .05^{*}$ $p < .01^{**}$ $p < .005^{***}$

(P<.01; R_s = -.35) and ratings of difficulty in performing everyday activities. There is no relationship between the General Coping Measure and measures of activity frequency. With Active Coping Strategies there is no relationship with difficulty ratings, although there is a positive relationship with frequency of activity (p<0.05; R_s=.27). The Avoidance scale is positively correlated with reported difficulty of activity (P<.05; R_s=.27) and negatively correlated with reported frequency of activity (P<.005; R_s= -.43). The Use of Drugs scale is positively correlated with activity difficulty (P<.05; R_s=.3) but unrelated to reports of activity frequency. There is no relationship between the Pain Communication Scale and either of the activity measures.

7.2d Discussion

The strong relationship between the General Coping Measure and measures of affect validates this scale as a measure of the emotional consequences of chronic pain. The finding that it relates to self report measures of difficulty of performing everyday activities but is unrelated to frequency of activities further substantiates this scale as a measure of feelings rather than behaviour. The absence of any relationship between the General Coping Measure and measures of locus of control suggest a separation between affective and cognitive components.

It was surprising that no relationship existed between the General Coping Measure and any of the scales from the McGill Pain Questionnaire. One would have expected a positive relationship between General Coping Measure and PRI-A particularly as the General

Coping Measure was established as a measure of affect by virtue of its very strong relationship with measures of depression. It was also surprising that from examination of the correlation matrix of all variables (see appendix M), PRI-A had no relationship with depression.

There are several possible reasons why no relationship was found between the General Coping Measure and PRI-A scale from the McGill Pain Questionnaire. Sometimes patients have difficulty with the complexity of vocabulary used in the McGill Pain Questionnaire and this may make the test unreliable due to low comprehensibility. There is no reason to assume that the present samples were any less verbally able than any other sample of chronic pain patients. In addition, other verbal self report measures were completed without difficulty and yielded interpretable results. Whilst low comprehensibility may be a criticism of this test in general, it is unlikely that this could have accounted for the absence of the expected relationship.

The McGill Pain Questionnaire weights sensory aspects of pain more heavily than affective and evaluative (i.e. there are more sensory than affective or evaluative words) and this may cause problems. Patients are forced to give more consideration to sensory aspects of pain than to affective or evaluative aspects and this may bias the outcome obtained. It may be that the reason why the expected relationship did not emerge was because of low reliability and validity of the PRI-A scale.

A number of investigations have performed critical evaluations of the McGill Pain Questionnaire (Chapman et al, 1985) with respect to confirmation of factor structure (Byrne et al, 1982), reliability

(Graham et al, 1980) and validity (Kremer and Atkinson, 1981). There has been considerable support overall for basic structure and reliability although some validity studies have produced equivocal results (Leavitt et al, 1978; McCreary et al, 1982). A recent study by Turk et al (1985) found that the three components of the McGill Pain Questionnaire do not display adequate discriminant validity. The authors recommend that only the total score is appropriate for pain assessment. It seems likely that the General Coping Measure was unrelated to the PRI-A scale because the PRI-A scale is not a reliable measure of the affective component of chronic pain.

The fact that the General Coping Measure was also unrelated to PRI-Total and number of words chosen has interesting implications in terms of its clinical utility. This finding suggests that there is a separation between measures of pain intensity and the affective consequences of pain. The results suggest that the McGill Pain Questionnaire is not measuring the affective component adequately and that the General Coping Measure could usefully be used to evaluate the affective aspect of chronic pain.

The Active Coping Strategies scale was unrelated to measure of depression and anxiety. This suggests that the scale is not measuring affect or emotional component of pain. Unlike the General Coping Measure, it was correlated with two of the control scales in the direction as predicted. This suggests that the Active Coping Strategies scale is measuring cognitive rather than emotional aspects of pain. High scores on the Active Coping Strategies scale are associated with greater internal sense of control and lower attributions of control to "powerful others". The Active Coping

Strategies scale was also positively related to self-report activity ratings.

The finding of significant positive correlations between Active Coping Strategies and various measures of pain intensity such as number of NWC, PRI-S and PRI-Total on the McGill Pain Questionnaire was surprising. This means that patients who have high scores on Active Coping Strategies meaning they have a greater sense of control over the pain and they have a belief in the adoption of positive strategies to cope with pain also have greater levels of pain intensity with particular reference to sensory dimensions.

There are a number of possible reasons for this relationship. It is possible that people who adopt positive strategies have more pain for physical reasons and that this encourages them to have more positive beliefs. This seems to be an unlikely explanation. Another possibility is that the adoption of Active Coping Strategy involves patients doing more, avoiding less and as a result of this they actually suffer more pain. It may be that although greater activities increase the sensory pain they result in less psychological distress and this compensates for the greater sensory pain levels. Another possibility is that individual patients who have high scores on Active Coping Strategies take more notice of their pain, by virtue of their greater sense of control over their pain which leads them to try and monitor and understand their pain. This may result in higher scores on the McGill Pain Questionnaire. It is not possible to establish which of these explanations is the more likely from the data available. It is of course possible that these explanations are not mutually exclusive.

There was a strong negative relationship between Avoidance and the self- report activity frequency measure. This provides evidence that the Avoidance Scale is measuring the activity dimension. In addition there was an association with a depression and also a strong association with belief in attributions of control to "powerful others". This is an interesting relationship. One might speculate that people with high scores on the control by "powerful others" are more likely to unquestioningly accept frequently given advice from Doctors to "rest and take your medicine" as a way of dealing with chronic pain. This advice is often not indicated in chronic pain conditions and is sometimes considered to be unhelpful. There was only a weak relationship between Avoidance and PRI-S and no relationship with PRI-Total. This suggests that Avoidance is more determined by belief in attributions of control to "powerful others" than actual levels of pain intensity.

The Use of Drugs Scale was not related to measures of affect. Like Avoidance there was a strong association with beliefs in attributions of control by "powerful others". Significantly, there was no relationship between use of drugs and any of the measures of pain intensity from the McGill Pain Questionnaire. Although these relationships might be unexpected, in many ways they reflect clinical experience. Excessive medication use in chronic pain patients is not uncommon. It is also not uncommon for patients to report that despite taking large amounts of different drugs their pain is unaffected. When asked why they take large amounts of drugs, even though their pain is unaffected, many patients report "because the Doctor says so". These findings suggest that attitudes to taking drugs are not

formulated by the affectiveness of this behaviour in reducing pain but are more likely to be related to belief in the control of "powerful others". Of course in the case of chronic pain patients, "powerful others" are Doctors. Whilst the advice to "take your tablets and rest" in acute pain is maybe helpful, as pain lingers into chronicity such advice is often counter-productive and may be positively harmful. Patients who do have strong beliefs in the control of "powerful others" may find it difficult to change their behaviour, even though it does not appear to be helping. These findings may have clinical utility. It is possible that if patients who have strong belief in the control of "powerful others" could be identified, then they may be helped significantly by strongly worded advice from Doctors to keep active and try more positive approaches to dealing with chronic pain.

The Pain Communication scale did not have any meaningful relationships with the other variables and hence the validity of this scale remains in doubt.

7.3 VALIDITY STUDY 2. INVESTIGATION OF CRITERION RELATED VALIDITY OF PAIN COPING QUESTIONNAIRE WITH REFERENCE TO CHRONIC LOW BACK PAIN AND POST-HERPETIC NEURALGIA

7.3a Introduction

The Pain Coping Questionnaire has been established as a reliable and valid measure. It appears to be measuring predominantly psychological aspects of coping with pain and includes both affective and cognitive components. It appears to be relatively unaffected by sensory changes or pain intensity.

Only recently have systematic comparisons of pain behaviour and pain coping strategies in different populations of pain patients been carried out (Keefe and Dolan, 1986). With respect to the Pain Coping Questionnaire one would expect different profiles to emerge between patients who suffer from pain syndromes that are known to be particularly associated with psychological factors and patients who suffer from pain syndromes where psychological factors play only a minor role. In simple terms, one would expect the Pain Coping Questionnaire to distinguish "functional" pain syndromes from "organic" pain syndromes. In general, one would expect "functional" pain syndromes to be associated with greater psychological distress reflected by lower scores on the General Coping Measure, more reliance on negative coping strategies reflected by higher scores on Avoidance and Use of Drugs scales and less reliance on positive strategies, reflected by lower scores on the Active Coping Strategies Scale when compared with "organic" pain syndromes.

The present study was designed to evaluate affective and cognitive aspects of pain as measured by the Pain Coping Questionnaire in two common chronic pain syndromes; chronic low back pain and post-herpetic neuralgia. These two syndromes may be considered to represent "functional" and "organic" pain syndromes respectively and offer an opportunity to validate the Pain Coping Questionnaire against a clinical criterion.

Lack of definitive organic pathology and ineffectiveness of many medical treatments has brought about a multidisciplinary attitude towards the study and treatment of low back pain. Inceasingly,

psychological variables are considered important factors in the aetiology and treatment of chronic low back pain (Turk and Flor, 1984). Some reports suggest that psychosocial variables may be more closely related to chronic low back pain than organic factors (Margora, 1970; Westrin et al, 1972). Turk and Flor (1984) view low back pain as :-

> "a psychophysiological and psychosocial problem stemming from the interaction of physical, psychological and social factors".

Chronic low back pain represents a common pain syndrome in which psychological factors are very likely to play an important role. One would therefore expect an assessment device that purports to measure psychological components of chronic pain to be able to discriminate this group from other patients with pain syndromes that are less associated with psychological factors.

Post herpetic neuralgia is a complication of herpes zoster, a viral disease due to the same virus as that causing chicken pox (varicella). Of all patients with herpes zoster, approximately 10% will develop post herpetic neuralgia. It is most common in the elderly. The pain syndrome is usually characterised by a constant burning and aching upon which may be superimposed shocks or jabs. Although the pain may fluctuate in intensity it is always present to some degree. With respect to treatment, Loeser (1986) comments:-

> "we do not have any proven treatment programme for post herpetic neuralgia. Like most pain due to injury to the nervous system, it does not respond to the remedies for pain due to tissue damage. This means that the treatments utilised at the present time should have a very low risk of damaging the patient, for they all have only a small chance of providing long term benefit".

Like chronic low back pain, post herpetic neuralgia results in persistent and chronic pain for which there is no very effective medical treatment. Unlike low back pain, however, there is a clear and definitive organic reason for the pain and psychological factors are not implicated in aetiology.

The present study was designed to evaluate psychological aspects of coping with pain as measured by the Pain Coping Questionnaire in two common chronic pain syndromes: chronic low back pain and post herpetic neuralgia. These syndromes broadly represent predominantly "functional" and "organic" pain problems respectively. A measure of pain intensity, the McGill Pain Questionnaire and measures of demographic and pain characteristics were also taken to better describe the two patient groups studied.

7.3b Methods

Subjects

Twenty five patients (12 males and 13 females) suffering from post herpetic neuralgia and 20 patients (7 males and 13 females) suffering from chronic low back pain served as subjects. Average age of post herpetic neuralgia patients was 71.6 years (SD = 7.4years) and mean duration of pain was 3.4 years (SD = 2.2years). The average age of chronic low back pain patients was 50.6 years (SD = 10.5years) and average duration of pain was 11.7 years (SD = 11.9years). All patients were on the research register of the Pain Relief Foundation, at Walton Hospital, Liverpool and had been independently diagnosed on the basis of history and clinical examination by a Consultant in Pain

Relief.

Procedure

All patients were contacted by post and asked to complete and return a bundle of questionnaires. (see appendix N, D.2, H.3 for details of introductory letter and questionnaire). The measures utilised were:-

1. Demographic and pain characteristics.
2. The Pain Coping Questionnaire.
3. The McGill Pain Questionnaire. (see paragraph 7.2 for details of scoring. The sensory, affective, evaluative, miscellaneous and total scores for Pain Rating Index were calculated).

7.3c Results

Mean ages and durations of pain are shown in Table 7.15. Post herpetic neuralgia patients were significantly older ($p<.0001$) and had significantly shorter durations of pain ($p<.05$) compared with chronic low back pain patients. Sex distribution for the two groups is shown in Table 7.16. There were no differences in the proportion of males and females making up these two groups. A series of chi-square analyses revealed several differences in terms of demographic characteristics. Table 7.17 shows frequency of responses for marital status for the two groups. Chronic low back pain patients were more likely to be married, whereas post herpetic neuralgia patients were more likely to be widowed or single. Table 7.18 shows employment status. Chronic low back pain patients were fairly evenly represented across the various categories. 92% of the post herpetic neuralgia patients were retired. Table 7.19 shows frequency of responses for

TABLE 7.15 Mean ages (yrs) and duration of pain (yrs) for chronic low back pain (CLBP) and post-herpetic neuralgia (PHN) groups.

VARIABLE		N	MEAN	S.D	t	D.F	2-TAIL PROB.
AGE	PHN	23	71.6	7.4	7.64	41	< 0.001
	CLBP	20	50.6	50.6			
DURATION	PHN	18	3.4	2.2	-2.88	29	0.029
	CLBP	13	11.6	11.9			

TABLE 7.16 Sex distribution for chronic low back pain (CLBP) and post-herpetic neuralgia (PHN) groups.

	PHN	CLBP
MALES	12	7
FEMALES	13	13
TOTAL	25	20

Chi-square = 0.76 D.F = 1 p = 0.56 (NS)

TABLE 7.17 Marital status for chronic low back pain (CLBP) and post herpetic neuralgia (PHN) groups.

	PHN	CLBP
MARRIED	9	15
SINGLE	5	1
DIVORCED	2	2
SEPARATED		1
WIDOWED	9	1
TOTAL	25	20

Chi-square = 11.14 D.F = 4 p = 0.02

TABLE 7.18 Employment status for chronic low back pain (CLBP) and post-herpetic neuralgia (PHN) groups.

	PHN	CLBP
EMPLOYED FULL TIME		3
EMPLOYED PART TIME		2
RETIRED	23	3
HOMEMAKER		1
UNEMPLOYED DUE TO PAIN	2	8
UNEMPLOYED FOR OTHER REASONS		2
MISSING		1
TOTAL	25	19

Chi-square = 26.6 D.F = 5 p = 0.0001

TABLE 7.19 Onset of pain for chronic low back pain (CLBP) and post herpetic neuralgia (PHN) groups.

	PHN	CLBP
ACCIDENT AT HOME		1
ACCIDENT AT WORK	1	7
ROAD ACCIDENT		2
FOLLOWING ILLNESS	9	
PAIN "JUST BEGAN"	8	7
OTHER	1	2
MISSING	6	1
TOTAL	26	20

Chi-square = 16.9 D.F = 5 p = 0.0047

TABLE 7.20 Frequency of pain for chronic low back pain (CLBP) and post herpetic neuralgia (PHN) groups.

	PHN	CLBP
CONTINUOUSLY	18	13
SEVERAL TIMES A DAY	5	4
ONCE A DAY	1	
SEVERAL TIMES A WEEK		
SEVERAL TIMES A MONTH		2
ONCE A MONTH		1
LESS FREQUENT THAN ONCE A MONTH		
MISSING	1	
TOTAL	25	20

Chi-square = 4.59 D.F = 4 p = 0.331

TABLE 7.21 Pattern of pain change over time for chronic low back pain (CLBP) and post herpetic neuralgia (PHN) groups.

	PHN	CLBP
INCREASED	3	15
DECREASED	5	2
STAYED THE SAME	17	3
TOTAL	25	20

Chi-square = 18.76 D.F = 2 p = 0.0001

onset of pain. There were significant differences between the two groups with a larger proportion of the post herpetic neuralgia patients reporting their pain had begun either following illness with more patients in the chronic low back pain group reporting their pain had resulted from an accident. Table 7.20 shows reported frequency of pain. There were no differences between the two groups with most patients reporting continuous pain. Table 7.21 shows pattern of pain change over time. There were significant differences between the two groups with most chronic low back pain patients reporting their pain had increased since onset compared with post herpetic neuralgia patients, most of whom reported their pain had stayed the same.

Table 7.22 shows mean scores for evaluative, affective, sensory and miscellaneous sub-scales and total score of the McGill Pain Questionnaire. A series of t-tests was carried out. Results indicate that the chronic low back pain patients and post herpetic neuralgia patients differed significantly on affective, evaluative, miscellaneous and total scores. There were no differences in scores on the sensory sub-scales between the two groups.

Table 7.23 shows mean scores on the scales from the Pain Coping Questionnaire for the two groups. Comparisons made using t-tests revealed that the post herpetic neuralgia patients scored significantly higher on the General Coping Measure than low back pain patients. There were no differences between the two groups on Active Coping Strategies, Avoidance, Use of Drugs and Pain Communication scales.

In order to illustrate how the two groups scored on the Pain Coping

TABLE 7.22 Means and standard deviations on the McGill Pain Questionnaire for chronic low back pain (CLBP) and post herpetic neuralgia patients. Pain Rating Index for "sensory", "affective", "evaluative", "miscellaneous" and "total" catagories.

DIMENSION	CLBP (N=20) MEAN	(S.D)	PHN (N=25) MEAN	(S.D)	t
SENSORY	9.2	(5.4)	6.8	(5.2)	-1.45
AFFECTIVE	1.7	(2.1)	0.5	(1.4)	-2.4*
EVALUATIVE	2.7	(1.6)	1.5	(1.4)	-2.6*
MISCELLANEOUS	4.6	(3.1)	1.7	(2.1)	-3.9**
TOTAL	18.3	(8.9)	9.07	(5.9)	-3.6**

$p < 0.05^{*}$ $p < 0.001^{**}$

TABLE 7.23 Mean scores for pain coping scales for chronic low back pain (CLBP) and post-herpetic neuralgia (PHN) groups.

VARIABLE		NO. OF CASES	MEAN	S.D	t	D.F	2-TAIL TEST
GENERAL COPING MEASURE	CLBP	19	57.42	14.63	2.25	35	0.031
	PHN	18	67.16	11.36			
ACTIVE COPING STRATEGIES	CLBP	18	32.83	7.49	0.27	33	0.786
	PHN	17	33.47	6.13			
AVOIDANCE	CLBP	20	13.35	2.91	-0.66	37	0.515
	PHN	19	12.79	2.37			
USE OF DRUGS	CLBP	20	11.10	4.55	0.05	36	0.963
	PHN	18	11.11	3.25			
PAIN COMMUN-ICATION	CLBP	20	14.00	1.41	0.44	36	0.665
	PHN	18	14.27	2.42			

Fig.7.1 Mean standard scores on Pain Coping Questionnaire for low back pain and post–herpetic neuralgia patients. Scores are based upon a mean of 100 and standard deviation of 15.

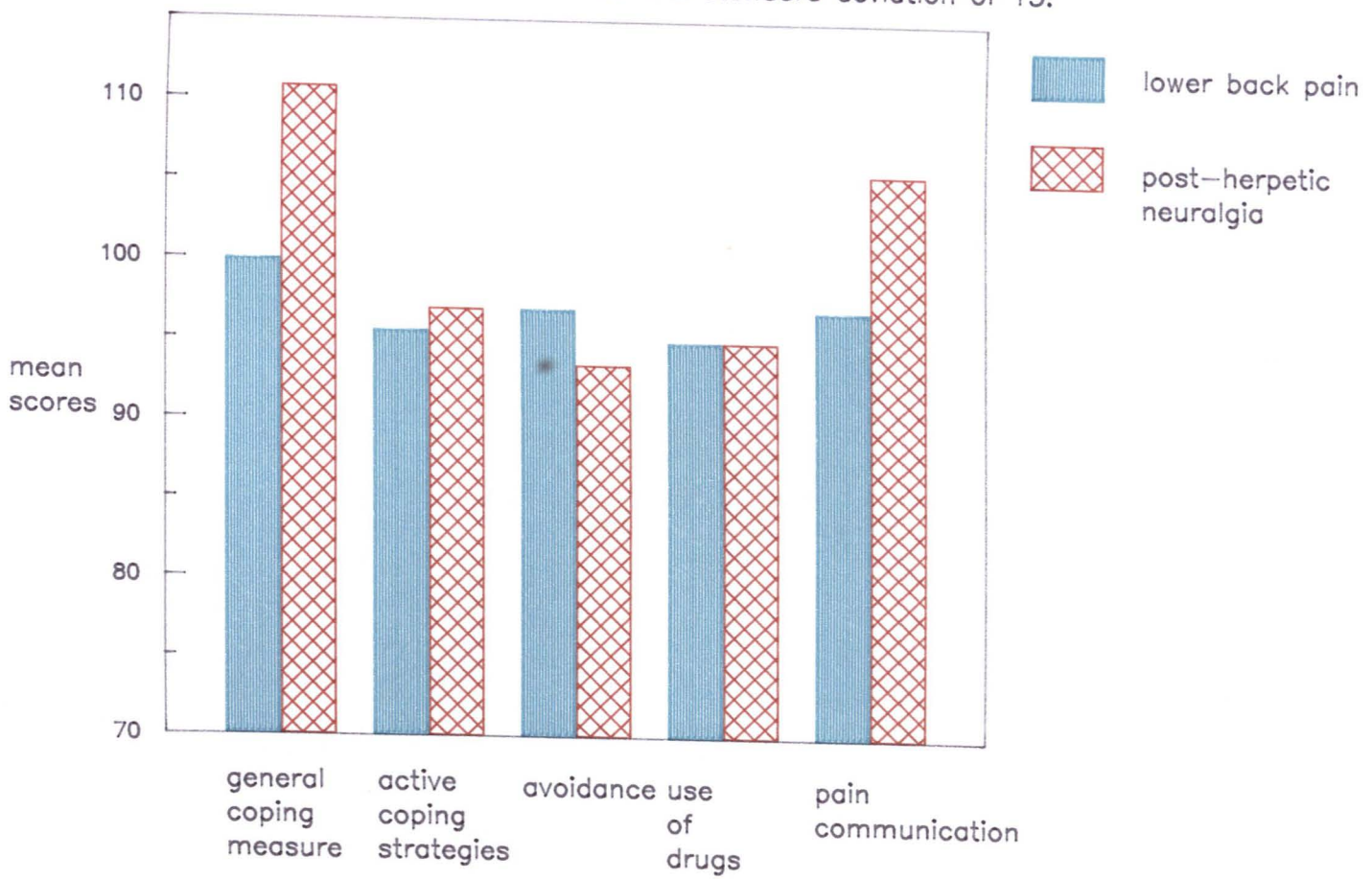


TABLE 7.24 Analysis of variance with age as covariate for scales from Pain Coping Questionnaire for chronic low back pain (CLBP) and post herpetic neuralgia (PHN) patients.

	COVARIATE AGE F VALUE	MAIN EFFECT CLBP Vs PHN F VALUE
GENERAL COPING MEASURE	1.138	3.86*
ACTIVE COPING STRATEGIES	0.623	0.383
AVOIDANCE	0.032	0.45
USE OF DRUGS	0.118	0.123
PAIN COMMUNICATION	0.271	1.131

$p < 0.05$*

Questionnaire in relation to the standardisation sample (see Chapter 5), the raw scores were transformed into standard scores based upon a mean of 100 standard deviation of 15 (see appendix J for method). Figure 7.1 shows the mean standard scores on the Pain Coping Scales for the two groups. The post herpetic neuralgia group were significantly above average in terms of the General Coping Measure. There was a clear trend for post herpetic neuralgia patients to use more active coping strategies and less avoidance strategies although this did not reach statistical significance. The Use of Drugs Scale was identical for both groups and a little lower than the mean of the standardisation sample. Post herpetic neuralgia patients scored considerably higher on the Pain Communication Scale compared with the low back pain patients although this just failed to reach statistical significance.

In order to control for the possible effect of age on some of the variables, analysis of co-variance with age as a co-variate and diagnosis as the main effect was performed. Table 7.24 shows the results of this analysis. Age had no influence on the dependent variables in this sample and did not significantly influence the findings.

7.3d Discussion

There were important differences between the two groups in terms of demographic and pain characteristics. As expected, the post herpetic neuralgia group were significantly older, with shorter durations of pain and this is in keeping with what has been expected from clinical findings (Loeser, 1986). The differences in employment and marital

status were related to the higher age group of post herpetic neuralgia patients with a greater proportion of patients being retired and widowed. There were differences in the mode of onset and this is again consistent with what would have been expected with most post herpetic neuralgia patients reporting that their pain had begun following illness. In most cases, post herpetic neuralgia results as a complication of herpes zoster. There were differences in the pattern of pain with chronic low back pain patients reporting pain had increased whereas most post herpetic neuralgia patients reported the pain had remained the same since onset. This would again be expected given that chronic low back pain patients were considered to have greater psychological overlay, and this would account for the deterioration of the pain over time (Sternbach, 1976).

There were interesting differences in terms of pain intensity as measured by the various components from the McGill Pain Questionnaire. There were no differences between the two groups in terms of sensory components of the Pain Rating Index but with large differences on the other sub-scales. A possible interpretation is that this finding reflects the higher emotional, or functional component to low back pain. Although this interpretation is appealing, recent studies suggest that the components of the Pain Rating Index do not display adequate discriminant validity and that only the total score of the Pain Rating Index is appropriate for pain assessment (Turk et al, 1985). The results clearly show that there are differences in pain intensity between the two groups. It is not clear which dimensions of pain are worse, from the results of the McGill, although there are indications that affective and evaluative components are more intense than sensory components in low back pain patients.

On the Pain Coping Questionnaire there was a significant difference on the General Coping Measure. This means that the post herpetic neuralgia patients showed better psychological adjustment and generally coped better with their pain from an emotional point of view than the chronic low back pain patients. There were no significant differences on the other scale, although Figure 7.1 does show a trend with post herpetic neuralgia patients having slightly higher scores on Active Coping Strategies and lower scores on Avoidance compared with chronic low back pain patients.

A possible explanation for the significant difference in scores on the General Coping Measure was that this merely reflects the more severe nature of the pain in chronic low back pain patients and the longer duration of pain compared with post herpetic neuralgia. This explanation is unlikely, given the findings from the previous study. The previous study demonstrated that the General Coping Measure was independent of pain intensity as measured by any scales on the McGill Pain Questionnaire. In addition the General Coping Measure is also independent of duration of pain (see Chapter 5). This suggests, that the differences in General Coping Measure are not simply a reflection of differences in pain intensity or duration but are a reflection of the greater psychological distress and overlay in the chronic low back pain group compared with the post herpetic neuralgia group. This finding suggests that the General Coping Measure has good discriminative validity when applied to clinical groups.

Although there was a trend of post herpetic neuralgia patients showing more positive coping strategies compared with the chronic low back

pain patients the differences failed to reach statistical significance. Active Coping Strategies, Avoidance and Use of Drugs were demonstrated to be correlated with age in the standardisation sample. Although analysis of co-variance with age as the co-variate did not suggest that age was exerting any significant influence on the findings in the present sample, it is possible that age may be a relevant factor in the failure to find any differences in terms of coping strategies between the two groups. It would have been very interesting to have matched the two groups in terms of age. Unfortunately this proved difficult because of the comparative rarity of patients suffering from post herpetic neuralgia in a younger age group.

7.4 CONCLUSION

Empirical studies of construct and concurrent validity revealed that the Pain Coping Scales are valid. They relate to other psychological dimensions in ways predicted from the cognitive-behavioural perspective of chronic pain. As predicted, the General Coping Measure has been established as a measure of affective componant of chronic pain. Active Coping Strategies, Avoidance and Use Of Drugs are predominantly cognitive dimensions in that they appear to be measuring beliefs in the use of certain types of pain coping strategies.

Self-report measures and clinically defined diagnostic groups were used to validate the Pain Coping Questionnaire. No behavioural measures based upon direct observation were used. Further validation studies are required to explore the extent to which Pain Coping Scales

predict behaviour with the use of objective measures of affect and pain coping strategies that do not rely on self-report. These studies are beyond the scope of this thesis.

Normative data has been presented on two common chronic pain syndromes. This represents a first step in the investigation of the nature and role pain coping strategies and psychological adjustment have in different clinical groups.

CHAPTER 8

THE PAIN COPING QUESTIONNAIRE AS A MEASURE OF CHANGE

8.1 INTRODUCTION

Recognition that chronic pain is a complex, neurophysiological, behavioural and psychological phenomenon have led to the development of treatment programmes that combine a number of different approaches. Such treatment programmes have developed steadily since Fordyce (1973) first described a behavioural treatment for chronic pain based upon principles of operant conditioning. The multi-modal approach aims to produce a maximally effective treatment package for chronic pain sufferers utilising several treatment techniques to control as many variables as possible. Although there are many differences in the make-up of individual programmes, all are based on the assumption that pain is a multi-dimensional phenomenon that requires a multi-disciplinary approach to treatment. Most programmes offer a variety of operant, respondent, cognitive and educational approaches, either on an in-patient or out-patient basis (Swanson et al, 1976; Keefe et al, 1981; Roberts and Reinhardt, 1980, Newman et al, 1978; Chapman et al, 1981, Fordyce, 1973). Turk and Genest (1979) describe such approaches to treatment as:-

> "Blunderbuss, all-inclusive approaches".

Azrin (1977) argues that first an effective treatment package should be developed, then subsequently the value of its components should be studied.

The Pain Management Pogramme, Walton Hospital, Liverpool, is an example of a multi-modal treatment for chronic pain sufferers. The rationale, aims and components of the treatment are described in detail in Chapter 3. This chapter is concerned with investigating the usefulness of the Pain Coping Questionnaire as a measure of change in the evaluation of outcome for this treatment approach for chronic pain.

Multi-modal treatment programmes that incorporate behavioural and cognitive techniques appear to help many chronic pain patients (Keefe, 1982). Many patients treated in such programmes have long histories of pain and repeated failures to respond to treatment. The chronic nature of their pain and pain-behaviour pattern does provide a baseline against which the positive results achieved can be compared. There have been a number of attempts to empirically evaluate outcome of pain treatment programmes (Linton, 1986; Aronoff 1982 for reviews). Although initial results have been promising (Swanson et al, 1976; Painter, 1980; Seres and Newman, 1976), many of the outcome studies are beset with methodological problems which cloud interpretation (Broome, 1985; Aronoff , 1982; Keefe, 1982). These include lack of objective outcome measures, lack of standardisation in treatment components, and failure to include control groups for comparison. Aronoff (1982), referring to the methodological problems inherent in research into the effects of Pain Treatment Programmes, states:

> "The first of these problems involves the recognition that the concept 'improvement in functioning' requires an analysis of multiple factors and that for many of these factors at present no test exists which has been standardised, which has proven reliability and validity and for which norms have been developed".

The lack of appropriate tests to measure changes following psychological intervention for chronic pain problems is further emphasised by Pearce (1984) who, commenting in a review of cognitive-behavioural treatments on the lack of empirical evidence to support efficacy of cognitive behavioural methods for chronic pain management, states:-

> "This is primarily due to the lack of adequate tests of cognitive-behavioural methods rather than the demonstration that the methods are ineffective ... it is hoped future studies will consider development of outcome measures".

In general, the aim of most multi-modal pain treatments is to improve patients' ability to cope with pain and improve psychological adjustment. Unlike physical treatments, it is rarely the aim of psychological intervention to "cure" or remove or reduce the pain. Although many chronic pain treatment programmes emphasise teaching cognitive and behavioural skills to increase the ability of patients to control pain, empirical data concerning the effectiveness of such treatment on the use of coping skills and adjustment are lacking. In a comprehensive review of psychological pain programmes, Aronoff (1982) highlights only one study that attempts to use patients' ability to cope with pain as an outcome measure.

Newman et al (1978) reported an 18-month follow-up of low back pain patients who had undergone a multi-modal pain treatment programme. This study is notable in that it included as an outcome measure, information pertaining to pain-intensity, mood and ability to cope. The main findings were that although pain intensity was unchanged,

most patients stated that they were better able to cope with continuing pain in the face of much higher activity levels and greatly reduced levels of analgesic drugs. Although an attempt to measure coping with pain was made, no standardised measures were used. Only comparatively recently have reports on the use of measures of coping to assess efficacy of cognitive, behavioural or operant behavioural treatments appeared in the literature (Turner and Clancy, 1986).

Examination of the literature concerned with evaluating outcome of psychological pain management programmes reveals studies weakened by methodological problems. One clear and consistent omission from the various outcome measures used, is a standardised reliable and valid measure of "coping with pain". This omission is particularly notable given the fact that improved ability to cope with the pain is the fundamental aim of most psychological treatment interventions for chronic pain.

The Pain Coping Questionnaire is a measure of coping with pain that has been standardised on a large and representative group of chronic pain patients. The Pain Coping Scales appear to measure affective and cognitive dimensions of pain experience, and are relatively independent of pain intensity in terms of sensory dimensions. This means it is likely to be particularly sensitive to the evaluation of psychological aspects of chronic pain. It broadly provides a measure of attitude to chronic pain and, to the extent that attitudes predict behaviour, it may be predictive of important pain-related behaviour. It is a reliable instrument (see Chapter 6), and there is some evidence to support concurrent and construct validity in terms of other measures of pain experience, theoretical considerations and

clinical criteria (see Chapter 7). These properties suggest that the Pain Coping Questionnaire may represent an important additional outcome measure in the evaluation of treatment teachniques for chronic pain.

Two empirical studies investigating the use of the Pain Coping Questionnaire as a measure of change are described. The first study is a repeated measure design comparing scores obtained by 22 consecutive patients who attended the Pain Management Programme on the Pain Coping Questionnaire before and after treatment. The second study is a controlled outcome study using the Pain Coping Questionnaire, and standardised measures of mood, pain-intensity and activity ratings as outcome variables.

8.2 OUTCOME STUDY 1. INVESTIGATION OF THE USE OF THE PAIN COPING QUESTIONNAIRE AS A MEASURE OF CHANGE IN AN UNCONTROLLED SINGLE GROUP OUTCOME STUDY OF A MULTI-MODAL PAIN MANAGEMENT PROGRAMME

8.2a Introduction

The purpose of this study was to investigate whether the Pain Management Programme, Walton Hospital, Liverpool produced any changes in psychological aspects of coping with chronic pain as measured by the Pain Coping Questionnaire.

The Pain Coping Questionnaire is a standardised measure. This enabled examination of pre and post-treatment test scores on the Pain Coping Questionnaire to be compared with the standardisation sample. This may provide important information as to what type of patients are

being selected for treatment on the Pain Management Course and may be helpful as a first step in the development of psychological variables that could predict outcome.

8.2b Methods

Subjects

Subjects were 22 consecutive chronic pain patients who attended the Pain Management Programme, Walton Hospital, Liverpool. All patients were attending Walton Hospital Pain Relief Clinic for treatment of chronic pain. They were selected for treatment on the Pain Management Programme according to the following criteria:-

1. Had chronic pain.
2. No improvement with conventional medical approaches.
3. No likelihood of further benefit from physical methods in the opinion of the Consultant in Pain Relief.
4. According to the Consultant in Pain Relief's judgement, likely to benefit from Pain Management Programme.
5. Patients were willing to attend.

Patients were excluded for the following reasons:-

1. Pain caused by malignant disease.
2. Organic brain disease.

3. Severe psychiatric disturbance.

4. Over 70 years old.

5. Unable to participate fully in the course for physical reasons.

There were five males and seventeen females. Average age was 44.2 years (SD = 9.7 years). Average duration of pain was 7.3 years (SD = 5.7 years).

No subjects had participated in the standardisation study or had been exposed to the Pain Coping Questionnaire in any other context prior to entering the study.

Measures

The Pain Coping Questionnaire consists of five scales; General Coping Measure, Active Coping Strategies, Avoidance, Use of Drugs and Pain Communication Scales, and these were used as the outcome measures. Subjects also completed a brief questionnaire detailing demographic and pain characteristics and history. See appendix D2.

Procedures

Patients who were selected for treatment on the Pain Management Programme attended the Outpatient Clinic once a week before commencing the course. A preliminary interview was conducted when details of the course were explained and any questions answered. Psychological and clinical background information was obtained. Patients were asked to complete the Pain Coping Questionnaire and bring along the completed form on the first day of attendance the following week. All measures were completed immediately following treatment. At the end of the

course, patients attended for an extra day for introduction to the self-help follow-up programme, and it was during this time that the Pain Coping Questionnaire was completed. In five cases this was inappropriate due to the distance patients had to travel and follow-up was returned by post between one to three weeks following completion of the course.

All treatment was conducted in a group format. Details of the treatment are given in Chapter 3.

8.2c Results

Frequency of responses on marital status, employment, location of pain, onset of pain, frequency of pain and pattern of pain change over time, are shown in Tables 8.1 - 8.6.

In order to determine whether there were significant changes in scores on the Pain Coping Scales before and after treatment, paired - comparison t tests were performed for each on the scales. The results of this analyses are shown in Table 8.7. The results revealed highly significant differences on the General Coping Measure, Active Coping Strategies, Avoidance and Use of Drugs Scales ($p < 0.001$ between pre and post-treatment scores). There were no significant changes in the scores on the Pain Communication Scale before and after treatment.

In order to compare changes in scores between Pain Coping Scales more clearly and to compare these scores with the standardisation sample, the raw scores were converted into standard scores based upon a mean of 100 and a standard deviation of 115. See Appendix J. for details

TABLE 8.1 Frequencies of responses of marital status.

	FREQ.	%
MARRIED	14	63
RE-MARRIED	1	4
SINGLE	5	22
SEPARATED	1	4
DIVORCED	1	4
TOTAL	22	

TABLE 8.2 Frequencies of employment status.

	FREQ.	%
EMPLOYED FULL TIME	4	18
EMPLOYED PART TIME	4	18
RETIRED	3	13
HOMEMAKER	2	9
UNEMPLOYED DUE TO PAIN	6	27
UNEMPLOYED FOR OTHER REASONS	3	13
TOTAL	22	

TABLE 8.3 Frequencies of location of pain.

	FREQ.	PERCENT
BACK	5	23
HEAD	1	4
MORE THAN ONE AREA	15	68
MISSING	1	
TOTAL	22	

TABLE 8.4 Frequencies of circumstances of onset of pain.

	FREQ.	PERCENT
ACCIDENT AT HOME	3	14
ACCIDENT AT WORK	7	32
ROAD ACCIDENT	2	9
FOLLOWING ILLNESS		
FOLLOWING SURGERY	1	4
PAIN "JUST BEGAN"	6	27
OTHER INJURY	3	13
TOTAL	22	

TABLE 8.5 Frequencies of reported pain.

	FREQ.	PERCENT
CONTINUOUSLY	16	73
SEVERAL TIMES A DAY	6	27
TOTAL	22	

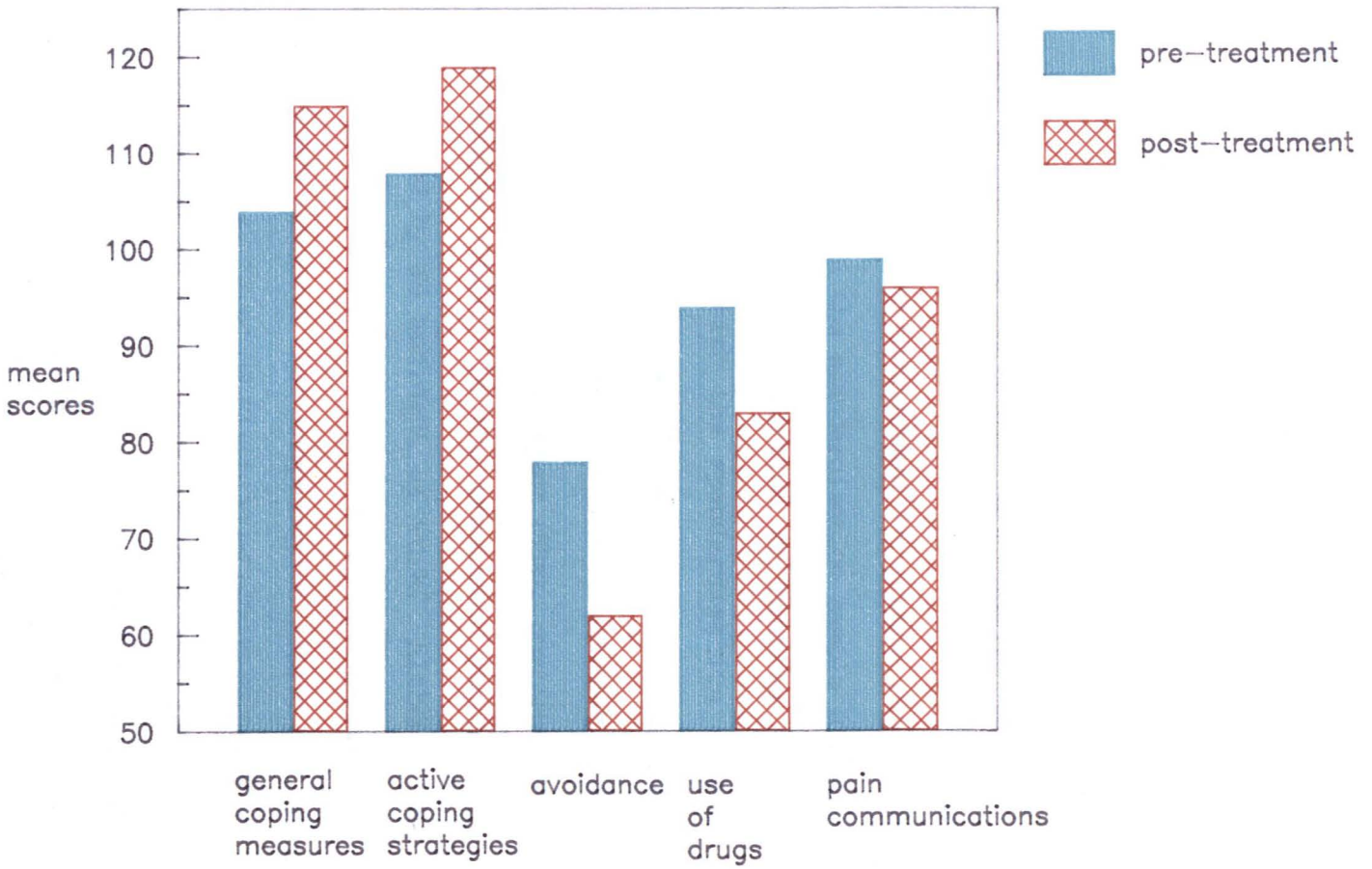
TABLE 8.6 Pattern of pain change over time.

	FREQ.	PERCENT
INCREASED	11	50
DECREASED	5	23
STAYED THE SAME	6	27
TOTAL	22	

TABLE 8.7 Measures for pain coping scales before and after treatment on Pain Management Course for 22 chronic pain patients.

VARIABLE		MEAN	S.D	t	D.F	2-TAIL PROB.
GENERAL COPING MEASURE	PRE-TREAT	61.5	13.5	4.16	21	< .001
	POST-TREAT	71.7	15.8			
ACTIVE COPING STRATEGIES	PRE-TREAT	39.3	5.5	4.48	21	< .001
	POST-TREAT	44.5	5.9			
AVOIDANCE	PRE-TREAT	9.7	2.4	4.58	21	< .001
	POST-TREAT	6.5	3.5			
USE OF DRUGS	PRE-TREAT	10.9	3.4	5.4	21	< .0001
	POST-TREAT	8.2	2.5			
PAIN COMMUN-ICATION	PRE-TREAT	12.5	2.3	1.19	21	0.249
	POST-TREAT	11.8	2.3			

Fig.8.1 Mean standard scores on Pain Coping Questionnaire before and after treatment on Pain Management Course. Standard scores based upon mean of 100 and standard deviation of 15.



of conversion of raw scores into standard scores. Fig. 8.1 shows mean standard scores on Pain Coping Scales before and after treatment.

Table 8.8 shows mean scale scores for the Pain Coping Scales for the group selected for for the Pain Management Programme (pre-treatment scores), a group of low back pain patients and a group of pain patients suffering from post-herpetic neuralgia.

8.2d Discussion

Examination of demographic and pain characteristics of the 22 patients selected for treatment in the Pain Management Programme reveals a similar pattern to that found in the standardisation sample (Chapter 4). There was a slightly higher proportion of females in the treatment group (77%), compared with the standardisation sample (66%).There was an interesting difference in terms of onset of pain. A much higher proportion of the patients in the treatment group reported pain-onset due to some kind of accident (55%), compared with the standardisation sample (28%). In the treatment group, 32% reported pain onset caused by an accident at work. Although no information as to whether patients were involved in litigation was available, this high figure suggests that compensation issues may be important. There was a similar level of disability reflected by the proportion of patients unemployed due to pain. Twenty-seven per cent of the treatment group were unemployed due to pain, compared with 22% in the standardisation sample. As with the standardisation sample, most patients reported pain in a fairly widespread location, with back pain being the single commonest reported site of pain. Seventy-three per cent of the treatment group reported continuous pain compared with

77% of the standardisation sample. With respect to pattern of pain change over time, both 50% of the treatment group and the standardisation sample reported pain having increased since onset. Demographic and pain characteristics of the treatment group were similar to those found in the standardisation sample, on the measures taken. Sex distribution, age and duration of pain were similar.

Comparison of pre and post-test scores on the Pain Coping Scales show highly significant changes. Scores on the General Coping Measure increased following treatment. This suggests that treatment resulted in improvement in general ability to cope with pain, reduced affective disturbance and improvement in psychological well-being. Scores on Active Coping Strategies scale also increased significantly following treatment. This suggests that treatment resulted in increased beliefs in the use of active strategies to cope with pain and enhanced sense of control over pain. Scores on the Avoidance and Use of Drugs Scales significantly decreased following treatment. This suggests that treatment resulted in general weakening of belief that rest, avoidance and medication are helpful strategies in coping with chronic pain. There were no changes on Pain Communication scale before and after treatment.

Overall, the results suggest that the Pain Management Programme resulted in significant changes on affective and cognitive aspects of pain experience, and that these changes occurred in a positive direction. There was no control group against which to compare the results obtained, and this limits the interpretation on the findings. By virtue of referral to the Pain Clinic and their subsequent selection for the Pain Management Programme, all patients had long

histories of pain, had not been helped by many different treatments and were generally considered to be a difficult and recalcitrant group to treat. The fact that such large changes occurred in this group provides some evidence of the effectiveness of the treatment.

The group of patients selected for treatment on the Pain Management Programme were similar to the standardisation sample in terms of the usual criteria used to match groups such as pain history, duration, location, sex distribution and age. The fact that the Pain Coping Questionnaire is a standardised instrument with established norms allows a comparison to be made between the group selected for treatment and the standardisation sample in terms of psychological characteristics measured by the Pain Coping Questionnaire. In the standardisation study (Chapter 5), it was found that patients who had attended the Pain Management Programme showed significantly higher scores on the Pain Coping Questionnaire when compared with patients who had not attended the Pain Management Programme. It was suggested that the reasons for this may have been due to selection effects, treatment effects or a combination of both. If the differences were entirely due to treatment effects, then one would expect pre-treatment standard scores for a group of patients selected for the Pain Management Programme to be fairly close to the mean. If, on the other hand, the differences were due entirely to selection effects, one would expect pre-treatment scores for such a group to differ from the mean in the direction shown in the standardisation study. i.e. in a positive direction.

Table 8.8 shows mean standard scores for the group selected for treatment (pre-treatment scores), a group of chronic low back pain

TABLE 8.8 Mean Standard scores on pain coping scales for chronic low back pain, post herpetic neuralgia and pre-treatment sample. Scores are based upon mean of 100 and standard deviation of 15.

VARIABLE	CHRONIC LOW BACK PAIN N=20	POST HERPETIC NEURALGIA N=25	PRE-TREATMENT SAMPLE N=25
GENERAL COPING MEASURE	100	110	104
ACTIVE COPING STRATEGIES	95	97	108
AVOIDANCE	97	93	78
USE OF DRUGS	95	95	94
PAIN COMMUNICATION	97	105	99

sufferers and a group of patients suffering with post-herpetic neuralgia. These latter groups represent predominantly functional and "organic" pain syndromes, respectively. All scores are based upon a mean of 100 and a standard deviation of 15.

Inspection of pre-treatment standard scores for groups selected for the Pain Management Programme reveals that not all scale scores are close to average. Although the General Coping Measure, Use of Drugs and Pain Communication Scales are fairly close to the mean, Active Coping strategies and Avoidance Scales are not. Active Coping Strategies Scale is higher than average and Avoidance Scale is considerably lower than average, being over one standard deviation below the mean. These findings at least raise the question that patients selected for treatment on the Pain Management Programme are not representative of a large sample of chronic pain patients in general, at least in terms of belief in the use of positive and negative pain-coping strategies. It appears that for the present sample, patients are being selected for treatment who hold relatively strong beliefs in the use of positive strategies and relatively weak beliefs in the use of negative strategies compared to the standardisation sample.

There are several possible reasons for this. One obvious explanation is that cancer patients with severe physical problems were included in the standardisation sample, and that medical reasons may account for the differences in profiles. It is possible that patients suffering from cancer or other serious physical diseases, develop stronger beliefs in the use of negative strategies and weaker beliefs in the use of positive strategies. As patients with cancer are excluded from

the Pain Management Programme, then one might expect those patients who are included to show relatively higher scores on scales measuring positive strategies and lower scores on scales measuring negative strategies. Whilst this is a possible explanation, there are indications that other factors are involved.

Inspection of the standard scores in Table 8.8 shows a comparison with two common pain syndromes. Neither of these groups have cancer, and yet - unlike the groups selected for treatment on the Pain Management Programme - they still have profiles fairly close to the mean. The chronic low back pain patients would typically be considered to be suitable patients for treatment on the Pain Management Programme, given the expected degree of psychological overlay. The fact that beliefs in coping strategies are quite different in the group of patients actually selected for treatment, suggests that the differences are not solely due to physical conditions or diagnosis, and raise the possibility that selection effects are important.

In some respects, it is possible that only patients who already have beliefs in the use of positive strategies are likely to accept treatment on the Pain Management Programme. The treatment is demanding in time and commitment. Some patients may simply not believe it could help and refuse to accept treatment. This may bias the group who are selected for treatment in favour of stronger beliefs in the use of positive strategies.

Treatment is not compulsory and patients are selected for treatment after the Pain Management Programme has been explained in detail by the Consultant in Pain Relief. Patients completed the Pain Coping

Questionnaire after this explanation and before attending the course. It is possible that this interview subsequently influenced beliefs in the use of certain strategies. The fact that, possibly for the first time, a doctor has suggested that the patient should take a more active and responsible role in managing pain may have influenced these beliefs. It has already been demonstrated that both Active Coping Strategies and Avoidance Scales are related to beliefs in attributions of control to "powerful others", a scale from the Multi-dimensional Health Locus of Control Scale (Wallston & Wallston, 1978). (See Chapter 7). This means that patients who have strong beliefs in the control of "Powerful Others" are likely to be readily influenced by the advice of doctors whether the advice is to "rest and take the medication" or to "keep active and stop taking medication". One would expect that, in at least a proportion of patients in the present group, the advice given on the preliminary interview, might have changed certain beliefs. It may be relevant that although scores on the Active Coping Strategies and Avoidance Scales were in the positive direction, scores on the General Coping Measure were close to the mean, and this probably reflects a low level of psychological adjustment. It is possible that the belief in positive strategies were recently acquired and had not been established long enough to effect change in behaviour and subsequent improvement in psychological adjustment.

The process whereby patients were selected for treatment included the Consultant in Pain Relief's judgement that patients would be helped by the Pain Management Programme. "Judgement",in this context, referred to clinical judgement and was not a standardised procedure. It is possible that this aspect of the selection process was biased in

favour of selecting patients who showed certain beliefs in the use of positive strategies. It is feasible that the Pain Coping Questionnaire has picked up and measured psychological dimensions that have hitherto been in the rather vague and undefined domain of "clinical judgement". One might speculate that in this context, clinical judgement that patients would benefit from attendance on Pain Management Programmes, may simply mean that patients have high scores on Active Coping Strategies, low scores on Avoidance, with average scores on General Coping Measures compared with the standardisation sample.

It is, of course, possible that some combination of these explanations may apply or that none are relevant and that the pre-test psychological profiles obtained represent a chance finding. Further studies of the Pain Coping Questionnaire in patients selected for the Pain Management Programme would be interesting to examine if a similar pattern emerges.

The present study represents the first step in evaluating the Pain Coping Questionnaire as a measure of change. Whether the patients were "prepared" or "not" for the treatment, highly significant changes in the dimensions studied were found. Results show that four of the five scales from the Pain Coping Questionnaire were sensitive to change. These were General Coping Measures, Active Coping Strategies, Avoidance and Use of Drugs Scale. No significant changes were found on the Pain Communication Scale, and this study provides yet further evidence that this scale is probably not measuring any meaningful psychological dimension. Although the findings are suggestive of the effectiveness of the Pain Management Programme in producing changes in

affective and cognitive dimensions of chronic pain, only limited conclusions can be drawn with respect to treatment evaluation. It is not clear what components of treatment or, indeed, in the absence of a control group, whether any aspects of the Pain Management Programme were important in producing change. Controlled outcome studies, with additional outcome measures, including objective indices of behaviour, pain intensity and affect, are required to further evaluate the Pain Management Programme.

8.3 OUTCOME STUDY 2. INVESTIGATION OF THE USE OF THE PAIN COPING QUESTIONNAIRE AS A MEASURE OF CHANGE IN A CONTROLLED OUTCOME STUDY OF A MULTI-MODAL PAIN MANAGEMENT PROGRAMME WITH WAITING LIST CONTROL GROUP

8.3a Introduction

The purpose of this study was to investigate how the Pain Coping Questionnaire functions as a measure of change in relation to other outcome variables in a controlled outcome study of the Pain Management Programme,Walton Hospital. It represents a replication and further development of Outcome Study 1 (see paragraph 8.2).

Selection of outcome variables was constrained for practical reasons by the need to use instruments that were appropriate for postal administration. This meant a reliance on self-report measures. A compromise had to be struck between the development of an acceptable and manageable battery of self-report measures that reliably assessed important variables without losing relevant information. In addition to the Pain Coping Questionnaire, measures were sought to assess pain intensity, psychological adjustment, pain behaviour and activity

levels.

There are general problems in finding suitable control groups for this type of study, and these are mainly associated with assumptions about the comparability of groups. Aronoff (1982) states:-

> "The possibility of finding patients who are acceptable for treatment and probably would successfully participate in in a Pain Unit Programme but do not, seems almost impossible".

A waiting list group was used as the control group against which to compare the effects of treatment on outcome variables. Selection criteria for attendance on Pain Management Programmes was fairly broad, and not confined to patients suspected of having a large psychological component to their pain. This meant that it was fairly easy to find an equivalent group, at least in terms of age, duration of pain, pain history, pattern and intensity. Whether such a group is equivalent in psychological dimensions is less clear. The Pain Coping Questionnaire, in standard form, provides a way of examining equivalents in cognitive and affective dimensons of pain experience between the groups.

8.3b Methods

Subjects

Subjects were 52 patients suffering with chronic pain. Twenty-two patients were selected for the treatment group. Thirty patients were

selected for the waiting list control group. Criteria for selection for treatment group is outlined in paragraph 8.2(a).

The waiting list control group comprised of new referrals of chronic pain patients to the Walton Hospital Pain Clinic, who could not be offered appointments during the course of the study. Clinical details of the patients on the waiting list were inspected, and any patients who had any exclusion criteria (see paragraph 8.2b) for attendance on the Pain Management Programme, were not included in the control group. No subjects had participated in a standardisation study of the Pain Coping Questionnaire, or had been exposed to the Pain Coping Questionnaire in any other context.

Measures

See appendix H for details of the following outcome measures used.

1. Demographic characteristics; age, sex, marital status, employment status.

2. Pain history, duration, onset, location of pain.

3. The Pain Coping Questionnaire. See Appendix D2.

4. Pain intensity was assessed by the McGill Pain Questionnaire, (Melzack, 1975). The pain rating index for sensory, affective, evaluative and total categories, and the number of words chosen, were used to provide an assessment of pain intensity.

5. Psychological adjustment and mood were assessed by the Leeds Scale for self-assesment of axiety and depression (Snaith, Bridge and Hamilton, 1976). This is a valid and reliable self-report measure that yields separate scores for depression and anxiety. Scores above six to seven on both scales are considered to be cut-off points for clinical conditions.

6. Activity was assessed by a self-report activity rating scale (Grimshaw, 1986). This provides a measure of the difficulties patients experience in performing everyday activities and a measure of the frequency that such activities are performed. Subjects are required to rate sixteen different behaviours, representative of activities of daily living, on a five-point scale indicating the degree of difficulty patients experience when performing the behaviours. The sum of the ratings provides an overall measure of the difficulties in performing everyday activities. Subjects are also required to rate the frequency that the behaviours have been performed over the previous week (and, in some behaviours, over the previous month). The frequencies are summed, and this gives an estimation of recent activity levels.

7. Present pain intensity was assessed by asking subjects to rate present pain on a 0-100 scale, with verbal anchors; "no pain", "very mild pain", "fairly mild pain", "fairly severe pain", "very severe pain", "worst imaginable pain".

Procedures

All patients in the treatment group were interviewed one week before

the Pain Management Programme commenced. Clinical and psychological information relevant for the treatment was obtained, and any issues that were unclear to the patient were clarified. Patients were given a bundle of questionnaires to complete at home, and asked to return the completed questionnaires when they attended the course. All measures were completed following treatment. Patients were given the same bundle of questionnaires on their last day of attendance and asked to complete the questionnaires one week after finishing the course and return the questionnaires by post. Patients in the waiting list control group were contacted by post. The purpose of the study was explained and they were asked to participate by completing the enclosed questionnaires. They were contacted by post following a four-week waiting list period and asked to complete the questionnaires for a second time.

Treatment was conducted in a group format. Details of the treatment are discussed in Chapter 3.

8.3c Results

Of the 22 patients selected for treatment, five dropped out and seven failed to return the follow-up questionnaires. Of the waiting list control group, 26 of the 30 patients who completed the initial questionnaire returned the follow up questionnaire. Complete data were obtained for 10 patients in the treatment group and 26 patients in the control group.

There were seven females and three males in the treatment group and 16 females and 10 males in the control group. Mean age for the treatment

TABLE 8.9 Marital status for treatment and control groups.

	TREATMENT	CONTROL
MARRIED	4	14
RE-MARRIED		6
SINGLE	2	2
DIVORCED	2	3
SEPARATED	2	1

Chi-square = 7.03 D.F = 5 p = 0.21 (NS)

TABLE 8.10 Employment status for treatment and control groups.

	TREATMENT	CONTROL
EMPLOYED FULL TIME	1	1
EMPLOYED PART TIME		1
HOMEMAKER		6
RETIRED	3	3
UNEMPLOYED DUE TO PAIN	4	14
UNEMPLOYED DUE TO OTHER REASONS	2	1

Chi-square = 9.3 D.F = 5 p = 0.09 (NS)

TABLE 8.11 Circumstances of onset of pain for treatment and control groups.

	TREATMENT	CONTROL
ACCIDENT AT HOME		3
ACCIDENT AT WORK		7
ROAD ACCICENT	1	
FOLLOWING ILLNESS		
FOLLOWING SURGERY	2	4
PAIN "JUST BEGAN"	4	10
OTHER INJURY	3	2

Chi-square = 9.1 D.F = 5 p = 0.10 (NS)

TABLE 8.12 Location of pain for treatment and control groups.

	TREATMENT	CONTROL
BACK	5	20
HEAD	1	2
FACE	1	1
NECK	1	
LEGS	1	3
ABDOMEN	1	

Chi-square = 10.15 D.F = 8 p = 0.25 (NS)

group was 49.7 years and mean age for the control group was 48.3 years. Mean duration of pain in the treatment group was 13.2 year and duration of pain for the control group was 11.4 years. There were no differences in sex distribution (chi-square = .53; p = .767) age (F = 0.22; p = .86) and duration of pain (F = 0.098; p = .9) between the two groups.

Marital status, employment, onset of pain, location of pain for treatment and control groups are shown in Tables 8.9 - 8.12. There were no differences between the two groups in terms of frequencies of responses on these variables.

Mean scores and standard deviations obtained by the treatment and control groups before and after treatment for the Pain Coping Questionnaire, Leeds Depression and Anxiety Scales, Anxiety self-report and McGill Pain Questionnaire are shown in Tables 8.13 - 8.16.

The data were analysed using repeated measure univariate analysis of variance. Three effects were examined. Between subjects source of variation was the effect due to the grouping factor ("Groups")and examines any overall differences between the treatment and control groups. Two effects due to within subjects source of variation were examined. Occasion tested ("occasion") examines any differences between pre and post-test scores. The group by occasion interaction ("Groups by occasion") examines the interaction between the grouping effect and differences between pre and post-test scores. This effect examines whether any changes in scores between the two occasions is consistently related to membership of treatment or control groups. Results of these analyses for the Pain Coping Questionnaire, Leeds

TABLE 8.13 Means and standard deviation for pain coping scales for treatment and control groups before and after treatment.

MEASURE		PRE-TREATMENT		POST-TREATMENT	
		MEAN	S.D	MEAN	S.D
GENERAL COPING MEASURE	TREAT.	55.8	13.5	65.6	14.0
	CONTROL	51.5	15.4	51.5	15.5
ACTIVE COPING STRATAGIES	TREAT.	39.4	7.6	40.1	10.2
	CONTROL	34.2	6.7	33.7	6.6
AVOIDANCE	TREAT.	14.5	2.7	11.4	2.7
	CONTROL	15.3	3.4	15.6	2.6
USE OF DRUGS	TREAT.	10.5	3.9	8.4	2.8
	CONTROL	14.2	3.6	13.9	3.4
PAIN COMMUN-ICATION	TREAT.	12.4	2.9	11.0	3.1
	CONTROL	13.5	2.8	12.8	3.0

TABLE 8.14 Means and standard deviations for scores on "Leeds" depression and anxiety scales for treatment and control groups before and after treatment.

MEASURE		PRE-TREATMENT		POST-TREATMENT	
		MEAN	S.D	MEAN	S.D
DEPRESSION	TREAT.	9.9	4.8	7.3	3.9
	CONTROL	10.6	3.6	11.2	3.3
ANXIETY	TREAT.	7.3	5.2	5.5	3.7
	CONTROL	8.3	4.4	8.4	4.2

TABLE 8.15 Means and standard deviations for scores on "Activity difficulty" and "Activity frequency" self-report questionnaires for treatment and control groups before and after treatment.

MEASURE		PRE-TREATMENT		POST-TREATMENT	
		MEAN	S.D	MEAN	S.D
ACTIVITY DIFFICULTY	TREAT.	61.6	19.8	54.4	21.4
	CONTROL	68.8	25.2	71.5	23.2
ACTIVITY FREQUENCY	TREAT.	48.4	30.6	46.2	24.2
	CONTROL	54.8	43.8	40.5	26.6

TABLE 8.16 Means and standard deviations for scores on McGill Pain Questionnaire for treatment and control groups before and after treatment. Scales used were numbers of words chosen (NWC), pain rating index-sensory (PRI-S), pain rating index-affective (PRI-A), pain rating index-evaluative (PRI-E), pain rating index-total (PRI-T) and present pain intensity (PPI).

		PRE-TREATMENT		POST-TREATMENT	
		MEAN	S.D	MEAN	S.D
NWC	TREAT.	7.7	6.2	9.6	4.9
	CONTROL	9.5	5.3	10.1	5.2
PRI-S	TREAT.	10.7	9.5	11.5	7.9
	CONTROL	13.5	7.9	14.5	7.3
PRI-A	TREAT.	2.6	2.3	2.9	2.3
	CONTROL	2.8	2.9	3.0	2.8
PRI-E	TREAT.	1.7	1.6	2.2	1.5
	CONTROL	2.6	1.9	3.4	1.4
PRI-T	TREAT.	17.9	13.6	20.3	10.7
	CONTROL	23.3	12.9	25.4	12.7
PPI	TREAT.	17.9	13.6	20.3	10.7
	CONTROL	23.3	12.9	25.4	12.7

Depression and Anxiety Scales, Self-report Activity Measure and McGill Pain Questionnaire are shown in Tables 8.17 - 8.20.

On the General Coping Measure from the Pain Coping Questionnaire, there was no significant overall group effect. There was a significant effect in terms of source of variation due to occasion tested ($F = 8.87$ with 1,25 df; $p < .01$) and a significant interaction between group and occasion tested ($F = 9.04$ with 1, 25 df; $p < .01$). This means that there was a significant difference between pre and post-test scores on the General Coping Measure Scale and that this difference was related significantly to the grouping factor, i.e. membership of treatment or control group.

There was a significant overall group effect on the Avoidance Scale ($F = 6.15$ with 1, 34 df; $p < .05$). There was also a significant effect of occasion tested ($F = 11.02$ with 1, 34 df; $p < .005$) and a significant interaction between occasion tested and grouping factor ($F = 14.84$ with 1, 34 df; $p < .001$). This shows that pre- and post-treatment scores on the avoidance scale were significantly different and that this difference was related to the grouping factor.

On the Use of Drugs Scale there was a significant group effect ($F = 6.15$ with 1, 34 df; $p < .05$), a significant effect due to occasion tested ($F = 11.02$ with 1, 34 df; $p < .005$) and a significant interaction between occasion tested and grouping factor ($F = 6.6$ with 1, 34 df; $p < .05$).

There were no significant effects on the Active Coping Strategy Scale, although the group effect approached significance ($F = 3.74$ with 1, 28

TABLE 8.17 Repeated measure univariate analysis of variance for Pain Coping Questionnaire.

MEASURE	SOURCE OF VARIATION	SUM OF SQUARES	D.F	F	SIG. OF F
GENERAL COPING MEASURE	GROUPS	790.1	1,25	1.82	.189
	OCCASION	223.4	1,25	8.87	.006
	GPS X OCCASION	227.8	1,25	9.04	.006
ACTIVE COPING STRATEGIES	GROUPS	362.0	1,28	3.74	.063
	OCCASION	0.15	1,28	0.02	.900
	GPS X OCCASION	3.82	1,28	0.41	.526
AVOIDANCE	GROUPS	93.9	1,34	6.15	.018
	OCCASION	29.7	1,34	11.02	.002
	GPS X OCCASION	40.1	1,34	14.84	.000
USE OF DRUGS	GROUPS	272.5	1,31	11.74	.002
	OCCASION	18.9	1,31	11.50	.002
	GPS X OCCASION	10.9	1,31	6.60	.015
PAIN COMMUN-ICATION	GROUPS	31.3	1,33	2.02	.165
	OCCASION	16.6	1,33	9.24	.005
	GPS X OCCASION	1.4	1,33	0.81	.374

TABLE 8.18 Repeated measure univariate analysis of variance for Leeds Depression and Anxiety scales.

MEASURE	SOURCE OF VARIATION	SUM OF SQUARES	D.F	F	SIG. OF F
LEEDS DEPRESSION	GROUPS	77.95	1,34	2.78	.105
	OCCASION	14.22	1,34	5.67	.023
	GPS x OCCASION	37.33	1,34	14.89	.000
LEEDS ANXIETY	GROUPS	56.8	1,34	1.70	.201
	OCCASION	10.72	1,34	2.33	.136
	GPS x OCCASION	12.72	1,34	2.76	.106

TABLE 8.19 Repeated measure univariate analysis of variance for self report activity measures.

MEASURE	SOURCE OF VARIATION	SUM OF SQUARES	D.F	F	SIG. OF F
ACTIVITY DIFFICULTY	GROUPS	1639.5	1,34	1.73	.197
	OCCASION	8.2	1,34	.06	.810
	GPS x OCCASION	171.5	1,34	1.22	.277
ACTIVITY FREQUENCY	GROUPS	1.5	1,26	.00	.977
	OCCASION	845.8	1,26	1.67	.208
	GPS x OCCASION	454.4	1,26	.90	.353

TABLE 8.20 Reapeated measures univariate analysis of variance for McGill Pain Questionnaire. Scales used were pain rating index-sensory (PRI-S), pain rating index-affective (PRI-A), pain rating index-evaluative (PRI-E), pain rating index-total (PRI-T), number of words chosen (NWC) and present pain intensity (PPI).

MEASURE	SOURCE OF VARIATION	SUM OF SQUARES	D.F	F	SIG. OF F
NWC	GROUPS	18.1	1,34	.42	.520
	OCCASION	22.85	1,34	1.54	.223
	GPS x OCCASION	5.96	1,34	.40	.531
PRI-S	GROUPS	123.1	1,34	1.37	.249
	OCCASION	12.2	1,34	.33	.571
	GPS x OCCASION	0.2	1,34	.01	.941
PRI-A	GROUPS	0.4	1,34	.03	.862
	OCCASION	0.8	1,34	.23	.634
	GPS x OCCASION	0.1	1,34	.01	.917
PRI-E	GROUPS	15.9	1,34	4.86	.034
	OCCASION	5.8	1,34	2.46	.126
	GPS x OCCASION	0.3	1,34	0.11	.742
PRI-T	GROUPS	397.5	1,34	1.67	.206
	OCCASION	74.9	1,34	0.90	.350
	GPS x OCCASION	0.22	1,34	0.00	.959
PPI	GROUPS	1663.8	1,34	2.9	.097
	OCCASION	1.0	1,34	0.00	.960
	GPS x OCCASION	64.64	1,34	0.86	.360

df; p = .063). There were no suggestions of any trend towards significant differences between pre and post-test changes or interaction effects.

On the Pain Communication Scale there was no significant group effect. There was an effect due to occasion ($F = 9.24$ with 1,33 df; $p < .005$). There was no significant interaction between occasion tested and the grouping factor. This means that although there were significant changes betwen pre and post-test scores on the Pain Communication Scale, the changes in scores were not related to the grouping effect and therefore could not be considered to be related to treatment.

On the Leeds Depression Scale, there was no significant overall group effect. There was a significant effect due to occasion tested ($F = 5.67$ with 1, 34 df; $p < .05$) and a significant interaction between occasion tested and grouping factor ($F = 14.89$ with 1,34 df; $p<.001$). No significant effects were found on the anxiety scale.

No significant effects were found on the self-report activity measures.

On measures of pain intensity, there was a significant overall group effect of PRI-E of the McGill Pain Questionnaire ($F = 4.86$ with 1, 34. df; $p < .05$). There were no significant effects due to occasion tested or interaction between occasion and grouping factor. There were no other significant findings on other measures of pain intensity.

The equivalence of the treatment and control groups in terms of pre-

TABLE 8.21 One way analysis of variance comparison of pre-treatment experimental and control grouyps on psychological variables.

VARIABLE	SUM OF SQUARES	F RATIO	F PROB.
GENERAL COPING MEASURE	100.7	.46	.49
ACTIVE COPING STRATEGIES	271.6	5.18	.02*
AVOIDANCE	5.6	.53	.47
USE OF DRUGS	72.6	5.21	.02*
PAIN COMMUNICATION	7.5	.92	.34
LEEDS DEPRESSION	3.7	.23	.63
LEEDS ANXIETY	7.9	.36	.54
ACTIVITY DIFFICULTY	375.2	.65	.42
ACTIVITY FREQUENCY	320	.21	.65
NWC	22.4	.72	.39
PRI-S	56.6	.81	.37
PRI-A	.31	.03	.84
PRI-E	6.1	1.74	.19
PRI-T	208	1.2	.27
PPI	536	2.2	.14

$p < 0.05$*

treatment psychological variables was examined by comparing pretreatment scores for the treatment and control groups. Table 8.21 shows the results of one-way analyses of variance for all psychological variables evaluated. Significant differences were found on the Active Coping Strategies Scale ($F = 5.18$; $p < .05$) and use Use of Drugs Scale ($F = 5.21$; $p < .05$) between the treatment and control groups.

8.3d Discussion

The results show that the Pain Management Programme has a significant effect on certain scales of the Pain Coping Questionnaire compared with the waiting list control group. Scores on the General Coping Measure increased significantly following treatment. This suggests that the Pain Management Programme reduced psychological disturbance and improved patients ability to cope with pain from an emotional point of view. The significant changes found in the Leeds Depression Scale provide further evidence that the programme significantly improves psychological well- being, by reducing depression. Treatment also resulted in significant changes on scores on the Avoidance and Use of Drugs Scales. Both of these scales measure beliefs in the use of what could be considered to be negative pain coping strategies such as avoidance, rest, inactivity and medication usage. Treatment resulted in beliefs that these strategies were less helpful in coping with pain. Treatment did not have any significant effect on anxiety, activity self-report measures or any measures of pain intensity. Overall, the main effect of treatment was to improve psychological adjustment and change beliefs in the use of certain strategies for coping with pain.

The current findings are consistent with the findings from outcome study 1 (see paragraph 8.2). Unlike the findings in outcome study 1, no changes were found on the Active Coping Strategies Scale as a result of treatment. As found in outcome study 1, treatment did not have any significant effect on the Pain Communication Scale. This scale remains of questionable validity.

The overall findings are consistent with reports in the literature that pain management programmes improve depression, attitudes to illness, activity levels and decrease reliance on medication (Large, 1985; Herman and Baptiste, 1981; Khatami et al, 1979; Seres and Newman, 1976). The lack of any evidence of change in activity levels in the present study is difficult to interpret given the crude assessment device used, the questionable validity of self-report activity measures and the lack of follow-up data. Although no objective measures of activity or medication were taken, scales measuring beliefs in activity (Avoidance and Use of Drugs) did change significantly following treatment. As beliefs frequently predict behaviour, the present results can be seen as consistent with current findings. At present, it is largely a matter of faith that the Pain Coping Scales predict behaviour and, in this context, follow- up measures of the Pain Coping Scales in conjunction with objective behavioural indices are required.

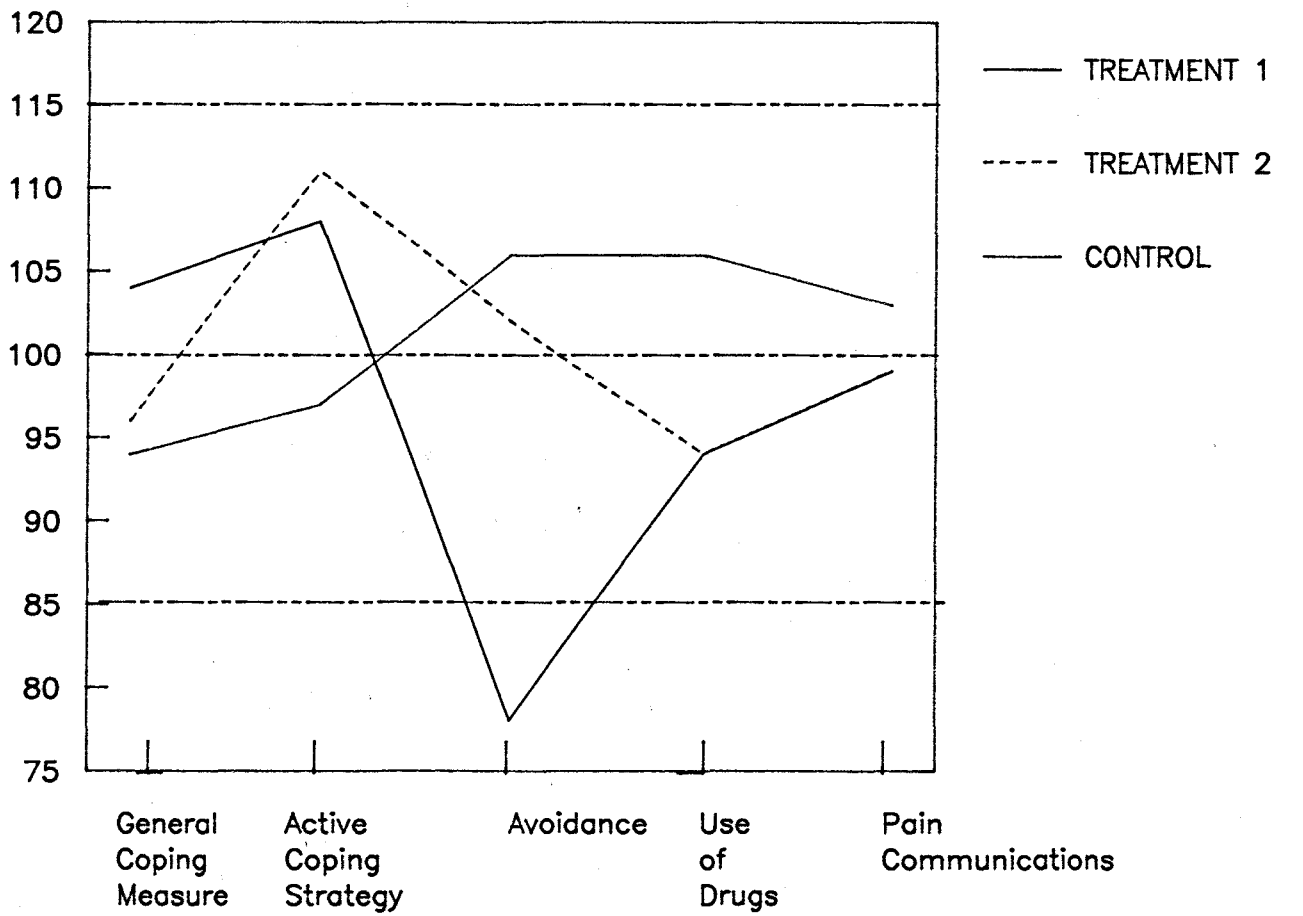
There was a large drop-out rate from treatment and a proportion of patients who did complete treatment failed to return the follow up questionnaires. Unlike outcome study 1 when patients completed the follow up questionnaires in clinic, patients were asked to return the

questionnaires by post. This would be expected to result in a slight fall off in follow-up data. Whatever the reasons for the drop-out rate and the failure of patients to return the questionnaires, the findings from the present study must be interpreted with caution. It is possible that patients who dropped out or did not return the questionnaire were not helped by the Pain Management Programme and, as a result, they did not feel inclined to participate further in the study. Excluding these patients from the analysis may bias the results in a positive direction and imply the Pain Management Programme is more effective than it actually is. This weakens any conclusions drawn with respect to the efficacy of the Pain Management Programme on the basis of the results presented.

The treatment and control groups were equivalent in terms of age, duration of pain intensity and mood-ratings, using standard measures. There were some differences in terms of scores on the Active Coping Strategy Scale and Use of Drugs Scale of the Pain Coping Questionnaire. Patients selected for treatment had significantly higher scores on the Active Coping Strategy Scale compared with the control group. This means they have stronger beliefs in the use of positive strategies to cope with pain, such as exercise, relaxation or distraction. Patients in the control group have stronger beliefs in the helpfulness of drugs to control pain. This is, perhaps, not surprising given that patients in chronic pain awaiting treatment are likely to rely on drugs to help in the absence of any other advice or treatment.

The pre-treatment differences in beliefs between the treatment and control groups, despite their equivalence in terms of depression,

Fig.8.2 Mean standard scores for pain coping scales for two groups selected for treatment and a waiting list control group.



anxiety, pain history and pain intensity, may have important implications in terms of response to treatment. It was not possible for clinical and practical reasons in the present study to randomise subjects to treatment or control groups. The findings on the Pain Coping Scales highlight the need for randomisation even when the groups appear equivalent in terms of commonly accepted criteria.

In outcome study 1, it was noted that pre-test Pain Coping Scale standard scores for the patients selected for treatment on the Pain Management Course were different from the mean. Patients selected for treatment showed relatively stronger beliefs in the use of positive coping strategies when compared with the standardisation sample. Figure 8.2 shows pre-test Pain Coping Scale standard score profiles for the groups selected for treatment on Pain Management Programme from outcome study 1 and outcome study 2, compared with scores from the waiting list control group. The two groups selected for treatment have similar profiles, in that both have elevated scores on Active Coping Strategies scale. The similarities between the two profiles suggest that the findings are not simply due to random effects. It appears that a certain level of belief in the use of positive pain coping strategies is associated with selection for treatment on the Pain Management Programme.

8.4 CONCLUSIONS

The aim of the outcome studies was primarily to investigate whether the Pain Coping Questionnaire was sensitive to change and therefore suitable for use as an outcome measure. Evaluation of efficacy of the Pain Management Programme was not a central objective given that the

main outcome measure was in the development stage. It was for this reason that extensive follow-up data was not obtained. Although the results strongly suggest that the treatment had positive effects, the lack of follow-up data limits any conclusions with respect to long term effectiveness of the Pain Management Programme.

The results from two empirical studies investigating the use of the Pain Coping Questionnaire as an outcome measure demonstrated that with the exception of Pain Communication, the Pain Coping Scales are measuring important psychological dimensions that are sensitive to change. Significant changes in dimensions measured by General Coping Measure, Active Coping Strategies, Avoidance and Use of Drugs scales in the directions predicted were found. Treatment appeared to result in improved psychological adjustment and more adaptive use of pain coping strategies. These findings suggest that the Pain Coping Questionnaire is likely to be a useful additional outcome measure in the evaluation of psychological treatment for chronic pain.

CHAPTER 9

CONCLUSIONS

9.1 MAIN FINDINGS

The Pain Coping Questionnaire is a standardised instrument that was designed to measure how people in chronic pain cope with their problems. It was developed directly from studying the responses of 298 chronic pain patients who were attending a large British Pain Clinic. Developmental studies of the questionnaire have revealed it is a reliable and valid instrument with sound psychometric properties. It has provided information on the structure of coping with chronic pain as well as having practical applications in the assessment and planning of treatment. To the authors knowledge no similar instrument has been previously developed. The Pain Coping Questionnaire represents an original contribution that is likely to have broad applications in the psychological assessment and treatment of chronic pain.

With respect to the structure of coping with pain, four psychologically meaningful scales have been constructed based upon principal component factor analysis of responses from the original 65 item questionnaire. A clear separation emerged between a factor measuring the emotional consequences of pain (General Coping Measure scale) and behaviour and cognitive strategies that were adopted to cope with pain (Active Coping Strategies, Avoidance and Use of Drugs scales). This basic structure of the questionnaire corresponds to accepted notions of what "coping" refers to. Cohen and Lazarus (1979)

define coping as:-

> "Efforts, both action-orientated and intrapsychic, to manage environmental stresses and/or to regulate the emotions caused by the stress".

There are two aspects to coping, the actions that are performed, and how effective those actions are in regulating emotion. The Pain Coping Questionnaire measures both the types of strategies adopted to cope with pain and how effective those strategies are in terms of regulating or controlling the emotional aspects of pain.

The General Coping Measure is a measure of emotional and psycho-social disturbance that may occur as a consequence of chronic pain. It measures how successful the coping strategies are in reducing or controlling emotional distress generated by chronic pain. To some extent, it contains items similar to those found on traditional measures of anxiety, depression and affective disturbance and this would be expected as all measures of psychological distress are likely to be related. The main advantage of the General Coping Measure over other measures commonly used is that it has been standardised and developed directly from study of a chronic pain population. This means that it is likely to be a much better instrument for describing experiences of chronic pain patients when compared with instruments that have been developed from psychiatric populations.

Inspection of the items making up the General Coping Measure reveals important indicators of the nature of the emotional disturbance experienced by chronic pain patients. The scale was developed from factor analysis. Items with the highest loadings of a factor are

considered to best describe or characterise that factor. On this basis, items relating to social withdrawal, disruption of social relationships and social isolation seem particularly to characterise this dimension. In some respects this is consistent with the operant formulation which views loss of reinforcement of well-behaviours as a large contributory factor to chronic pain syndrome. As social interaction provides the normal setting for reinforcement of well behaviours one would expect that disruption of normal social functioning which leads to isolation would reduce the opportunity for natural reinforcement of well-behaviours and contribute to emotional disturbance.

The finding that emotional disturbance and poor coping is reflected largely by disruption of social behaviour has implications for treatment. Treatment should focus on improving social functioning as well as helping patients to use behavioural or cognitive coping strategies to deal with their pain. This aspect of psychological treatment of chronic pain is not normally considered central with individually based cognitive or respondant approaches. Operant or multi-modal treatments do emphasise social behaviour and provide an appropriate setting to treat this aspect of the problem. Group based treatments are likely to have advantages in the sense that problems of chronic pain are considered within a social context. It is the authors frequent clinical observation that one of the main benefits of multimodal treatment of pain compared with individual treatment is the improvement in social functioning and decreased feelings of social isolation. The comment "I have discovered I am not the only one" frequently occurs following group treatment and this realisation appears to have beneficial results.

The great majority of operant or multi-modal treatments of chronic pain are conducted on a group basis. The improvements in social functioning that may result from these treatments are rarely directly assessed nor are they considered central in the therapeutic process. The present investigation reveals that social functioning is likely to be a very important aspect of coping with chronic pain and should consequently be a central focus in management. It is possible that the improvements reported following operant and multimodal treatments are brought about more by the non-specific effects that group based inpatient pain management programmes have upon social interaction and functioning rather than by the specific environmental manipulations which are assumed to be the major determinants of behaviour change within the operant framework. These questions could be answered by appropriately controlled outcome studies comparing operant treatments with non-specific group treatments with the main focus being to improve social functioning and decrease social isolation. Unfortunately, very few of the outcome studies have used appropriate control groups (see Chapter 1, Table 1.1).

The scales measuring coping strategies appeared to be grouped into two major divisions according to whether the strategies were active (Active Coping Strategies) or passive (Avoidance and Use of Drugs) in nature. Active strategies were associated with less psychological disturbance and better coping. Passive strategies were associated with greater psychological disturbance and poorer coping. Psychological treatment should therefore try to help patients adopt more active strategies and not use the more passive strategies.

This classification of coping strategies into whether they are active or passive broadly corresponds to other findings in the literature. Rosenstiel and Keefe (1983) described two types of coping strategies used by chronic pain patients in the development of the Coping Strategy Questionnaire. Cognitive Coping and Suppression consisted mainly of active strategies whereas Helplessness referred to strategies that were passive in nature. These types of coping strategies broadly correspond to Slade's hypothesis of a continuum of coping strategies from confrontation to avoidance that are predicted by his "fear-avoidance model of exaggerated pain perception" (Lethem et al.,1983; Slade et al.,1983). Studies of how patients cope with painful surgical procedures have also revealed similar types of coping strategies. Cohen and Lazarus (1973) described coping along an "avoidance versus vigilance" dimension and Scott and Clum (1984) described an "avoidance-sensitisation" classification of coping strategies.

Active pain coping strategies were measured by the Active Coping Strategies scale. This dimension included beliefs in the helpfulness of strategies such as relaxation, physical activity and mental distraction. Use of these strategies was also associated with increased sense of control over pain. People who found mental distraction helpful also found relaxation and exercise helpful. Interestingly, relaxation was more related to physical activity than to avoidance of activity. This clearly demonstrates that relaxation is viewed as an active strategy while rest or avoidance are seen as passive strategies. This is an interesting distinction because to the observer of behaviour, the two activities may appear to be the same. These findings emphasise that there are important cognitive

distinctions in the way that these two activities are construed by chronic pain patients. The importance difference may be the element of control. Relaxation is an activity performed by the individual in order to control or attempt to control pain or its consequences. Rest or avoidance of activity is determined by the amount of pain experienced and therefore construed to be out of the domain of personal control. It should be emphasised that these relationships and groupings of coping strategies were found in a large sample of chronic pain patients, the majority of whom had not received any form of psychological treatment or counselling. These groupings and relationships represent "natural" pain coping strategies.

The finding that coping strategies such as relaxation, physical activity and mental distraction were related and appeared to be construed within a single dimension, emphasises the importance of an integrated approach to pain management. Different coping strategies can be derived from different models of pain. The separation according to whether strategies are derived from the respondant, operant or cognitive model is probably not valid. The results show clearly that coping strategies are construed in terms of whether they are active or passive and not in terms of the particular model from which the strategies have been derived. Although strategies derived from respondant, operant and cognitive models were explicitly included in the original questionnaire, factor analysis failed to confirm this classification in terms of how the strategies are actually used by chronic pain patients.

Active Coping Strategies scale is probably similar to the Cognitive Coping and Suppression factor from the Coping Strategy Questionnaire

(Rosenstiel and Keefe,1983). Both scales measure active strategies that are used to cope with pain. Interestingly, both factors seem to be related to increased pain ratings. Active Coping Strategies was related to higher ratings of pain on certain indices of the McGill Pain Questionnaire. Unlike the Cognitive Coping and Suppression factor, Active Coping Strategies was also associated with less psychological disturbance and hence can validly be considered a coping strategy in the sense that the actions and thoughts adopted do seem to have a generally beneficial effect on emotional adjustment. The Coping Strategy Questionnaire was critisised for assessing effectiveness of the strategies in terms of control over pain. This was considered inappropriate in chronic pain conditions given that coping with chronic pain is mainly concerned with moderating or reducing the emotional rather than sensory aspects of pain. The Pain Coping Questionnaire, by including measures of emotional consequences of pain, provides a more valid measure of active coping strategies.

It is questionable whether the passive coping strategies, Avoidance and Use of Drugs, should be considered as separate dimensions. They both represent beliefs underlying two of the most common manifestations of illness behaviour. Whether or not they should be considered separately or as two aspects of the same dimension, probably depends upon the population under study. There was some indirect evidence that if patients with cancer or serious physical pathology that produces pain and is likely to require medication for purposes other than pain relief are included, then the scales should be considered separately. If a population is studied that only includes chronic benign pain sufferers, then the two scales may be more appropriately considered as a single dimension.

The Avoidance and Use of Drugs scales are similar to the Helplessness factor found by Rosenstiel and Keefe (1983). Both strategies are associated with higher levels of pain and also appeared to be associated with greater levels of emotional discomfort and poorer coping. In this respect, Avoidance and Use of Drugs cannot be considered "coping" in the sense that they do not appear to result in reduced discomfort. As with the Helplessness and Catastrophising strategies found on the Coping Strategy Questionnaire, it seems important to help patients not to use these passive coping strategies as they appear to be maladaptive responses for most patients.

Activity levels and medication use are the two most commonly used outcome measures on pain management programmes. They are assessed by a variety of methods including direct observation, activity diaries and other forms of self report. It is not known from the present investigations whether scores on the Avoidance and Use of Drugs scales predict behaviour although the evidence is suggestive that they do. These scales may be useful supplementary measures of the subjective aspects of avoidance and medication use. These scales to some extent may be seen as measuring intentions to behave which according to the "theory of reasoned action" (Fishbien and Ajzen,1975) are important predictors of behaviour.

Avoidance behaviour and the use of pain killing medication are two very common features of chronic pain syndrome. The operant model views these behaviour patterns, in some cases, as resulting from patterns of environmental contingencies that positively and negative reinforce avoidance and drug taking behaviour. There was some

evidence from the present study that cognitive factors may represnt additional determinants of avoidance and drug taking behaviour. Both Avoidance and Use of Drugs scales were related to beliefs in attributions of control to "powerful others". In the context of chronic pain, this means that people who strongly believe their doctor is a powerful, controlling figure, are also likely to adopt these maladaptive strategies for coping with chronic pain. The operant model does not predict that patients who show avoidance behaviour and take drugs should show any differences in terms of beliefs in control of "powerful others" compared with people who do not use avoidance or drug taking as coping strategies. This suggests that although environmental contingencies may be important determinants of avoidance and drug taking behaviour in some individuals, cognitive factors may also be important in others.

Avoidance, rest and drugs are the commonest treatments prescribed by doctors treating acute pain problems. They probably represent entirely appropriate strategies for dealing with acute pain. As the pain lingers into chronicity, a time is reached when these strategies are no longer useful and begin to be maladaptive and unhelpful. Many doctors fail to recognise this and continue to treat chronic pain as if it were acute pain by continuing to prescribe rest, avoidance and drugs (Wells,1986). It is possible that a proportion of patients continue to adopt what are essentially maladaptive strategies, not because any benefit is derived, but because of their belief system which makes high attributions of control to "powerful others". If this is the case then one would expect that, at least in a proportion of these patients, their beliefs in using certain coping strategies could be changed by an appropriate cognitive intervention such as, for

example, a clear explanation of the benefits of active coping strategies given by an individual who is construed as a "powerful other" by the patient. The outcome studies presented, show that these scales do change in response to cognitive intervention. Even within the strictly operant framework, education to change beliefs in the use of certain strategies is used to change behaviour with the discussion and explanation of concepts such as "hurt is not the same as harm" (Fordyce,1984).

The Pain Communication scale failed to show adequate reliability, validity and sensitivity to change as an outcome measure. The results from the various studies clearly and consistently demonstrated that Pain Communication is not measuring any meaningful dimension and therefore should be rejected from the Pain Coping Questionnaire. Although communication of pain is a very important aspect of chronic pain in the sense that it is related to social functioning and social reinforcement, it seems that it is not validly assessed on such a simple self-report measure. Readiness to communicate pain experience to others as measured by the Pain Communication scale does not seem to be related to coping with pain.

Investigations of coping strategies in chronic pain patients is a recent development and to the authors knowledge no very similar instrument has been previously developed. The Coping Strategy Questionnaire was developed to investigate coping strategies in 61 low back pain patients (Rosenstiel and Keefe,1983). Factor analysis of responses to a questionnaire measuring frequencies that different cognitive and behavioural strategies were used by chronic pain patients yielded three factors. Similarities between these factors

and the factors found on the Pain Coping Questionnaire have been previously discussed. There are several important differences between the two instruments.

Unlike the Pain Coping Questionnaire the Coping Strategy Questionnaire does not include a measure of emotional distress or discomfort and therefore does not adequately access coping strategies used for chronic pain. Effectiveness of coping strategies on the Coping Strategy Questionnaire is made on the basis of control over pain rather than any benefits that may result in terms of broader psychological measures. In contrast, the Pain Coping Questionnaire measures effectiveness of strategies in terms of emotional consequences of pain and it is argued that this is a more appropriate way of assessing coping strategies used by chronic pain patients. In addition, the coping strategies included on the Coping Strategy Questionnaire were mainly derived from studies of acute and laboratory pain. Strategies for the Pain Coping Questionnaire were derived from studying chronic pain populations directly and a broader range of behavioural and cognitive strategies were sampled.

The Pain Coping Questionnaire measures beliefs in the helpfulness of certain strategies in coping with pain rather than asking patients to estimate frequencies that certain strategies are used. This is a more appropriate way of assessing coping in chronic pain. Frequency estimations do not indicate whether a behaviour or cognition is used as a coping strategy or merely occurs as a passive accompaniment to pain. For example, crying is a frequent response to pain. Some individuals may actively use crying as a coping strategy by gaining benefit from tension relieving properties. Other individuals simply

cry because they have pain. Frequency estimation of this behaviour does not distinguish between whether it is used as a coping strategy or whether it occurs for other reasons.

The scales on the Coping Strategy Questionnaire had questionable validity in the sense that they were not associated with less discomfort or distress. Adoption of the strategies did not appear to help the patients "cope" better with their pain. In contrast, scales from the Pain Coping Questionnaire have been shown to be valid measures of coping in that they do seem to be related in a systematic way to psycho-social distress caused by pain. Use of certain strategies does appear to help patients "cope" better with chronic pain.

The Coping Strategy Questionnaire was based upon responses of 61 low back pain patients. The Pain Coping Questionnaire was based upon a much larger and representative sample of 298 chronic pain patients attending a British Pain Clinic. This means that the questionnaire is likely to be a more valid measure when used on a similar population to that of the original standardisation sample.

9.2 LIMITATIONS

The Pain Coping Questionnaire was derived from principal components factor analysis of responses to a 65 item questionnaire. Items from this original questionnaire were selected on the basis of clinical experience and examination of relevant literature. The scales developed from this analysis will necessarily be limited to variables included in the original questionnaire. It is possible that

important coping strategies that chronic pain patients frequently use were not included in the original questionnaire and, if this was the case, the Pain Coping Questionnaire could not be considered to be an adequate measure of coping with chronic pain.

Not all strategies that could have been included in the original questionnaire were included. Detailed cognitive strategies such as directing attention to internal/external events or relabelling were not included. Negative strategies such as praying, hoping or catastrophising were also not included. A balance was struck between including a broad range of behavioural and cognitive strategies that were likely to have been used or experiened by chronic pain patients and including detailed examples of different strategies within a particular category. Overall, the results from the analysis yielded interpretable results that were broadly consistent with previous research into coping with pain. It is, however, an accepted limitation of the Pain Coping Questionnaire that some types of strategies are under represented and may not fully desribe the coping strategies of all chronic pain patients.

Factor analysis of the responses on the questionnaire revealed five factors that formed the basis of scale construction. Overall these factors explained 40% of the total variance. This means that a large proportion of the variance was unexplained and due to random effects. To some extent, this would be expected given that it was an exploratory study with few expectations of the factor structure and only broad criteria for selection of items to include in the original questionnaire. It was also conducted on a group of diverse chronic pain patients and this may also have contributed to the proportion of

unexplained variance. The purpose of factor analysis was to make sense of the data. Interpretable and meaningful results were obtained and this is the main criteria by which the adequacy of the solution is judged.

Some of the items making up the scales have similar wording and it is questionable whether the scales should be reduced to only include items with obvious separation. It was decided to include similarly worded items in the scales because a) no items were identical and, as little is known about the dimensions under study, all items were included in order not to risk losing information, b) sensitivity of the measures would be increased. It is possible that similarly worded items are infact measuring identical components of the factor and therefore the reliability estimates might be slightly inflated.

The reliablity of the questionnaire was assessed by detailed examination of the same group over a period of time. This method of estimating reliability does have its limitations and further studies on different populations are particularly required to investigate the stability of the factor structure.

The questionnaire was based upon a study of a large and mixed group of chronic pain patients that was very likely to have included pain syndromes caused by malignant disease as well as chronic benign pain. It could be argued that this is not an appropriate group to study given that normally only people who suffer from chronic benign pain are usually considered suitable for psychological treatment. It was considered to be appropriate to use this diverse group of chronic pain patients for the standardisation sample because there is no evidence

that the primary cause of chronic pain has any significant relationship with the type of coping strategies used. It is increasingly being considered appropriate to treat patients with chronic pain whether or not they have clear physical pathology. In addition, there is no reason within the cognitive-behavioural perspective of chronic pain, why patients with cancer and other serious physical illnesses causing pain should not benefit from a psychological approach. For these reasons it was considered important to use a representative sample of chronic pain patients to investigate coping responses. The fact that the standardisation samples did include such a diverse group of patients should however be taken into account when using normative data in comparison with different types of chronic pain population.

An important limitation relates to the lack of definitive clinical information from the standardistion sample. Clinical details of the standardisation sample was based upon self-report questionnaire and this limits the amount of information available. It would have been very interesting to investigate clinical syndromes in terms of coping strategies with, for example, comparisons between groups with malignant and benign pain. This was not conducted because such an analysis requires both detailed perusal of individual case notes together with discussion with relevant medical officers. Detailed clinical case analysis was not a practical proposition within the context of a large scale survey.

A study of clinical groups was conducted with a comparison of coping strategies used by a group of Chronic Low Back Pain patients and a group of patients suffering from Post-Herpetic Neuralgia. These groups

were diagnosed independently upon clinical grounds. Unfortunately this comparison was limited by the fact that due to the nature of pain syndromes under study there was a significant difference in ages between the two groups. Although statistical methods were used to control for age differences, some strategies are related to age and it would hve been preferable to have compared two groups matched for age and sex. The rarity of finding patients suffering from Post-Herpetic Neuralgia in the age group similar to that associated with Chronic Low Back Pain makes this a difficult comparison to make.

It has not been definitively established to what extent the scales on the Pain Coping Questionnaire actually predict behaviour. For example, it is not known whether people who score high on Avoidance and Use of Drugs scales actually do less and take more drugs than people who score low on these scales. There is evidence from the validation and outcome studies that suggest the scales do predict behaviour, but no direct evidence is available because no direct behavioural measures were taken. The study was largely limited to the use of self-report measures and this limits the extent that behaviours can be measured. Further studies comparing the reported use of coping strategies with more direct measures of pain related behaviours are required.

9.3 APPLICATIONS

The Pain Coping Questionnaire is a reliable and valid instrument, standardised on a British population, that fills a gap in the measurement of subjective aspects of coping with pain. It is likely to have wide applications in the psychological assessment and

treatment of chronic pain patients.

Patients are often selected for psychological treatment because they are considered not to be coping adequately with their problems. The Pain Coping Questionnaire is likely to represent a useful additional instrument in the preliminary assessment of pain patients prior to undergoing psychological therapy. Knowledge about individual coping strategies adopted and psycho-social adjustment when coupled with clinical information is likely to be valuable in planning appropriate treatment programmes designed to help patients adopt more suitable coping strategies. The Pain Coping Questionnaire also offers the opportunity to monitor progression during treatment by objectively quantifying any changes in adjustment or coping strategies used. It is an easily administered questionnaire with high face validity and could be used as a screening devise to select patients for further detailed psychological evaluation in preparation for treatment. Some normative data has been presented and as this develops, suitable cut-off scores for classification purposes could be derived.

Most psychological therapies for chronic pain are designed to improve the patient's ability to cope with pain rather than "cure" or remove the pain. Studies investigating effectiveness of psychological treatment programmes for pain have been limited by the narrow range of outcome measures used and, in particular, by the lack of suitably standardised measures of subjective aspects of coping with pain. The Pain Coping Questionnaire represents an additional instrument that could be appropriately used in the evaluation of psychological treatments, particularly multimodal pain management programmes, that have the explicit aim of improving patients' ability to cope with

pain. Extensive investigations on various groups of chronic pain patients have revealed that it is a reliable and valid instrument and its strong psychometric characteristics make it particularly suitable for this application.

Recently attention has been turned to examining characteristics of patients who are most likely to benefit from certain types of treatment. Patient characteristics such as duration of pain, employment, pain levels, drug dependency, personality characteristics. medico-legal status and pain behaviour (Maruta et al.,1979; Swanson et al.,1978; Keefe et al.,1982) have all been associated with outcome on behavioural management programmes. No very clear pattern has emerged from this research other than a general tendency for the more severe patients on several parameters to do less well in treatment. Although it seems reasonable that use of certain coping strategies may have important influences on response to treatment, the lack of appropriate measures of coping has precluded research investigating whether coping strategies used by chronic pain patients predict outcome on pain management programmes. The Pain Coping Questionnaire offers an appropriate instrument to measure and classify coping strategies and adjustment that could be used in research investigating predictors to successful treatment.

There was some indirect evidence from the outcome study (Chapter 8) that some of the scales from the Pain Coping Questionnaire may predict response to treatment. The results from analysis of pre-treatment profiles on the Pain Coping Questionnaire seemed to show that patients selected for treatment on the Walton Hospital Pain Management Programme had a trend towards higher scores on the Active Coping

Strategies scale compared with patients who were not selected for treatment. This implies that patients selected for treatment had different coping strategies compared with patients who were not selected for treatment. Furthermore, treatment appeared to be successfully reflected by highly significant changes on all measures of the Pain Coping Questionnaire (with the exception of the Pain Communication scale). This finding may be reflecting higher levels of motivation shown by patients selected for treatment. A basic selection criteria for all psychological treatment is that patients show some degree of motivation to change. One might expect this motivation to be stronger when selected for an intensive treatment like a Pain Management Programme, that by its nature demands a considerable degree of planning and adjustment to attend. This finding at least raises the possibility that coping strategies as measured by some scales of the Pain Coping Questionnaire may be predictive of outcome and provide the basis for further research.

Investigations of sub-groups who show particular patterns of responses on the Pain Coping Questionnaire would be interesting. Although relationships between variables on the Pain Coping Questionnaire were investigated as a group, this form of analysis tends to obscure sub-groups who may be showing patterns of coping strategies that do not conform to the relationships revealed by group analysis. For example, are high scores on Avoidance and Use of Drugs always associated with poor adjustment or is there a group of patients in whom these passive strategies are adaptive in the sense that they are not associated with psycho-social disturbance? Analysis of patterns of scores such as these may have implications with respect to identifying important groupings of pain patients which have different treatment

implications.

It has been suggested that in some patients high scores on Avoidance and Use of Drugs may arise because of patterns of negative and positive reinforcement. As these behaviours are responses to environmental contingencies one might expect such passive strategies to occur in the context of minimal emotional disturbance reflected by normal scores on the General Coping Measure. A profile similar to the psychosomatic "V" pattern (elevated Hypochondriasis and Hysteria with Depression in the normal range) on MMPI may be similar to this pattern and described in terms of satisfaction with the invalid role (Sternbach,1974). In other patients, high scores on Avoidance and Use of Drugs may arise not as an adaptive response to patterns of social reinforcement, but because of beliefs in the control of "powerful others". In other words, they do what the doctor says. If the doctor says "rest and take your tablets" they do so and continue to do so even if these actions do not have positive results. In this case, one might expect elevated scores on Avoidance and Use of Drugs to be associated with greater degrees of psycho-social disturbance reflected by lower scores on General Coping Measures. Comparisons of these two patterns of scores in terms of beliefs in control of "powerful others" would be very interesting. One would predict that patients with high scores on Avoidance and Use of Drugs and low scores on General Coping Measures would have strong beliefs in the control of "powerful others". Conversely one would predict that patients with high scores on Avoidance and Use of Drugs with normal or high scores on General Coping Measures would have weaker beliefs in the control of "powerful other". Identification of sub-groups in terms of patterns of coping strategies awaits further investigations.

All pain starts off as an acute problem. In some cases, it persists despite normal medical intervention and develops into "chronic pain syndrome". The personal pain coping strategis that people adopt in attempting to cope with pain in the early stages may influence the progression into the chronic stage. Chronic pain may develop in some cases because people adopt maladaptive strategies in the early stages which result ultimately in poor coping and the development of various psychological problems associated with chronic pain syndrome. Although coping strategies have been implicated from a theoretical point of view in the development of chronic pain (Slade et al.,1983; Lethem,1983) the lack of appropriate measures of coping strategies adopted by chronic pain patients has limited this type of research.

There was some suggestion from the present study that active coping strategies were associated with decreased pain over time and passive coping strategies with increase in pain over time. The findings only revealed a trend and the analysis was limited by the fact that all patients studied were being treated in a specialist pain clinic and by definition had longstanding, chronic problems. Nevertheless, these preliminary findings suggest that the Pain Coping Questionnaire is a suitable instrument to investigate the role of coping strategies in the development of chronic pain. It would be interesting to compare groups with acute pain in terms of coping strategies measured by the Pain Coping Questionnaire and examine whether the strategies were predictive of future adjustment. If such an association was found, then appropriate interventions at a much earlier stage would be indicated. Intervention may focus on modifying any maladaptive pain

coping strategies and therefore help to prevent the pain from progressing into chronicity.

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APPENDICIES

Appendix A.1

DATE	NAME	TIME IN	TIME OUT	REASON FOR ABSENCE

Appendix A.2

PAIN MANAGEMENT PROGRAMME

MONDAY

8.45	Physiotherapy
9.30	Psychology
10.45	Relaxation Instruction
12.00	Lunch
1.00	Physiotherapy and Targets
2.00	Yoga
4.00	Hypnosis

TUESDAY

8.45	Physiotherapy
9.30	Psychology
10.45	Relaxation Practice
12.00	Swimming
1.00	Lunch
2.00	Social Worker
3.00	Lecture
4.00	Physiotherapy and Targets

WEDNESDAY

8.45	Physiotherapy
9.30	Psychology
10.45	Occupational Therapist and Social Worker
12.00	Lunch
1.00	Physiotherapy and Targets
2.00	Relaxation Practice and Lecture

THURSDAY

8.45	Physiotherapy
9.30	Psychology
10.45	Dance
12.00	Lunch
1.00	Relaxation Practice
2.00	Occupational Therapy

FRIDAY

8.45	Follow-up Group Discussion
12.00	Lunch
1.00	Yoga

ALL DAILY SESSIONS FINISH AT 5.00 pm

	NAME	TARGETS	COMMENTS
WEEK ONE			
WEEK TWO			
WEEK THREE			
WEEK FOUR			

	NAME	TARGETS	COMMENTS
WEEK ONE			
WEEK TWO			
WEEK THREE			
WEEK FOUR			

Appendix A.4

WALTON PAIN MANAGEMENT COURSE

NAME ..... DATE .....

FFUNCTIONAL EXERCISE PROGRAME

STANDING	MONDAY		TUESDAY		WEDNESDAY		THURSDAY		FRIDAY	
	GOAL	LEVEL	GOAL	LEVEL	GOAL	LEVEL	GOAL	LEVEL	GOAL	LEVEL
1. Heel Raise, Touch toes										
2. Knee Raising.										
3. Lateral Bending										
4. Arm Circling.										
5. Step-ups										
6. Wall Slide.										
7. Push-ups against wall.										
8. Knee on stool, forward Stretch.										
9. Lift bottom off chair and lower.										
10. Push-ups on arms of chair.										

Appendix A.4

MALTON PAIN MANAGEMENT COURSE

NAME .....DATE .....

FUNCTIONAL EXERCISE PROGRAM

LYING	MONDAY		TUESDAY		WEDNESDAY		THURSDAY		FRIDAY	
	GOAL	LEVEL	GOAL	LEVEL	GOAL	LEVEL	GOAL	LEVEL	GOAL	LEVEL
1. Deep breathing.										
2. Ankle movements.										
3. Ankle Circling.										
4. Alternate Leg Stretch,										
5. Pelvic Tilt.										
6. Alternate Arm Stretch										
7. Alternate Arm Stretch										
8. Knee Bend Extend Lower										
9. Alternate Hand to Knee										
10. Hamstring Stretch.										
11. Lie on Side, Leg raise.										
12. Lie on Tummy, Alternate leg raise.										
13. Push-ups.										
14. Lie on Opposite side, Leg raise.										
15. Cat Stretch.										

TUNTURI ERGOMETER ROTA

WEEK COMMENCING: .....

Appendix A.5

GROUP 'A'

	MONDAY						WEDNESDAY					
	GOAL			LEVEL			GOAL			LEVEL		
	W	RPM	TIME	W	RPM	TIME	W	RPM	TIME	W	RPM	TIME
(WK. 4)												
(WK. 3)												
(WK. 2)												
(WK. 1)												

GROUP 'B'

	TUESDAY						THURSDAY					
	GOAL			LEVEL			GOAL			LEVEL		
	W	RPM	TIME	W	RPM	TIME	W	RPM	TIME	W	RPM	TIME
(WK. 4)												
(WK. 3)												
(WK. 2)												
(WK. 1)												

NOTE: 'W' = LOAD - AS PER GUIDE TABLE.
'RPM' = PEDALING SPEED.
'TIME' = IN MINUTES - NOT TO EXCEED SEVEN

Table 1. LOAD GUIDE VALUES

	Intensity (W)	
	men	women
under 25 years old	150	100
25 – 35 years old, regular exercise	150	100
25 – 35 years old, several years without exercise	100	75
35 – 50 years old, regular exercise	100	75
35 – 50 years old, several years without exercise	50	50
over 50 years old, several years without exercise	25	25

Appendix A.5

NAME	WEEK Nº	INTENSITY (W)	RPM	DISTANCE	TARGET ACHIEVED MON	TUES	WED	THU

Appendix A.6

WALTON PAIN MANAGEMENT COURSE

NAME: _____ DATE: _____

ACTIVITIES	FUNCTIONAL EXERCISE PROGRAMME									
	MONDAY		TUESDAY		WEDNESDAY		THURSDAY		FRIDAY	
	GOAL	LEVEL	GOAL	LEVEL	GOAL	LEVEL	GOAL	LEVEL	GOAL	LEVEL
1. Walking Tolerance (Distance and/or Time).										
2. Sitting Tolerance - Time, (Before you have to stand and move).										
3. Driving Tolerance (Weekends - excluding first).										
4. Standing Tolerance.										
5. Stairs - Number of Steps/Flights, Up and Down.										
6. Sitting Tolerance in Car or Buses (Being Driven.)										
7. Swimming - Lengths/Widths										

Appendix A.7

GOODBYE SPEECH OUTLINE

1. Name
   Diagnosis - pain problem
   Date commencing programme

2. Why and/or how did you come to the Pain Unit?
   What were you like upon starting the programme?

   a) Medication - How much? How often?

   b) Activity Level - How did you spend most of your day?

   c) Emotionally - What were you like? Mood?

3. How have you changed since being on the Pain Programme? (Categories a, b, c, above)

4. What have you learned as a result of your stay on the Programme?

5. What will be your future plans to continue your pain-controlling therapy programme?

6. Any closing comments and/or suggestions are welcome.

Thank you.

Appendix B.1

PATIENT BACKGROUND INFORMATION

INSTRUCTIONS: Please read and answer each question carefully and print your answers clearly.

NAME: _____ AGE: _____

ADDRESS: _____

_____

BIRTHDATE: _____ SEX(tick): ( )Male ( )Female

MARITAL STATUS: ( )Married ( )Remarried ( )Single

( )Divorced ( )Separated ( )Widowed

WHAT IS YOUR CURRENT EMPLOYMENT STATUS?

( ) Employed full time
( ) Employed part time
( ) Retired
( ) Homemaker
( ) Unemployed due to pain
( ) Unemployed for other reasons (Describe) _____

Where do you suffer pain? _____

Have you attended the Pain Management Course at Walton Hospital?
( )YES
( )NO

If YES please give date started _____; date finished _____

Are you due to attend the Pain Management Course at Walton Hospital?
( )YES
( )NO

If YES please give date that course is due to start _____

Are you currently attending the Pain Management Course at Walton Hospital?
( )YES
( )NO

If YES please give date that course started _____

HOW HAS THE INTENSITY OF THE PAIN CHANGED THROUGHOUT THE TIME YOU HAVE HAD IT?

( )Increased
( )Decreased
( )Stayed the same

B.1

Date pain began: _____

Circumstances of onset (tick):

( ) Accident at home
( ) Accident at work
( ) Road accident
( ) Following illness
( ) Following Surgery
( ) Pain 'just began'
( ) Other injury (Explain): _____

_____

_____

RATE HOW OFTEN YOUR PAIN OCCURS (tick):

( ) Continously
( ) Several times a day
( ) Once a day
( ) Several times a week
( ) Several times a month
( ) Once a month
( ) Less frequent than once a month
( ) Never

DIRECTIONS: Please indicate the extent to which you agree or disagree with each of the following statements.

Put a circle around the appropriate word.

Please answer ALL the questions.

1(C5). I cannot distract myself from pain even if I keep busy.

strongly disagree | disagree | uncertain | agree | strongly agree

2(A6). My pain is usually associated with doing certain things.

strongly disagree | disagree | uncertain | agree | strongly agree

3(A3). I feel that I have no control over my pain whatsoever.

strongly disagree | disagree | uncertain | agree | strongly agree

4(A10). My pain is always with me.

strongly disagree | disagree | uncertain | agree | strongly agree

5(I1). I am convinced that I have something seriously wrong which the doctors cannot diagnose.

strongly disagree | disagree | uncertain | agree | strongly agree

6(D1). Painkilling tablets are the only way that I can control my pain.

strongly disagree | disagree | uncertain | agree | strongly agree

7(I10). It is possible that my pain can be made worse by what I am thinking or doing.

strongly disagree | disagree | uncertain | agree | strongly agree

8(A5). I feel that it is pointless to try and do something in order to reduce my pain.

strongly disagree | disagree | uncertain | agree | strongly agree

9(D4). When I have pain I usually take painkillers and rest.

strongly disagree | disagree | uncertain | agree | strongly agree

10(I8). Pain does not always mean that there is something physically wrong.

strongly disagree | disagree | uncertain | agree | strongly agree

Please answer ALL the questions.

B.1

11(G3). I feel happy about my life in general.

strongly disagree | disagree | uncertain | agree | strongly agree

12(C2). It is best to keep physically active even if I am experiencing pain.

strongly disagree | disagree | uncertain | agree | strongly agree

13(A7). I do not think that my pain can be affected by my state of mind.

strongly disagree | disagree | uncertain | agree | strongly agree

14(G9). I have lost my confidence.

strongly disagree | disagree | uncertain | agree | strongly agree

15(B1). It is best not to talk about my pain to other people.

strongly disagree | disagree | uncertain | agree | strongly agree

16(H1). I try to avoid other people when I have pain.

strongly disagree | disagree | uncertain | agree | strongly agree

17(F1). Relaxation does not have any effect on my pain.

strongly disagree | disagree | uncertain | agree | strongly agree

18(B4). Most of my family and friends know that I have a pain problem.

strongly disagree | disagree | uncertain | agree | strongly agree

19(A8). I am resigned to experiencing pain for the rest of my life.

strongly disagree | disagree | uncertain | agree | strongly agree

20(E2). It is not helpful when people are sympathetic because of my pain.

strongly disagree | disagree | uncertain | agree | strongly agree

21(H5). I feel my pain cuts me off from other people.

strongly disagree | disagree | uncertain | agree | strongly agree

22(I4). I sometimes worry that I have a serious illness.

strongly disagree | disagree | uncertain | agree | strongly agree

Please answer ALL the questions.

23(I2). I would let the doctors try anything to relieve the pain.

strongly disagree | disagree | uncertain | agree | strongly agree

24(E5). The worst thing about pain is having to depend on other people.

strongly disagree | disagree | uncertain | agree | strongly agree

25(C8). I often have to lie down and rest because of pain.

strongly disagree | disagree | uncertain | agree | strongly agree

26(A2). When I experience pain I am usually able to do something in order to reduce it.

strongly disagree | disagree | uncertain | agree | strongly agree

27(H8). My pain affects the way I get on with my family and friends a great deal.

strongly disagree | disagree | uncertain | agree | strongly agree

28(I6). I am sure that if I search for long enough I will find a cure for my pain.

strongly disagree | disagree | uncertain | agree | strongly agree

29(G7). My pain makes me feel tense and frustrated.

strongly disagree | disagree | uncertain | agree | strongly agree

30(A4). I can usually tell when I am going to experience pain.

strongly disagree | disagree | uncertain | agree | strongly agree

31(G2). I do not let my pain get me down.

strongly disagree | disagree | uncertain | agree | strongly agree

32(B2). It is always better to let other people know when I am in pain.

strongly disagree | disagree | uncertain | agree | strongly agree

33(G4). My pain makes me feel miserable most of the time.

strongly disagree | disagree | uncertain | agree | strongly agree

Please answer ALL the questions. **B.1**

34(E4). I have to rely on other people a great deal because of my pain.

strongly disagree | disagree | uncertain | agree | strongly agree

35(F3). When I am in pain it helps if I try to relax.

strongly disagree | disagree | uncertain | agree | strongly agree

36(H9). I never go out because people do not want to know you when you have pain.

strongly disagree | disagree | uncertain | agree | strongly agree

37(F4). Relaxation helps me cope with pain.

strongly disagree | disagree | uncertain | agree | strongly agree

38(E3). It is not helpful when people do too much for me because of my pain.

strongly disagree | disagree | uncertain | agree | strongly agree

39(H3). It is better not to let my pain stop me from mixing with other people.

strongly disagree | disagree | uncertain | agree | strongly agree

40(C3). It is always better to avoid anything that causes more pain.

strongly disagree | disagree | uncertain | agree | strongly agree

41(G5). My pain stops me from leading a normal life.

strongly disagree | disagree | uncertain | agree | strongly agree

42(F2). I find it very difficult to relax.

strongly disagree | disagree | uncertain | agree | strongly agree

43(C6). When I have pain I can control it to some extent by thinking certain thoughts.

strongly disagree | disagree | uncertain | agree | strongly agree

44(H7). My pain makes me opt out of things.

strongly disagree | disagree | uncertain | agree | strongly agree

45(B3). I always try to hide the fact that I am in pain.

strongly disagree | disagree | uncertain | agree | strongly agree

Please answer ALL the questions.

46(H6). My pain stops me from going places.

strongly disagree | disagree | uncertain | agree | strongly agree

47(C7). The best thing to do about pain is to ignore it and carry on.

strongly disagree | disagree | uncertain | agree | strongly agree

48(C4). I think that regular physical exercise is important in helping me to control my pain.

strongly disagree | disagree | uncertain | agree | strongly agree

49(D3). I always take painkillers when I have pain.

strongly disagree | disagree | uncertain | agree | strongly agree

50(H2). Talking to other people about how I feel can help my pain.

strongly disagree | disagree | uncertain | agree | strongly agree

51(D2). I can manage without the help of drugs.

strongly disagree | disagree | uncertain | agree | strongly agree

52(H4). My pain makes it difficult for me to socialise with people.

strongly disagree | disagree | uncertain | agree | strongly agree

53(I3). If the doctor told me he could find nothing physically wrong with me I would believe him.

strongly disagree | disagree | uncertain | agree | strongly agree

54(G10). My pain does not stop me from doing anything.

strongly disagree | disagree | uncertain | agree | strongly agree

55(A1). It seems that whatever I do my pain is always there.

strongly disagree | disagree | uncertain | agree | strongly agree

56(G1). I am coping well with my pain.

strongly disagree | disagree | uncertain | agree | strongly agree

57(G8). My pain makes me feel useless and not needed.

strongly disagree | disagree | uncertain | agree | strongly agree

Please answer ALL the questions. **B.1**

58(C1). When I have pain it is best to stop what I am doing and rest.

strongly disagree | disagree | uncertain | agree | strongly agree

59(I5). All my problems are caused by pain.

strongly disagree | disagree | uncertain | agree | strongly agree

60(E1). It is very helpful when people do things for me because of my pain.

strongly disagree | disagree | uncertain | agree | strongly agree

61(I11). I get very angry when the doctors say they can find nothing physically wrong with me.

strongly disagree | disagree | uncertain | agree | strongly agree

62(G6). I manage to do most things in life that I want to.

strongly disagree | disagree | uncertain | agree | strongly agree

63(A9). In my day-to-day life I can influence my pain to some degree.

strongly disagree | disagree | uncertain | agree | strongly agree

64(I7). I think that my pain can be affected by my state of mind.

strongly disagree | disagree | uncertain | agree | strongly agree

65(I9). All my pain is caused by a physical problem.

strongly disagree | disagree | uncertain | agree | strongly agree

CENTRE FOR PAIN RELIEF
MERSEY REGIONAL DEPARTMENT OF MEDICAL AND SURGICAL NEUROLOGY

Tel: 051-525 3611

Walton Hospital
Rice Lane
Liverpool
L9 1AE

Our Ref:

Your Ref:

E.J. GHADIALI
(Principal Clinical Neuropsychologist
to Pain Clinic, Walton Hospital).
ext. 479/641 for further information.

Dear

I am currently conducting scientific research into the problem of chronic pain. As part of this research, I am trying to find out how people who have pain cope with the various problems. I would be very grateful if you would kindly complete the enclosed questionnaires. Your answers will increase our understanding of the problem of pain and will help us in our efforts to develop better treatments for people suffering from pain.

I have obtained your name from our records at Walton Hospital Pain Clinic. Your answers will be treated in strictest confidence. Please return the completed questionnaires as soon as possible. A prepaid envelope is enclosed.

I apologise if for any reason you feel it was not appropriate for you to have been sent these questionnaires.

Thank you for your kind cooperation.

Yours Sincerely,

E.J. Ghadiali
(Principal Clinical Neuro-
psychologist to Pain Clinic,
Walton Hospital).

APPENDIX C1:: Correlation matrix of variables entered into factor analysis (N= 298)

ANALYSIS NUMBER 1 LISTWISE DELETION OF CASES WITH MISSING VALUES

CORRELATION MATRIX:

	C5	A6	A3	A10	I1	D1	I10	A5	D4	I8	G3	C2
C5	1.00000											
A6	-.06160	1.00000										
A3	.50028	-.10045	1.00000									
A10	.17189	-.15671	.41459	1.00000								
I1	.18952	-.04111	.33143	.29099	1.00000							
D1	.13076	-.04694	.18423	.02598	.07668	1.00000						
I10	-.21756	.38546	-.21400	-.11856	-.02517	.01463	1.00000					
A5	.16281	.01283	.31440	.09163	.24156	.11580	-.08641	1.00000				
D4	.24306	.04330	.20209	.05139	.16828	.54680	.04190	.03715	1.00000			
I8	-.01496	.04912	-.07227	-.06618	-.14686	-.09801	.18457	-.09486	-.13288	1.00000		
G3	-.11018	-.06893	-.20690	-.23765	-.24554	-.01974	-.10192	-.14054	-.03978	.12994	1.00000	
C2	-.21225	-.06600	-.24239	.02536	-.13728	-.14209	-.01193	-.25089	-.18935	.05179	.15645	1.00000
A7	.23552	-.04293	.17853	.04658	-.01133	.08625	-.28449	.14635	.11505	-.07233	.17817	-.03817
G9	.23822	.06373	.29105	.19848	.27340	.13331	.06012	.15673	.14339	-.04266	-.49845	-.21850
B1	-.04881	-.01115	.02217	.09613	-.08435	.07685	-.02385	-.00571	-.06555	.07302	.03473	.19783
H1	.24147	.08774	.26921	.08040	.14052	.15842	.07998	.10962	.16666	-.04892	-.25222	-.11097
F1	.24438	-.10443	.44562	.26385	.22244	.13089	-.23718	.25326	.04087	-.00899	-.10440	-.06377
B4	.10799	-.01222	.17350	.14706	.13936	.04975	.05716	.03605	.13011	-.06033	.06875	-.16809
A8	-.04163	.16487	.08992	.21487	.20813	.10518	.09755	.15718	.07766	.03637	-.03539	-.12502
E2	-.01281	-.14867	.02636	.12476	-.00990	-.01730	-.17098	-.03673	-.06788	-.04241	.13282	.07858
H5	.24622	.01580	.35299	.26954	.23553	.12874	.06706	.12082	.19357	-.01579	-.39245	-.29301
I4	.12472	.03883	.19168	.12029	.53175	.18010	.13840	.21618	.12111	-.12734	-.23980	-.17557
I2	.22115	-.00346	.26146	.24568	.24568	.16528	-.12314	.02642	.16399	-.18694	-.01871	-.04427
E5	.03456	.08400	.12104	.02854	.04217	.05016	.05737	.01301	.15869	-.15833	-.19993	-.05691
C8	.17686	.12566	.23176	.13584	.27376	.17259	.13370	.11554	.43998	-.03054	-.23558	-.29325
A2	-.24260	.22442	-.39681	-.29785	-.12797	.12101	.14905	-.17706	.07310	.07572	.20168	.21035
H8	.24390	-.02109	.23238	.19407	.23755	.13197	.06124	.06867	.08828	-.09360	-.39958	-.11269
I6	.13746	-.11056	.16439	.06777	.16580	.05368	-.11692	-.03909	.14247	-.05266	.09928	.06255
G7	.21612	-.07110	.29041	.29147	.15624	.12757	.05649	-.02434	.11704	-.00683	-.27552	-.04060
A4	.10576	.19986	.09971	.07364	.26272	.00464	.25464	.08187	.13454	.00349	-.11036	.00640
G2	-.19531	.03912	-.20314	-.09032	-.22441	-.11213	-.04334	-.00464	-.12008	.10038	.38325	.25218
B2	.12074	.05048	.20261	-.03581	.12149	.14262	-.08821	.15461	.18608	-.11085	-.02301	-.17801
G4	.26566	-.01341	.36825	.23930	.22510	.21866	.00970	.23973	.16550	-.09821	-.34688	-.23908
E4	.15011	.02143	.23246	.18528	.30395	.09356	.02277	.06845	.33058	-.18632	-.30434	-.22304
F3	-.18276	.19566	-.27247	-.21161	-.10311	-.07516	.24298	-.14061	.08244	.08030	.11887	.02598
H9	.17024	-.00775	.22528	.18716	.23095	.17177	.06527	.16746	.14564	.07811	-.31055	-.21175
F4	-.18854	.17466	-.30225	-.20943	-.10138	-.06548	.29003	-.09594	.07838	.13956	.15912	.10978
E3	-.09280	-.04310	-.06335	.11904	-.08094	-.07533	-.02049	-.21359	-.14788	.06604	.05999	.32685
H3	-.21120	.04363	-.20816	-.04108	-.22418	-.06463	.00352	-.28839	-.03597	-.05445	.20187	.29344
C3	.26047	.15323	.26938	-.01045	.16335	.27279	.01007	.09264	.33531	-.08417	-.11999	-.20015

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	C8	A2	H8	I6	G7	A4	G2	B2	G4	E4	F3	H9
F3	.17912	.31577	-.06738	-.11436	-.09105	.13551	-.00600	.01193	-.18487	.00668	1.00000	
H9	.26297	-.22714	.39042	-.03538	.20876	.11825	-.26917	.02133	.43748	.28152	-.02552	1.00000
F4	.13323	.28945	-.10022	-.08766	-.10929	.09321	.03474	-.02344	-.22800	-.01286	.81161	-.04110
E3	-.15145	.10799	-.04643	.05152	.06994	-.10008	.05527	-.20274	-.07045	-.22751	.06050	-.05756
H3	-.07989	.23562	-.15183	.14030	-.05691	-.10406	.26669	-.10807	-.23204	-.10494	.10889	-.37971
C3	.23602	-.07080	.12114	-.01667	.10229	.18630	-.15799	.24756	.26418	.14636	-.06732	.13288
G5	.40117	-.27710	.45890	.02232	.42449	.27697	-.28275	.08662	.41447	.46852	-.12619	.40383
F2	.23058	-.21174	.33880	.03492	.45090	.13557	-.20590	.05450	.40823	.21053	-.18680	.29509
C6	-.12308	.31262	-.08311	-.02560	-.11703	.05976	.16497	-.02818	-.20033	-.14911	.33190	.01788
H7	.35968	-.20390	.39861	.03817	.32194	.23926	-.26402	.14797	.38857	.34989	.01475	.29608
B3	.09326	-.01225	.06005	-.00572	.04770	.02405	.15779	-.32686	.06452	.01031	.00182	.04982
H6	.34227	-.26031	.40553	.03064	.35459	.22004	-.33326	.06196	.42260	.39420	-.07390	.40466
C7	-.35415	.08778	-.18200	.15103	-.04575	-.12518	.35347	-.15995	-.14751	-.27505	.10930	-.08710
C4	-.13056	.25756	-.06991	.04299	-.02754	.06021	.18022	-.19319	-.23897	-.11318	.23936	-.11498
D3	.23130	-.04717	.20074	.03063	.09024	.01381	-.16196	.23008	.26704	.24666	-.09410	.27313
H2	.01954	.17091	-.05552	-.02880	-.01808	.09513	.00157	.22247	-.10715	.04056	.27043	-.05141
D2	-.31216	.10351	-.16362	-.03894	-.12633	-.04718	.24952	-.10803	-.24081	-.24842	.10512	-.18331
H4	.37096	-.33738	.56113	.05921	.35546	.21936	-.40320	.10819	.53885	.40744	-.08197	.52294
I3	-.11349	.16457	-.13990	.06346	-.05763	-.05738	.11981	-.05644	-.13170	-.19371	.03286	-.11837
G10	-.31580	.05944	-.32429	.10995	-.27730	-.10635	.25595	-.02170	-.20866	-.32464	-.01186	-.13118
A1	.20130	-.27022	.20326	.13765	.28668	.13630	-.10105	-.03492	.25997	.21288	-.17973	.14022
G1	-.21940	.29532	-.38024	-.06509	-.31475	-.14091	.44021	-.05395	-.37590	-.27217	.12069	-.29314
G8	.37504	-.21645	.49820	-.03822	.36156	.18306	-.31353	.04627	.50323	.39448	-.05701	.48809
C1	.51792	.03454	.17217	.02206	.09979	.21090	-.15825	.17293	.23003	.32289	.27044	.12801
I5	.25299	-.21839	.27327	-.03177	.20884	.19864	-.17995	-.01467	.39127	.36383	-.10770	.31490
E1	.37405	-.04734	.11229	-.01891	.20644	.28615	-.15082	.28958	.20280	.50029	.21620	.18238
I11	.16886	-.13829	.28241	.06538	.18356	.06943	-.15289	.07538	.25366	.21066	-.08432	.16238
G6	-.36592	.21839	-.34743	.02645	-.33224	-.12278	.27751	-.03248	-.33681	-.44983	.06130	-.25970
A9	-.08824	.42417	-.12112	-.02290	-.16720	.08591	.08175	-.05491	-.24123	-.20996	.34662	-.16816
I7	.05809	.12421	.10573	-.03874	.12827	.10782	-.08437	-.07021	.05728	-.06428	.30278	.07906
I9	.07249	.01697	.09732	.00341	.08964	.04401	.07597	.11249	-.01813	.07014	-.02503	-.01815

	F4	E3	H3	C3	G5	F2	C6	H7	B3	H6	C7	C4
F4	1.00000											
E3	.11015	1.00000										
H3	.08649	.33972	1.00000									
C3	-.09696	-.19773	-.06650	1.00000								
G5	-.17005	-.09350	-.18828	.22290	1.00000							
F2	-.19304	.06721	-.07619	.13578	.30160	1.00000						
C6	.37290	.15493	.15903	-.06016	-.24576	-.14484	1.00000					
H7	-.04999	-.08505	-.21175	.33394	.61818	.29314	-.23708	1.00000				
B3	.01209	.14621	.12268	.00888	.07619	.11195	.04224	.01925	1.00000			
H6	-.11495	-.08467	-.20882	.18620	.59836	.37579	-.25307	.60480	.10353	1.00000		
C7	-.03233	.19448	.14292	-.21789	-.21626	-.08862	.14845	-.22324	.22327	-.19510	1.00000	
C4	.18265	.18624	.25428	-.20389	-.17471	-.06970	.27973	-.22803	.08212	-.25925	.19210	1.00000
D3	-.04663	-.17700	-.20770	.23581	.19820	.13909	-.18860	.24909	-.02853	.26945	-.16118	-.19991

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FACTOR ANALYSIS

	A7	G9	B1	H1	F1	B4	A8	E2	H5	I4	I2	E5
B2	.05435	.11176	-.30811	.02924	.07388	.14057	.00791	-.13899	.10074	.16307	-.01684	.03922
G4	-.01357	.41727	.01662	.40668	.26150	.04495	.09748	.08137	.52471	.30664	.19971	.18006
E4	.00389	.42077	-.07180	.19956	.08356	.09538	.06853	.02169	.37478	.33440	.14700	.47105
F3	-.18295	.03019	-.08448	.03503	-.56698	-.11571	.01392	-.12342	-.06413	-.02885	-.17949	.00409
H9	-.05402	.54307	.12698	.41725	.13415	.00526	.18157	.01824	.54846	.30146	.06801	.22486
F4	-.19201	-.02591	-.03081	.04999	-.56922	-.15252	.01934	-.10720	-.09453	-.01974	-.09501	-.02910
E3	-.04314	-.12096	.23412	.09324	-.04835	-.04218	.01440	.25881	-.05166	-.17044	.01342	.01562
H3	.03740	-.34415	.04207	-.16505	-.14145	-.00470	-.13598	.03720	-.32254	-.26356	-.02862	.00002
C3	.10315	.13533	-.06073	.20691	.20812	.11960	-.01364	-.11631	.18566	.11910	.06585	.01752
G5	.01012	.42739	-.05672	.35126	.14715	.09929	.10918	.06323	.55968	.29264	.20686	.28093
F2	-.05287	.33471	.09046	.30662	.29782	.02715	.07877	.12971	.31402	.24220	.12896	.19262
C6	-.21424	-.12862	.03338	-.12514	-.25808	.03924	-.01696	-.01815	-.12190	-.01817	-.08607	-.06011
H7	.07992	.33526	-.08412	.41567	.09147	.07010	.05918	-.00010	.48909	.22641	.08622	.20655
B3	.08878	.00823	.39877	.09292	.04592	.06701	.17984	.23277	.07968	-.06486	.14701	.17489
H6	-.00420	.44630	.02043	.43318	.15949	.05372	.13806	.02640	.55533	.27179	.02601	.30680
C7	-.00997	-.24218	.17747	-.16441	.00785	-.05526	-.11628	.10339	-.24322	-.18274	.04776	-.07371
C4	-.13223	-.09548	.06386	-.15305	-.16015	-.08234	-.08597	-.02339	-.17797	-.10667	-.05420	.01398
D3	.11200	.23472	-.00423	.16883	.12756	.09705	.14318	-.02874	.30738	.27963	.17958	.15408
H2	-.04652	.02459	-.21003	-.09524	-.13487	.12829	.04258	-.26334	-.09900	.07628	-.00735	.07125
D2	-.07014	-.21373	-.07680	-.15836	-.13159	-.11446	-.18090	.05512	-.26926	-.24234	-.15579	-.16633
H4	.00465	.53554	-.00009	.47005	.20835	.00714	.04108	.13441	.66367	.35289	.14699	.32740
I3	-.03849	-.08779	.11755	-.14934	-.00346	-.14997	-.09713	.07318	-.18534	-.16062	-.03291	-.15032
G10	.04484	-.18450	.03688	-.21864	.10582	-.15984	-.03200	-.08565	-.30645	-.14654	-.03563	-.23452
A1	.04993	.16974	.05637	.04725	.25974	.16589	.14058	.13097	.23009	.12656	.24839	.04184
G1	.13038	-.43484	.07897	-.17709	-.23376	-.05688	-.03794	-.05966	-.37227	-.28281	-.09981	-.10194
G8	-.01918	.58845	.01613	.38741	.15613	.10288	.14431	.04219	.53669	.36652	.21188	.26348
C1	.00597	.18795	-.09498	.22961	-.10335	.03875	.08851	-.07255	.17383	.17648	.12008	.10812
I5	.06210	.33800	.17374	.26474	.19311	-.02176	.10916	.07186	.40890	.25118	.14465	.23255
E1	-.05724	.28099	-.16233	.10264	-.02300	.03752	.05276	-.20639	.22167	.29515	.11019	.33603
I11	.08226	.18707	-.01708	.12678	.04819	.14687	.14252	-.04793	.27576	.19289	.10179	.18294
G6	.06844	-.35660	.06646	-.27409	-.15861	-.12328	-.09930	-.00639	-.40450	-.18767	-.13488	-.29932
A9	-.16095	-.19581	.04695	-.13506	-.28329	-.09352	-.01340	-.04082	-.22373	-.05686	-.20215	-.06807
I7	-.41133	.08321	-.00831	.04851	-.16910	-.08204	.00970	-.06320	.05343	.14994	-.18040	-.03303
I9	.24344	-.02962	.02173	.06929	-.01750	.05226	-.01918	-.01254	.04302	-.10688	.06218	.03138

	C8	A2	H8	I6	G7	A4	G2	B2	G4	E4	F3	H9
C8	1.00000											
A2	-.01301	1.00000										
H8	.33721	-.18395	1.00000									
I6	.04150	-.03320	.05343	1.00000								
G7	.25179	-.12848	.37609	.19871	1.00000							
A4	.34014	-.01542	.16907	.02007	.17030	1.00000						
G2	-.24712	.20408	-.38570	.05469	-.32294	-.08796	1.00000					
B2	.17351	-.05597	.04233	.07309	.07083	.07587	-.06512	1.00000				
G4	.34628	-.29218	.48631	.11400	.39055	.20146	-.33097	.17000	1.00000			
E4	.44157	-.17262	.31740	-.00981	.24848	.19637	-.28131	.21410	.28870	1.00000		

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	C5	A6	A3	A10	I1	D1	I10	A5	D4	I8	G3	C2
G5	.24378	-.00326	.37540	.34406	.33340	.13860	.07085	.09176	.25486	-.14521	-.42934	-.23081
F2	.16908	-.12758	.37469	.28096	.19012	.12577	.03675	.13970	.06755	-.04133	-.25873	-.05095
C6	-.22521	.14038	-.34768	-.12891	-.05258	-.10054	.19639	-.13374	-.12297	.16283	.16032	.19282
H7	.25667	.05376	.34033	.21823	.19173	.15784	.07446	.10311	.28581	-.15329	-.31202	-.21183
B3	-.01375	.04480	.07229	.21583	.03980	.04364	-.00660	-.00211	.02426	.01009	-.03310	.05549
H6	.25491	-.00474	.40484	.30824	.29438	.10876	.08187	.13730	.24269	-.11758	-.40668	-.27531
C7	-.17059	-.07007	-.11049	.07091	-.05345	-.06166	-.06781	-.11774	-.21624	-.01271	.15478	.44512
C4	-.25389	.10013	-.36862	-.08244	-.14717	-.21329	.18351	-.32129	-.14104	.08208	.05102	.43799
D3	.19064	-.04537	.23922	.08470	.16310	.62741	.04628	.14400	.58143	-.10997	-.11119	-.22620
H2	-.09793	.05271	-.11494	-.07022	.02690	.02790	.22863	-.15406	.00830	-.01347	.06629	.07920
D2	-.18062	.01014	-.30015	-.17650	-.13957	-.51467	-.05747	-.09557	-.45387	.06240	.20841	.27732
H4	.30130	-.04320	.40393	.21576	.29040	.14277	.00799	.20005	.18960	-.11225	-.40450	-.23226
I3	-.08802	.02324	-.14152	-.12552	-.18046	.06126	-.07347	-.08477	-.08546	.28756	.23257	.12392
G10	-.16829	-.07245	-.15713	-.17544	-.12548	-.03330	-.16322	.04267	-.17819	.07268	.27298	.20550
A1	.17570	-.22379	.40713	.74081	.30200	.08043	-.13434	.08516	.10678	-.06349	-.17867	-.02003
G1	-.20559	.00817	-.29190	-.27713	-.23071	.04403	-.00990	-.11024	-.00741	.04632	.37362	.19654
G8	.23772	.01187	.29457	.26319	.36110	.19555	.10253	.22702	.19026	-.05656	-.43967	-.26466
C1	.23342	.18248	.15954	-.05324	.13170	.20762	.09340	.10451	.44030	-.06517	-.08889	-.33249
I5	.16286	-.01285	.29847	.30000	.21206	.07463	-.05814	.12923	.14525	-.14308	-.32064	-.09880
E1	.10487	-.14946	.20848	.01699	.15731	.17795	.16825	.05133	.33229	-.14706	-.22121	-.20688
I11	.15138	-.02459	.20421	.28516	.26484	.01277	-.01563	.09494	.10323	-.13870	-.28521	-.08635
G6	-.16734	-.04609	-.31800	-.30073	-.27792	-.00510	-.09730	-.07616	-.16319	.15132	.45895	.30141
A9	-.28477	.17591	-.43308	-.26227	-.13869	-.09164	.20376	-.16552	-.09368	.05122	.04054	.25025
I7	-.14986	.15325	-.19740	-.06403	-.02140	.00904	.40344	-.07941	-.14592	.23937	-.15182	.16549
I9	.14593	.06427	.13594	.12113	-.00409	.02593	-.08409	-.08661	.07460	-.09083	-.04141	.03549

	A7	G9	B1	H1	F1	B4	A8	E2	H5	I4	I2	E5
A7	1.00000											
G9	-.18138	1.00000										
B1	.01118	.05267	1.00000									
H1	.04364	.37365	.31962	1.00000								
F1	.19789	.15291	.03737	.08325	1.00000							
B4	.04804	-.06381	-.10781	-.03966	.08027	1.00000						
A8	-.00475	.10557	.11035	.12928	-.00235	.13323	1.00000					
E2	.01612	-.02250	.27322	.15379	.03939	.09323	.06188	1.00000				
H5	-.00623	.51907	.07533	.50110	.19764	.10136	.17608	.07233	1.00000			
I4	-.08409	.35778	-.08341	.21103	.12083	.00512	.20652	-.02033	.34144	1.00000		
I2	.19660	.10580	-.08451	.07443	.21156	.12401	.15742	.05789	.14318	.13493	1.00000	
E5	-.01521	.24921	.11624	.20192	.00360	.08883	.07914	.14581	.31782	.11831	.14023	1.00000
C8	-.02311	.37661	-.00363	.24844	-.01233	.06221	.16540	-.01099	.27870	.25439	.13753	.24215
A2	-.05855	-.23281	.09958	-.04768	-.36103	.03410	.01787	-.00453	-.31252	-.12470	-.14234	.01658
H8	-.07639	.39026	.05786	.42124	.11159	.02162	.07653	.08044	.57657	.33008	.20326	.24006
I6	.12168	-.00850	-.09290	-.04673	.27184	.06979	-.31247	.03910	-.02431	-.01720	.22830	.01528
G7	-.13549	.31644	.07043	.26810	.15639	.11414	-.08589	.09759	.27918	.19425	.13931	.15629
A4	-.07793	.15894	-.06192	.09773	.07958	.09151	.13235	-.02348	.16695	.16031	.11659	.08191
G2	.15840	-.44129	-.00320	-.22583	-.01029	-.01617	.04732	.08861	-.38208	-.31173	-.02954	-.02905

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	F4	E3	H3	C3	G5	F2	C6	H7	B3	H6	C7	C4
H2	.26860	-.04201	.10125	.05902	-.06196	-.08551	.17105	-.01537	-.08038	-.03233	-.00443	.22698
D2	.11135	.12412	.06947	-.20301	-.25948	-.21662	.18661	-.22616	.01868	-.29994	.27077	.16661
H4	-.10263	-.09149	-.29632	.18535	.57740	.35889	-.19326	.56152	.05259	.63277	-.21805	-.26616
I3	.05158	.04876	.10827	-.05518	-.22941	-.00068	.11975	-.21278	.01865	-.17132	.13383	.05493
G10	.02090	.00543	.03870	-.19506	-.47346	-.17004	.13973	-.48589	-.05304	-.36471	.19460	.13908
A1	-.20859	.02974	-.04951	.04512	.33120	.32248	-.15149	.25373	.18324	.27661	.09073	-.07326
G1	.19135	.09807	.22209	-.08530	-.36961	-.33685	.16804	-.27747	.06130	-.42179	.23747	.13457
G8	-.08310	-.08113	-.18805	.21393	.48941	.40519	-.06852	.36284	.09961	.43204	-.20776	-.14191
C1	.22735	-.25042	-.12191	.29466	.21409	-.01371	-.04974	.27776	.03053	.18801	-.27981	-.24636
I5	-.09690	-.01070	-.13037	.18391	.41694	.22537	-.09121	.32903	.18933	.43672	-.14405	-.01540
E1	.16751	-.27032	-.11497	.28251	.31735	.18422	-.06649	.35632	-.06412	.24767	-.24764	-.05084
I11	-.11435	.04590	-.03922	.16649	.26667	.10598	-.04639	.25043	.10216	.27638	-.03112	.00763
G6	.11861	.06867	.13455	-.11971	-.63994	-.29221	.19616	-.53620	-.09523	-.54471	.21452	.15348
A9	.36118	.13491	.16958	-.14730	-.24730	-.26049	.43136	-.23621	.05103	-.25526	.16789	.32925
I7	.33814	.13238	.06933	-.08020	-.04318	.10612	.34335	-.01358	-.03753	.00844	.13713	.19672
I9	-.03789	.04646	.05198	.10424	.25628	-.04251	-.08269	.20388	.04723	.08501	-.00814	-.01145

	D3	H2	D2	H4	I3	G10	A1	G1	G8	C1	I5	E1
D3	1.00000											
H2	.02969	1.00000										
D2	-.61427	.02787	1.00000									
H4	.24324	-.13425	-.23430	1.00000								
I3	-.07633	-.02280	.14537	-.21648	1.00000							
G10	-.08890	.01661	.23806	-.31217	.21375	1.00000						
A1	.18374	-.09838	-.22271	.23112	-.14395	-.19945	1.00000					
G1	-.11763	.06594	.21176	-.44145	.11915	.19829	-.28063	1.00000				
G8	.30257	-.00931	-.23833	.56846	-.13691	-.25369	.25712	-.35491	1.00000			
C1	.24092	.02013	-.15618	.23854	-.04094	-.08224	.02558	-.07297	.22776	1.00000		
I5	.16423	-.02161	-.16583	.44225	-.15637	-.18061	.28028	-.27861	.34757	.17810	1.00000	
E1	.23009	.10691	-.26959	.21342	-.23323	-.23495	.07571	-.11154	.23782	.32492	.20176	1.00000
I11	.08722	.04757	-.12514	.24392	-.39436	-.23295	.21567	-.12805	.30418	.05328	.18619	.12194
G6	-.16044	.05291	.24723	-.47201	.27204	.52651	-.33106	.37337	-.46138	-.13530	-.34339	-.29601
A9	-.23021	.24420	.23256	-.24539	.10163	.15860	-.31276	.19444	-.24995	-.04097	-.10876	-.09220
I7	-.09167	.15185	.09941	.02511	.09149	-.04948	-.07216	-.09545	.06651	-.05164	-.02012	.03775
I9	.02422	-.05589	-.04969	.10706	-.22992	-.19654	.11295	.08945	.00078	.09151	.17151	.11356

	I11	G6	A9	I7	I9
I11	1.00000				
G6	-.24934	1.00000			
A9	-.12241	.25398	1.00000		
I7	-.00435	-.00320	.40515	1.00000	
I9	.09504	-.20225	-.03200	-.18351	1.00000

APPENDIX C1:

CENTRE FOR PAIN RELIEF
MERSEY REGIONAL DEPARTMENT OF MEDICAL AND SURGICAL NEUROLOGY

Tel: 051-525 3611

Our Ref:

Your Ref: Mr E. Ghadiali.

Walton Hospital
Rice Lane
Liverpool
L9 1AE

Dear

We are conducting scientific research into the problem of chronic pain. Your name has been obtained from our records at Walton Hospital Pain Clinic. As part of this research we are trying to find out how people cope with various problems.

This has involved a large scale survey into the methods of coping used by people who have pain. We would be grateful if you would kindly complete the enclosed questionnaires. We appreciate that some of the questions are quite personal and assure your answers will be treated in strictest confidence. Your answers will increase our understanding, and will help us in our efforts to develop better treatments for people suffering from pain.

Please enclose your completed questionnaires in the prepaid envelope and return them as quickly as possible. It is possible you have filled in some of these forms before, but please fill them in as it is part of continuous research. We apologise if for any reason you feel it was inappropriate for you to be sent these questionnaires.

Thank you for your kind co-operation, with best wishes.

Yours sincerely,

N. Radcliffe, Psychologist
R. Sutherland, Psychologist
E. Ghadiali, Clinical Neuropsychologist

PAIN COPING QUESTIONNAIRE

Birthdate _____ Sex _____

Marital status:

Married ( )
Re-married ( )
Single ( )
Separated ( )
Divorced ( )
Widowed ( )

Number of children -

At home _____ Ages _____

Left home _____ Ages _____

How many brothers do you have? _____

How many sisters do you have? _____

Employment status

( ) Employed full-time
( ) Employed part-time
( ) Retired
( ) Homemaker
( ) Unemployed due to pain
( ) Unemployed other reasons describe _____

Where do you suffer pain? _____

Have you attended the Pain Management Course? YES / NO

How helpful did you find the Pain Management Course:

Extremely Helpful	Quite Helpful	Not Helpful	Unhelpful

How has the intensity of the pain changed throughout the time you have had it?

( ) Increased
( ) Decreased
( ) Stayed the same

Date pain began _____

Circumstances of Onset (Please tick)

( ) Accident at home
( ) Accident at work
( ) Road Accident
( ) Following illness
( ) Following surgery
( ) Pain 'just began'
( ) Other injury (explain)

Rate how often your pain occurs (please tick)

( ) Continuously
( ) Several times a day
( ) Once a day
( ) Several times a week
( ) Several times a month
( ) Once a month
( ) Less frequent than once a month
( ) Never

On a scale from '0' to '10', with '0' representing no pain and '10' representing the worst imaginable pain (totally disabling), what number would you give your usual (average) pain these days? Circle the appropriate number:

0	No pain
1	Extremely mild pain
2	Very mild pain
3	Mild pain
4	Fairly mild pain
5	Medium pain
6	Fairly severe pain
7	Severe pain
8	Very severe pain
9	Extremely severe pain
10	Worst imaginable pain

DIRECTIONS: Please indicate the extent to which you agree or disagree with each of the following statements.

Put a circle around the appropriate word

Please answer ALL the questions.

1. (C3) I cannot distract myself from pain even if I keep busy.

strongly disagree | disagree | uncertain | agree | strongly agree

2. (B12) My pain is usually associated with doing certain things.

strongly disagree | disagree | uncertain | agree | strongly agree

3. (B10) I feel that I have no control over my pain whatsoever.

strongly disagree | disagree | uncertain | agree | strongly agree

4. (F1) My pain is always with me.

strongly disagree | disagree | uncertain | agree | strongly agree

5. (F4) I am convinced that I have something seriously wrong with me which the doctors cannot diagnose.

strongly disagree | disagree | uncertain | agree | strongly agree

6. (D1) Painkilling tablets are the only way that I can control my pain.

strongly disagree | disagree | uncertain | agree | strongly agree

7. (B5) It is possible that my pain can be made worse by what I am thinking or doing.

strongly disagree | disagree | uncertain | agree | strongly agree

8. (D4) When I have pain I usually take painkillers and rest.

strongly disagree | disagree | uncertain | agree | strongly agree

9. (A10) I feel happy about my life in general.

strongly disagree | disagree | uncertain | agree | strongly agree

10. (A3) I have lost my confidence.

strongly disagree | disagree | uncertain | agree | strongly agree

11. (E1) It is best not to talk about my pain to other people.

strongly disagree | disagree | uncertain | agree | strongly agree

12. (A17) I try to avoid other people when I have pain.

Strongly disagree | disagree | uncertain | agree | strongly agree

13. (B7) Relaxation does not have any effect on my pain.

Strongly disagree | disagree | uncertain | agree | strongly agree

14. (F3) Most of my family and friends know that I have a pain problem.

Strongly disagree | disagree | uncertain | agree | strongly agree

15. F5) I am resigned to experience pain for the rest of my life.

Strongly disagree | disagree | uncertain | agree | strongly agree

16. (E3) It is not helpful when people are sympathetic because of my pain.

Strongly disagree | disagree | uncertain | agree | strongly agree

17. (A2) I feel my pain cuts me off from other people.

Strongly disagree | disagree | uncertain | agree | strongly agree

18. (A19) I sometimes worry that I have a serious illness.

Strongly disagree | disagree | uncertain | agree | strongly agree

19. (C4) I often have to lie down and rest because of my pain.

Strongly disagree | disagree | uncertain | agree | strongly agree

20. (B8) When I experience pain I am usually able to do something in order to reduce it.

Strongly disagree | disagree | uncertain | agree | strongly agree

21. (A4) My pain affects the way I get on with my family and friends a great deal.

Strongly disagree | disagree | uncertain | agree | strongly agree

22. (A15) My pain makes me feel tense and frustrated.

Strongly disagree | disagree | uncertain | agree | strongly agree

23. (A14) I do not let my pain get me down.

Strongly disagree | disagree | uncertain | agree | strongly agree

24. (E4) It is always better to let other people know when I am in pain.

strongly disagree | disagree | uncertain | agree | strongly agree

25. (A8) My pain makes me feel miserable most of the time.

strongly disagree | disagree | uncertain | agree | strongly agree

26. (A20) I have to rely on other people a great deal because of my pain.

strongly disagree | disagree | uncertain | agree | strongly agree

27. (B2) When I am in pain it helps if I try to relax.

strongly disagree | disagree | uncertain | agree | strongly agree

28. (A9) I never go out because people do not want to know you when you have pain.

strongly disagree | disagree | uncertain | agree | strongly agree

29. (B1) Relaxation helps me to cope with pain.

strongly disagree | disagree | uncertain | agree | strongly agree

30. (E5) It is not helpful when people do too much for me because of my pain.

strongly disagree | disagree | uncertain | agree | strongly agree

31. (C2) It is always better to avoid anything that causes more pain.

strongly disagree | disagree | uncertain | agree | strongly agree

32. (A7) My pain stops me from leading a normal life.

strongly disagree | disagree | uncertain | agree | strongly agree

33. (A16) I find it very difficult to relax.

strongly disagree | disagree | uncertain | agree | strongly agree

34. (B4) When I have pain I can control it to some extent by thinking certain thoughts.

strongly disagree | disagree | uncertain | agree | strongly agree

35. (A13) My pain makes me opt out of things.

strongly disagree | disagree | uncertain | agree | strongly agree

36. (E2) I always try to hide the fact that I am in pain.

strongly disagree | disagree | uncertain | agree | strongly agree

37. (A6) My pain stops me from going places.

strongly disagree | disagree | uncertain | agree | strongly agree

38. (B11) I think that regular physical exercise is important in helping me to control my pain.

strongly disagree | disagree | uncertain | agree | strongly agree

39. (D3) I always take painkillers when I have pain.

strongly disagree | disagree | uncertain | disagree | strongly agree

40. (B9) Talking to other people about how I feel can help my pain.

strongly disagree | disagree | uncertain | agree | strongly agree

41. (C2) I can manage without the help of drugs.

strongly disagree | disagree | uncertain | agree | strongly agree

42. (A1) My pain makes it difficult to socialise with people

strongly disagree | disagree | uncertain | agree | strongly agree

43. (F2) It seems that whatever I do my pain is always there.

strongly disagree | disagree | uncertain | agree | strongly agree

44. (A11) I am coping well with my pain.

strongly disagree | disagree | uncertain | agree | strongly agree

45. (A5) My pain makes me feel useless and not needed.

strongly disagree | disagree | uncertain | agree | strongly agree

46. (C1) When I have pain it is best to stop what I am doing and rest.

strongly disagree | disagree | uncertain | agree | strongly agree

47. (A18) All my problems are caused by pain.

strongly disagree | disagree | uncertain | agree | strongly agree

48. (A12) I manage to do most things in life that I want to.

strongly disagree	disagree	uncertain	agree	strongly agree

49. (B3) In my day-to-day life I can influence my pain to some degree.

strongly disagree	disagree	uncertain	agree	strongly agree

50. (B6) I think that my pain can be affected by my state of mind.

strongly disagree	disagree	uncertain	agree	strongly agree

APPENDIX E Correlation matrix of variables from confirmatory factor analysis (N = 171)

	C3	B12	B10	D1	B5	D4	A10	A3	E1	A17	B7	E3
C3	1.00000											
B12	.07077	1.00000										
B10	.52325	-.11287	1.00000									
D1	.21025	.01356	.28719	1.00000								
B5	-.15022	.19098	-.15422	-.01964	1.00000							
D4	.23006	.07087	.15213	.57927	-.08237	1.00000						
A10	-.14227	-.09996	-.28983	-.00526	.02923	-.16452	1.00000					
A3	.21046	.13089	.34014	.14562	.00976	.25167	-.59645	1.00000				
E1	.01391	.05111	.05781	.05633	-.03779	-.06485	-.11729	.09727	1.00000			
A17	.13735	.13346	.26857	.06072	.11933	.15459	-.40973	.41386	.25211	1.00000		
B7	.34859	-.14155	.37674	.18606	-.32044	.15686	-.11730	.30317	.00771	.15481	1.00000	
E3	.05926	-.20874	.05778	-.01827	-.01462	.02902	-.03893	.02420	.34662	.20128	.09675	1.00000
A2	.14866	.36019	.29589	.18280	.15349	.22384	-.56196	.62160	.06850	.63593	.17616	.08743
A19	.14113	.06339	.22959	.04596	.05030	.17235	-.40028	.38505	.05452	.35386	-.00651	.11458
C4	.33635	.02153	.25853	.17183	-.13505	.38260	-.30749	.38030	.00213	.33812	.15465	-.02839
B8	-.22723	.25576	-.38483	.03109	.15300	.07935	.23092	-.20176	-.08489	-.10898	-.39798	-.10964
A4	.14774	.03601	.25688	-.00663	.12171	.07490	-.48929	.43505	.07809	.54166	.09593	.08581
A15	.17565	-.09358	.26762	.07985	.13549	.08289	-.35844	.46500	.01386	.40240	.16004	.07984
A14	-.21351	-.04836	-.16739	-.13528	-.07172	-.25394	.53781	-.51285	-.00082	-.43512	-.15069	-.09284
E4	.07045	.13183	.15369	.13459	-.02253	.19826	-.05597	.12901	-.45696	.04208	.03912	-.34065
A8	.29637	.05734	.38108	.12213	-.01253	.21028	-.37601	.54549	.05787	.49574	.38188	.08513
B2	-.17124	.24190	-.24931	-.08903	.24957	.04341	.03218	-.11449	-.00326	-.06549	-.55648	-.02126
A9	.29955	.11848	.22160	.10549	.00070	.25076	-.36488	.47830	.14898	.37939	.07981	.08413
B1	-.25339	.26818	-.38702	-.05992	.27467	.00976	.16831	-.21756	-.04162	-.07665	-.63095	-.11234
B5	-.27875	-.32517	-.15655	-.14816	.15116	-.15366	.07874	-.08563	.02488	-.10313	-.22796	.01598
C2	.23722	.04020	.15728	.19374	.02515	.24955	-.07744	.23532	-.03107	.04511	.14310	.02241
A7	.22842	-.30177	.40892	.09931	-.06934	.13775	-.57303	.60838	.08537	.48909	.25638	.08420
A16	.17109	-.22371	.27537	.17355	.05263	.05140	-.19662	.33810	.21174	.25821	.32636	.19125
B9	-.31148	.15802	-.28011	-.16182	.31901	-.16382	.13306	-.19062	-.01992	-.03757	-.30596	-.11667
A13	.24738	.07913	.28227	.13799	-.00919	.25930	-.40819	.45109	.02523	.37430	.28498	.13885
E2	-.03219	.01972	-.11781	.13773	-.00998	.03679	-.01813	.01894	.32959	.08369	.01132	.21371
A6	.13868	.10078	.32131	.15165	-.01650	.24840	-.50197	.51591	.00519	.35703	.15901	.08709
A11	-.31127	.19067	-.34092	-.15085	.21826	-.25883	.13111	-.16666	.05619	-.11153	-.48875	-.18723
D3	.32170	.01288	.34625	.59015	-.03536	.61540	-.20098	.29827	.00462	.17349	.27289	-.01832
B9	-.23571	.22307	-.18892	-.01902	.26666	-.10171	.13531	-.06637	-.20918	-.17972	-.19957	-.32766
B2	-.27178	.04763	-.39115	-.06769	.05458	-.47737	.20913	-.20110	.10274	-.09955	-.27007	-.01632
A1	.22534	-.03283	.39883	.13834	.01894	.12535	-.47597	.50967	.07336	.49072	.17851	.15873
A11	-.13920	.03056	-.24987	-.01377	-.00295	-.09780	.45261	-.50084	-.11657	-.36815	-.27248	-.14320
A5	.22789	.15427	.34095	.15364	.07057	.25184	-.52802	.64522	.12788	.49085	.12748	.02534
C1	.33441	.28440	.28526	.28180	-.01475	.46676	-.19850	.33072	.04311	.28755	.04983	.11853
A18	.25117	.06010	.36495	.07341	-.06561	.18661	-.24743	.33663	-.00780	.32885	.18646	.19188
A12	-.15797	.03375	-.30447	-.02035	.08000	-.15198	.50641	-.42763	-.01350	-.28518	-.16424	-.11764
B3	-.33838	.32186	-.45072	-.14013	.22990	-.21740	.13439	-.17784	-.02978	-.10054	-.38082	-.13117
B6	-.19710	.12965	-.11353	-.11125	.54233	-.11554	.02146	.03494	.03493	.19449	-.21527	.08294

	A2	A19	C4	B8	A4	A15	A14	E4	A8	B2	A9	B1

A2	1.00000											
A19	.41374	1.00000										
C4	.24779	.19966	1.00000									
B3	-.13725	-.19018	-.03999	1.00000								
A4	.61268	.42849	.30118	-.13847	1.00000							
A15	.51719	.35197	.28418	-.16670	.49589	1.00000						
A14	-.53196	-.42710	-.28080	.23537	-.55044	-.47601	1.00000					
B8	.09562	.17718	.18184	.05752	.06066	.06452	-.09526	1.00000				
A8	.54404	.35498	.32012	-.27693	.47852	.45221	-.51563	.15868	1.00000			
B2	.33172	.02901	.05674	.35522	-.04319	-.05883	-.00938	-.03443	-.22648	1.00000		
A9	.49811	.38770	.27621	-.11762	.39988	.31186	-.39885	.06694	.40332	-.04852	1.00000	
B1	-.13906	-.06988	-.00327	.39748	-.10253	-.19395	.08971	-.02061	-.27468	.80093	-.12256	1.00000
B5	-.06352	-.15951	-.10169	-.00503	-.07191	.03902	.06368	-.14447	-.07941	.11525	-.14173	.19283
C2	.14822	.15733	.24320	-.22238	-.01088	.15425	-.19641	.16497	.35605	-.05997	.12074	-.14912
A7	.65641	.39716	.82553	-.19137	.56779	.54121	-.43647	.13184	.58734	-.15632	.45805	-.28201
A16	.36140	.21192	.05228	-.23670	.31026	.52544	-.29488	-.05603	.45579	-.23593	.24026	-.26056
B4	-.04666	-.15610	-.18832	.34851	-.08619	-.05113	.21792	.08567	-.18364	.40069	-.03258	.40165
A13	.53108	.25896	.42692	-.12563	.37878	.38151	-.33125	.06606	.42170	-.06243	.30212	-.15367
B2	.01952	.02384	.09068	.05396	.06631	.09229	.01958	-.36693	.09128	.03088	.03770	.11781
A6	.51432	.33560	.37629	-.19023	.48915	.41007	-.38896	.05184	.48391	-.08338	.44357	-.21925
B11	-.12276	-.10481	-.30800	.34402	-.12213	-.11354	.19645	-.04167	-.28462	.40583	-.08065	.45897
B3	.26567	.20555	.26342	-.13148	.19027	.22308	-.26678	.15596	.29613	-.21530	.25045	-.19243
B9	-.09609	-.09174	-.13388	.32521	-.07669	-.03570	.09310	.23305	-.09299	.25385	-.10114	.32292
B2	-.21049	-.25628	-.18625	.09053	-.19312	-.24645	.18884	-.13707	-.27273	.25276	-.18815	.38787
A1	.64277	.48427	.38857	-.24032	.66233	.46606	-.48695	.07605	.57008	-.08998	.54212	-.17778
A11	-.43169	-.39058	-.27555	.27989	-.47477	-.43399	.52604	.00883	-.51248	.20757	-.32951	.29621
A5	.63638	.57465	.38705	-.13056	.61084	.45077	-.52732	.15572	.60448	-.06630	.57079	-.17386
C1	.27239	.23253	.45807	.00520	.17010	.05922	-.22826	.18710	.24179	.16204	.34359	.03996
A18	.35727	.32471	.31303	-.04830	.42900	.26577	-.26800	.11759	.40171	-.01503	.37887	-.13959
A12	-.42941	-.26423	-.35888	.18402	-.46524	-.29705	.31270	.00983	-.37895	.10658	-.28008	.23788
B3	-.17684	-.11254	-.22366	.52257	-.10277	-.11456	.20725	.07750	-.32311	.32853	-.18667	.39879
B6	.15118	.03583	.04117	.26522	.21946	.16398	-.05397	-.06359	.01375	.27431	.02228	.28393

	E5	C2	A7	A16	B4	A13	E2	A6	B11	P3	P9	P2
E5	1.00000											
C2	-.07639	1.00000										
A7	-.09301	.15226	1.00000									
A16	.01065	.21954	.30518	1.00000								
P8	.23388	-.22754	-.32566	-.12537	1.00000							
A13	-.10718	.23180	.61219	.28421	-.27070	1.00000						
E2	.31273	-.08438	.09647	.18029	-.06242	.11336	1.00000					
A6	-.14309	.23065	.64622	.22478	-.26117	.70064	.13852	1.00000				
B11	.27268	-.27752	-.23676	-.12061	.53136	-.27216	.04722	-.28816	1.00000			
P3	-.13865	.34396	.21556	.21896	-.23770	.26558	.07802	.37910	-.29844	1.00000		
P9	.06666	-.07080	-.20206	-.06764	.40864	-.09018	-.08522	-.12279	.36780	-.13369	1.00000	
P2	.24192	-.17121	-.29361	-.26363	.29009	-.29582	-.12958	-.40952	.34383	-.58132	.16935	1.00000
A1	-.02732	.16055	.70889	.36539	-.22933	.52124	.07206	.61873	-.24056	.32559	-.17998	-.26854
A11	.33457	-.23996	-.52677	-.37432	.25516	-.37991	-.08632	-.44253	.35578	-.29839	.18761	.28566
A5	-.12217	.22938	.61530	.30763	-.13274	.38032	.11309	.50253	-.18752	.30958	-.04832	-.25377
C1	-.25877	.35185	.25088	.03871	-.13860	.24519	.01047	.28124	-.25300	.31302	-.20568	-.18560
A18	-.23157	.18320	.48047	.10450	-.19016	.38442	.08179	.42794	-.18936	.17919	-.06213	-.26042
A12	.35488	-.12085	-.62779	-.19529	.25631	-.58551	-.07188	-.59891	.30258	-.15161	.20205	.29867
B3	.27065	-.23889	-.24362	-.26253	.41296	-.21564	-.02830	-.25164	.47289	-.23194	.36490	.34139
B6	.17356	-.18557	-.05995	.01252	.42972	-.05155	.01253	-.04288	.30706	-.14186	.25178	.17623

	P1	A11	A5	C1	A18	A12	B3	B6
A1	1.00000							
A11	-.56240	1.00000						
A5	.65423	-.51029	1.00000					
C1	.24612	-.18552	.35880	1.00000				
A18	.53035	-.30548	.44036	.31014	1.00000			
A12	-.56782	.46351	-.42772	-.18331	-.39505	1.00000		
B3	-.13988	.20914	-.18471	-.17033	-.18415	.30446	1.00000	
B6	.03488	.00734	.10763	-.09568	-.03926	.15928	.37242	1.00000

APPENDIX F

Comparisons of 1st and 2nd wave subjects on demographic and pain characteristics

TABLE Fi Breakdown of males and females for 1st and 2nd wave samples.

	1st WAVE	2nd WAVE
MALES	103	59
FEMALES	195	112
TOTAL	198	171

Chi-square = 1.77 p = 0.99 (NS)

TABLE Fii Breakdown of marital status for 1st and 2nd wave samples.

	1st WAVE	2nd WAVE
MARRIED	200	112
RE-MARRIED	9	7
SINGLE	35	19
SEPARATED	15	6
DIVORCED	3	3
WIDOWED	36	24
TOTAL	298	171

Chi-square = 1.45 D.F.= 5 p = 0.92 (NS)

TABLE Fiii Breakdown of employment status for 1st and 2nd wave sample.

	1st WAVE	2nd WAVE
EMPLOYED FULL TIME	41	20
EMPLOYED PART TIME	29	13
RETIRED	88	54
HOMEMAKER	45	28
UNEMPLOYED DUE TO PAIN	66	40
UNEMPLOYED DUE TO OTHER REASONS	28	15
TOTAL	297	170

Chi-Square = 1.29 ; D.F = 5 ; p = 0.93 (NS)

TABLE Fiv Table breakdown of circumstances of onset of pain for 1st and 2nd wave.

	1st WAVE	2nd WAVE
ACCIDENT AT HOME	22	8
ACCIDENT AT WORK	44	18
ROAD ACCIDENT	17	14
FOLLOWING ILLNESS	31	18
FOLLOWING SURGERY	34	21
PAIN "JUST BEGAN"	101	67
OTHER INJURY	45	19
TOTAL	294	165

Chi-square = 5.9 D.F = 6 p = 0.45 (NS)

TABLE Fv Frequency of pain for 1st and 2nd wave.

	1st WAVE	2nd WAVE
CONTINUOUSLY	210	118
SEVERAL TIMES A DAY	53	32
ONCE A DAY	5	4
SEVERAL TIMES A WEEK	14	6
SEVERAL TIMES A MONTH	4	5
ONCE A MONTH	6	2
LESS FREQUENT	1	1
TOTAL	293	168

Chi-square = 2.72 D.F = 6 p = 0.84 (NS)

TABLE Fvi Breakdown of location of pain for 1st and 2nd wave samples.

	1st WAVE	2nd WAVE
BACK	56	37
LEG	24	13
ARMS	7	5
HEAD	18	13
SHOULDERS, CHEST, ABDOMEN	2	3
FACE	11	11
MORE THAN ONE AREA	156	77
ALL OVER	7	11
TOTAL	281	170

Chi-square = 2.06 D.F = 2 p = 0.35

TABLE Fvii Breakdown of pattern of pain change over time for 1st and 2nd wave samples.

	1st WAVE	2nd WAVE
INCREASED	142	94
DECREASED	52	24
STAYED THE SAME	90	48
TOTAL	284	166

Chi-square = 2.06 D.F = 2 p = 0.35

TABLE Fviii Breakdown of attendance on Pain Management Course (PMC) for 1st and 2nd wave.

	1st WAVE	2nd WAVE
ATTENDED PMC	66	83
NOT ATTENDED PMC	229	88
TOTAL	295	171

Chi-square = 34.07 $p < 0.001$

APPENDIX G

Comparisons of 2nd wave sample.

Attendance on PMC Vs non-attendance on PMC

Description of sample for test-retest scores.

TABLE Gi Mean scores on severity of pain rating scale for attendance and non-attendance on PMC. Visual analogue scale 1-10cm.

	NO. OF CASES	MEAN	S.D	D.F	2-TAIL PROB.
PMC	81	6.23	1.56		
				166	0.202 (NS)
N/A PMC	87	6.55	1.64		

TABLE Gii Frequencies of males and females for attendance and non-attendance on PMC.

	PMC	N/A PMC
MALE	32	27
FEMALE	51	61
TOTAL	73	88

Chi-square = 0.84 D.F = 1 p = 0.27 (NS)

TABLE Giii Frequencies of marital status for attendance and non-attendance on PMC.

	PMC	N/A PMC
MARRIED	51	61
RE-MARRIED	3	4
SINGLE	11	8
SEPARATED	2	4
DIVORCED	3	
WIDOWED	13	11
TOTAL	83	88

Chi-square=52 D.F=5 p=0.39

TABLE Giv Frequencies of employment status for attendance and non-attendance on PMC.

	PMC	N/A PMC
EMPLOYED FULL-TIME	9	11
EMPLOYED PART-TIME	3	10
RETIRED	27	27
HOMEMAKER	12	16
UNEMPLOYED DUE TO PAIN	24	16
UNEMPLOYED FOR OTHER REASONS	8	7
TOTAL	83	87

Chi-square = 6.11 D.F = 5 p = 0.29 (NS)

TABLE Gv Frequencies of location of pain for attendance and non-attendance on PMC.

	PMC	N/A PMC
BACK	23	14
LEG	4	9
ARMS	4	1
HEAD	3	10
SHOULDERS, CHEST, ABDOMEN	2	1
FACE	5	6
MORE THAN ONE AREA	38	39
ALL OVER	4	7
TOTAL	83	87

Chi-square = 10.84 D.F = 7 p = 0.14 (NS)

TABLE Gvi Pattern of pain for attendance and non-attendance on PMC.

	PMC	N/A PMC
INCREASED	50	44
DECREASED	8	16
STAYED THE SAME	22	26
TOTAL	80	86

Chi-square = 3.17 D.F = 2 p = 0.21

TABLE Gvii Onset of pain for attendance and non-attendance om PMC.

	PMC	N/A PMC
ACCIDENT AT HOME	4	4
ACCIDENT AT WORK	12	6
ROAD ACCIDENT	8	6
FOLLOWING ILLNESS	5	13
FOLLOWING SURGERY	9	12
PAIN "JUST BEGAN"	31	36
OTHER INJURY	9	10
TOTAL	81	87

Chi-square = 7.46 D.F = 5 p = 0.27 (NS)

TABLE Gviii Frequency of pain report for attendance and non-attendance on PMC.

	PMC	N/A PMC
CONTINUOUSLY	62	56
SEVERAL TIMES A DAY	14	18
ONCE A DAY	1	3
SEVERAL TIMES A WEEK	1	5
SEVERAL TIMES A MONTH	3	2
ONCE A MONTH		2
LESS FREQUENT		1
TOTAL	81	87

Chi-square = 7.46 D.F = 5 p = 0.27 (NS)

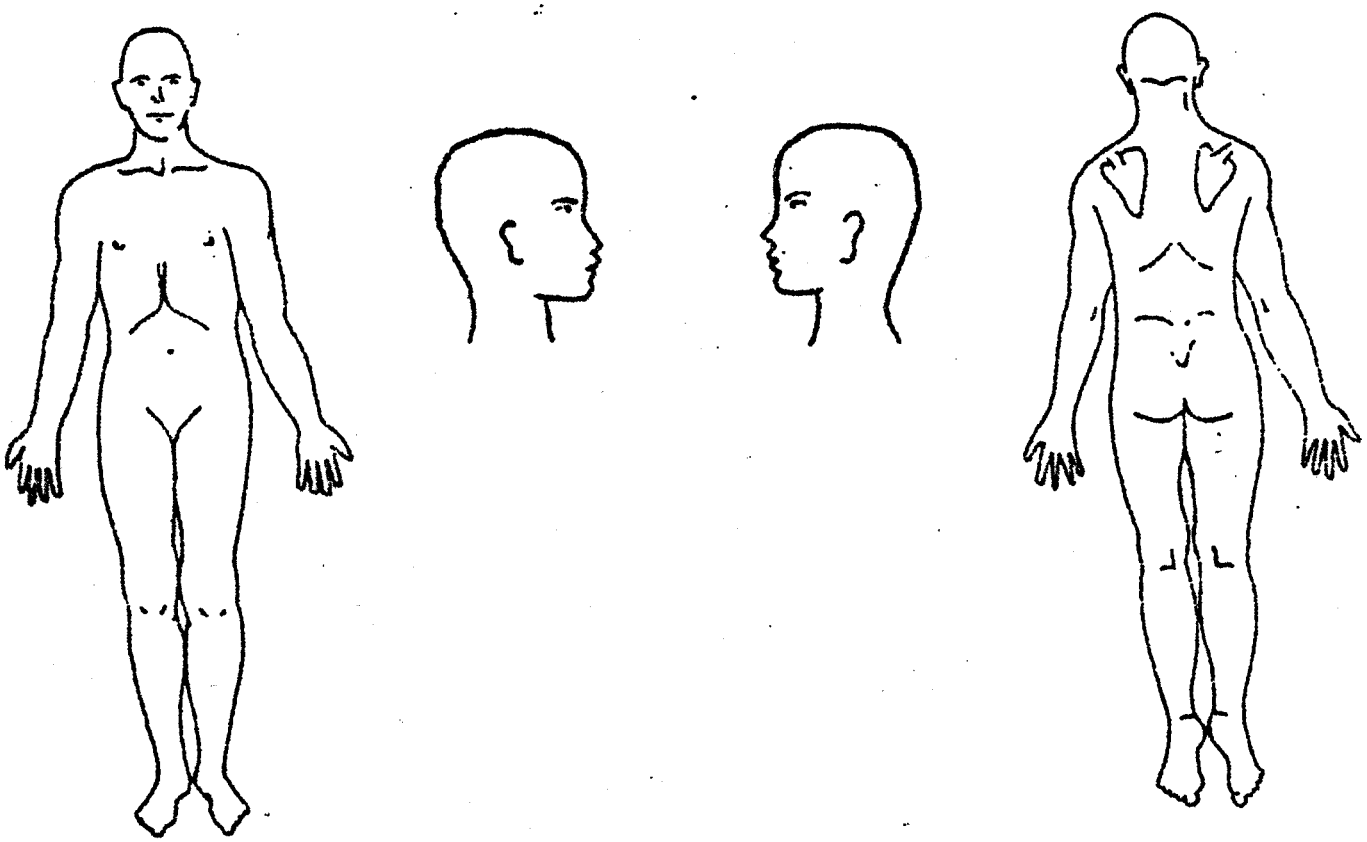
PAIN QUESTIONNAIRE I : USUAL PAIN

Name: .....

The aim of this questionnaire is to find out more about your usual or average pain. It asks two major questions. Where is it and how does it change over time.

1. Where is your usual (average) pain

Please mark on the drawings below the areas where your usual pain is, put a dot in the centre and a circle around the area. Put E if external, or I if internal, near the areas which you mark. Put EI, if your pain is both external and internal. Also if you have one or more areas which can trigger your pain when pressure is applied to them, mark each with an X.



2. How does your pain change with time?

a. Put a tick by the one group of words below which best describes the usual pattern of your pain.

( ) Continous, Steady, Constant
( ) Rhythmic, Periodic, Intermittent
( ) Brief, Momentary, Transient

b. Put a tick by the word which best describes the frequency of your usual pain

( ) Seldom ( ) Monthly ( ) Weekly ( ) Daily
( ) Several times a day

c. Put a tick by the word which best describes the duration of your usual pain

( ) Seconds or Minutes ( ) Hours ( ) Days
( ) Constant-waxes and wanes ( ) Constant-unchanging

d. How does your pain change during the day? Put a tick by the best description of your usual pain of those listed below

( ) Worst on rising, gets better during the day
( ) Least on rising, gets worse during the day
( ) Worst at night when trying to sleep
( ) None of the above

e. On a scale from 0 to 100, with 0 representing no pain and 100 representing pain so severe you would not be able to tolerate it more than a minute or two, what number would you give your usual (average) pain these days?

number =

f. The following five words describe pain of increasing intensity

1	2	3	4	5
Mild	Discomforting	Distressing	Horrible	Excruiating

Put a number in the brackets to indicate which of the above words best describes:-

(i) Your pain at its worst ( )
(ii) Your pain at its least ( )
(iii) The worst toothache you've ever had ( )
(iv) The worst headache you've ever had ( )
(v) The worst stomach-ache you've ever had ( )

PAIN QUESTIONNAIRE 2 : PAIN RIGHT NOW

Name: .....

The aim of this questionnaire is to find out more about your pain at this precise moment in time. It asks two major questions, what does your pain feel like and how strong is it right now?

1. What does your pain feel like?

a. Put a tick by the group of words below which best describes the pattern of your pain at this moment

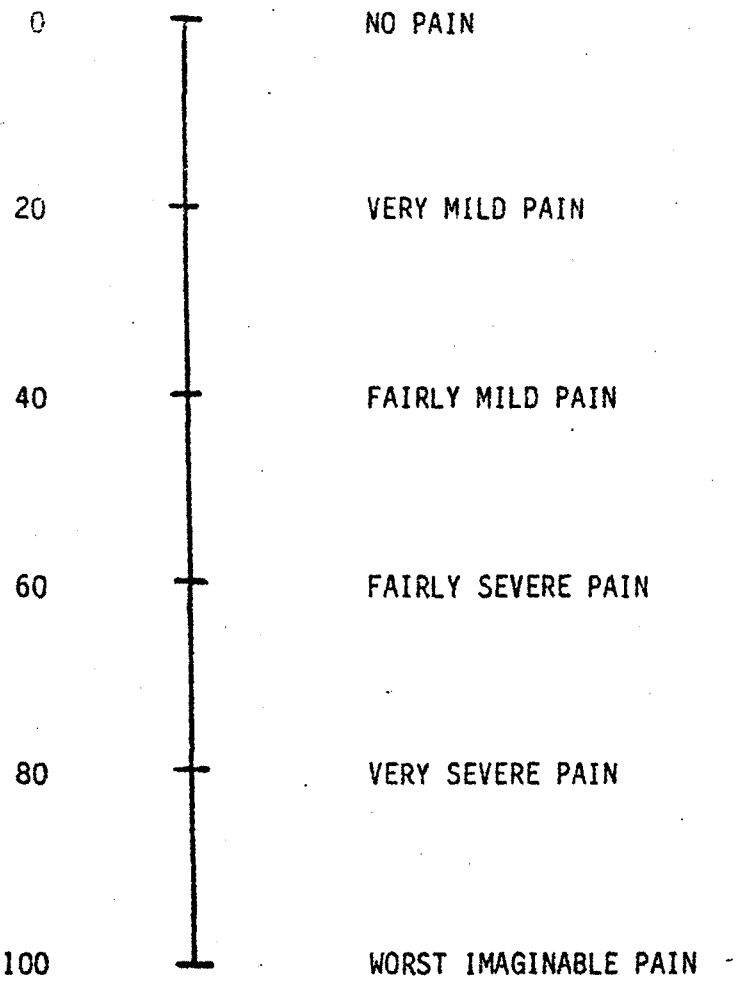
( ) Continuous, Steady, Constant
( ) Rhythmic, Periodic, Intermittent
( ) Brief, Momentary, Transient

b. Some of the words below may describe your pain at the present moment. Put atick by those words that best describe it. Leave out any category that is not suitable. Use only a single word in each appropriate category - the one that applies best.

1	2	3	4
Flickering	Jumping	Pricking	Sharp
Quivering	Flashing	Boring	Cutting
Pulsing	Shooting	Drilling	Lacerating
Throbbing		Stabbing	
Beating		Lancinating	
Pounding			
5	6	7	8
Pinching	Tugging	Hot	Tingling
Pressing	Pulling	Burning	Itchy
Gnawing	Wrenching	Scalding	Smarting
Cramping		Searing	Stinging
Crushing			
9	10	11	12
Dull	Tender	Tiring	Sickening
Sore	Taut	Exhausting	Suffocating
Hurting	Rasping		
Aching	Splitting		
Heavy			
13	14	15	16
Fearful	Punishing	Wretched	Annoying
Frightful	Grueling	Blinding	Troublesome
Terrifying	Cruel		Miserable
	Vicious		Intense
	Killing		Unbearable
17	18	19	20
Spreading	Tight	Cool	Nagging
Radiating	Numb	Cold	Nauseating
Penetrating	Drawing	Freezing	Agonizing
Piercing	Squeezing		Dreadful
	Tearing		Torturing

2. How strong is your pain?

Put a cross on the line below at the point which indicates the degree of pain you are experiencing at this moment in time



LEEDS SCALE ANSWER SHEET. **Appendix H.2**

NAME:_____ DATE:_____

Please indicate how you are feeling now,or how you have been feeling in the last day or two, by UNDERLINING the correct response to each of the following items:

1). I wake early and then sleep badly for the rest of the night.
a) Yes, definitely.
b) Yes, sometimes.
c) No,not much.
d) No,not at all.

2). I get very frightened or panic feelings for no reason at all.
a) Yes, definitely.
b) Yes, sometimes.
c) No,not much.
d) No,not at all.

3). I feel miserable and sad.
a) Yes, definitely.
b) Yes, sometimes.
c) No,not much.
d) No,not at all.

4). I feel anxious when I go out of the house on my own.
a) Yes, definitely.
b) Yes, sometimes.
c) No,not much.
d) No,not at all.

5). I have lost interest in things.
a) Yes, definitely.
b) Yes, sometimes.
c) No,not much.
d) No,not at all.

6). I get palpitations, or a sensation of "butterflies" in my stomach or chest.
a) Yes, definitely.
b) Yes, sometimes.
c) No,not much.
d) No,not at all.

7). I still enjoy the things I used to.
a) Yes, definitely.
b) Yes, sometimes.
c) No,not much.
d) No,not at all.

8). I feel scared or frightened.
a) Yes, definitely.
b) Yes, sometimes.
c) No,not much.
d) No,not at all.

H.2

9). I feel life is not worth living.
a) Yes, definitely.
b) Yes, sometimes.
c) No,not much.
d) No,not at all.

10). I feel tense or "wound up".
a) Yes, definitely.
b) Yes, sometimes.
c) No,not much.
d) No,not at all.

11). I find it easy to do the things I used to.
a) Yes, definitely.
b) Yes, sometimes.
c) No,not much.
d) No,not at all.

12). I get dizzy attacks or feel unsteady.
a) Yes, definitely.
b) Yes, sometimes.
c) No,not much.
d) No,not at all.

13). I have a good appetite.
a) Yes, definitely.
b) Yes, sometimes.
c) No,not much.
d) No,not at all.

14). I am restless and can't keep still.
a) Yes, definitely.
b) Yes, sometimes.
c) No,not much.
d) No,not at all.

15). I am more irritable than usual.
a) Yes, definitely.
b) Yes, sometimes.
c) No,not much.
d) No,not at all.

PLEASE CHECK THAT YOU HAVE ANSWERED ALL THE ITEMS: THANK YOU.

INSTRUCTIONS: Please indicate the extent to which you agree or disagree with the following statements by UNDERLINING the appropriate word(s).

1. If I get sick, it is my own behaviour which determines how soon I get well again.

strongly disagree | disagree | slightly disagree | slightly agree | agree | strongly agree

2. No matter what I do, if I am going to get sick, I will get sick.

strongly disagree | disagree | slightly disagree | slightly agree | agree | strongly agree

3. Having regular contact with my doctor is the best way for me to avoid illness.

strongly disagree | disagree | slightly disagree | slightly agree | agree | strongly agree

4. Most things that affect my health happen to me by accident.

strongly disagree | disagree | slightly disagree | slightly agree | agree | strongly agree

5. Whenever I don't feel well, I should consult a medically trained professional.

strongly disagree | disagree | slightly disagree | slightly agree | agree | strongly agree

6. I am in control of my health.

strongly disagree | disagree | slightly disagree | slightly agree | agree | strongly agree

7. My family has a lot to do with my becoming sick or staying healthy.

strongly disagree | disagree | slightly disagree | slightly agree | agree | strongly agree

8. When I get sick I am to blame.

strongly disagree | disagree | slightly disagree | slightly agree | agree | strongly agree

9. Luck plays a big part in determining how soon I will recover from an illness.

strongly disagree | disagree | slightly disagree | slightly agree | agree | strongly agree

10. Health professionals control my health.

strongly disagree | disagree | slightly disagree | slightly agree | agree | strongly agree

11. My good health is largely a matter of good fortune.

strongly disagree	disagree	slightly disagree	slightly agree	agree	strongly agree

12. The main thing which affects my health is what I myself do.

strongly disagree	disagree	slightly disagree	slightly agree	agree	strongly agree

13. If I take care of myself I can avoid illness.

strongly disagree	disagree	slightly disagree	slightly agree	agree	strongly agree

14. When I recover from an illness, its usually because other people have been taking good care of me.

strongly disagree	disagree	slightly disagree	slightly agree	agree	strongly agree

15. No matter what I do, I'm likely to get sick.

strongly disagree	disagree	slightly disagree	slightly agree	agree	strongly agree

16. If it's meant to be I will stay healthy.

strongly disagree	disagree	slightly disagree	slightly agree	agree	strongly agree

17. If I take the right actions I can stay healthy.

strongly disagree	disagree	slightly disagree	slightly agree	agree	strongly agree

18. Regarding my health, I can only do what my doctor tells me to do.

strongly disagree	disagree	slightly disagree	slightly agree	agree	strongly agree

PLEASE CHECK YOU HAVE ANSWERED ALL THE QUESTIONS. THANK YOU.

ACTIVITY QUESTIONNAIRE. **H.4**

For each of the following items please rate each activity from 1 --> 5 to best describe what you are able to do now.

Please circle the appropriate number.

1 = can do as normal
2 = can do with a little difficulty
3 = can do with some difficulty
4 = can do with much difficulty
5 = cannot do at all

1) Stand unaided for long periods.	1	2	3	4	5
2) Sit for long periods.	1	2	3	4	5
3) Lie down for long periods.	1	2	3	4	5
4) Walk a long distance.	1	2	3	4	5
5) Drive a long journey.	1	2	3	4	5
6) Bend to pick something up from the floor.	1	2	3	4	5
7) Lift an object from the floor.	1	2	3	4	5
8) Household activities:					
a) cooking	1	2	3	4	5
b) vacuuming	1	2	3	4	5
c) making beds	1	2	3	4	5
d) ironing	1	2	3	4	5
e) cleaning windows	1	2	3	4	5
f) decorating	1	2	3	4	5
g) cleaning the car	1	2	3	4	5
9) Employment activity.	1	2	3	4	5
10) Sexual activity.	1	2	3	4	5
11) Indoor leisure activities (state which)	1	2	3	4	5
12) Outdoor activities (state which)	1	2	3	4	5
13) Visiting friends in their home.	1	2	3	4	5
14) Going to pub/cinema/theatre.	1	2	3	4	5
15) Swimming.	1	2	3	4	5
16) Other sports (state which)	1	2	3	4	5

During the last week how many times did you:-

1) Stand unaided for long periods.

2) Sit for long periods.

3) Lie down for long periods.

4) Walk a long distance.

5) Drive a long journey.

6) Bend to pick something up from the floor.

7) Lift an object from the floor.

8) Do household activities:
   a) cook a meal
   b) vacuum the floor
   c) make the bed
   d) iron

During the last month, how many times did you:-

   e) clean the windows
   f) decorate
   g) clean the car

9) Go to work (if employed).

10) Have sex with your partner.

11) Do the indoor leisure activity you stated overleaf.

12) Do the outdoor leisure activity you stated above.

13) Visit friends in their home.

14) Go to the pub/cinema/theatre.

15) Go swimming.

16) Take part in some other sport.

APPENDIX J

Method for calculating standard scores for Pain Coping Scales

Raw scores of a given scale(X_1) are converted to standard score (X_2) based on a mean of 100 and standard deviation of 15 by means of the following equation:-

$$X_2 = 15/SD_S \; X_1 + [100 - M_S(15/SD_S)]$$

Where,

X_1 = raw score of pain coping scale

M_s = mean scale score from standardisation sample

SD_s = standard deviation of scale score from standardisation sample

X_2 = pain coping scale score

See table 5.10 for means and standard deviations of Pain Coping Scale scores from standardisation sample.

LEEDSAA

COUNT	VALUE	ONE SYMBOL EQUALS APPROXIMATELY .20 OCCURRENCES
1	.00	*****
0	1.00	
3	2.00	**********
4	3.00	**********
5	4.00	**********
4	5.00	**********
2	6.00	**********
0	7.00	
6	8.00	**********
4	9.00	**********
6	10.00	**********
3	11.00	**********
1	12.00	*****
1	13.00	*****
3	14.00	**********
2	15.00	**********
0	16.00	
2	17.00	**********

I.....I.....I.....I.....I.....I
0 2 4 6 8 10
HISTOGRAM FREQUENCY

MEAN	8.043	STD ERR	.631	MEDIAN	8.000
MODE	8.000	STD DEV	4.324	VARIANCE	18.694
KURTOSIS	-.726	S E KURT	.681	SKEWNESS	.253
S E SKEW	.347	RANGE	17.000	MINIMUM	.000
MAXIMUM	17.000	SUM	378.000		

VALID CASES	47	MISSING CASES	0

Fig. K1 Distribution of scores from Leeds anxiety scale

LEEDSDA

COUNT	VALUE	ONE SYMBOL EQUALS APPROXIMATELY .20 OCCURRENCES
1	1.00	*****
0	2.00	
1	3.00	*****
4	4.00	********************
2	5.00	**********
3	6.00	***************
2	7.00	**********
4	8.00	********************
2	9.00	**********
6	10.00	******************************
4	11.00	********************
5	12.00	*************************
6	13.00	******************************
2	14.00	**********
3	15.00	***************
1	16.00	*****
0	17.00	
1	18.00	*****

I.....I.....I.....I.....I.....I
0 2 4 6 8 10
HISTOGRAM FREQUENCY

MEAN	9.809	STD ERR	.565	MEDIAN	10.000
MODE	10.000	STD DEV	3.877	VARIANCE	15.028
KURTOSIS	-.562	S E KURT	.681	SKEWNESS	-.246
S E SKEW	.347	RANGE	17.000	MINIMUM	1.000
MAXIMUM	18.000	SUM	461.000		

VALID CASES	47	MISSING CASES	0

Fig. K1 Distribution of scores from Leeds depression scale

COUNT	MIDPOINT	ONE SYMBOL EQUALS APPROXIMATELY .20 OCCURRENCES
0	4.0	
0	5.5	
0	7.0	
1	8.5	*****
2	10.0	**********
2	11.5	**********
3	13.0	**********
6	14.5	**********
3	16.0	**********
6	17.5	**********
2	19.0	**********
7	20.5	**********
1	22.0	*****
5	23.5	**********
2	25.0	**********
2	26.5	**********
1	28.0	*****
2	29.5	**********
0	31.0	
0	32.5	
0	34.0	

I....+....I....+....I....+....I....+....I....+....I
0 2 4 6 8 10
HISTOGRAM FREQUENCY

MEAN	18.733	STD ERR	.809	MEDIAN	18.000
MODE	21.000	STD DEV	5.429	VARIANCE	29.473
KURTOSIS	-.641	S E KURT	.695	SKEWNESS	.163
S E SKEW	.354	RANGE	22.000	MINIMUM	8.000
MAXIMUM	30.000	SUM	843.000		

VALID CASES	45	MISSING CASES	2

Fig. K2 Distribution of scores from Multi-Dimensional Locus of control: "Chance" scale

MHLCPA

COUNT	MIDPOINT	ONE SYMBOL EQUALS APPROXIMATELY .20 OCCURRENCES
0	4.0	
1	5.5	*****
1	7.0	*****
3	8.5	**********
1	10.0	*****
3	11.5	**********
3	13.0	**********
7	14.5	**********
4	16.0	**********
6	17.5	**********
3	19.0	**********
4	20.5	**********
3	22.0	**********
3	23.5	**********
2	25.0	**********
0	26.5	
0	28.0	
0	29.5	
0	31.0	
1	32.5	*****
0	34.0	

I....+....I....+....I....+....I....+....I....+....I....+....I
0 2 4 6 8 10
HISTOGRAM FREQUENCY

MEAN	16.644	STD ERR	.796	MEDIAN	16.000
MODE	17.000	STD DEV	5.339	VARIANCE	28.507
KURTOSIS	.357	S E KURT	.695	SKEWNESS	.327
S E SKEW	.354	RANGE	26.000	MINIMUM	6.000
MAXIMUM	32.000	SUM	749.000		

VALID CASES	45	MISSING CASES	2

Fig. K2 Distribution of scores from Multi-Dimensional Locus of Control: "Powerful others" scale

MHLCIA

COUNT	VALUE	ONE SYMBOL EQUALS APPROXIMATELY .20 OCCURRENCES
1	11.00	*****
0	12.00	
0	13.00	
3	14.00	**********
2	15.00	**********
4	16.00	**********
1	17.00	*****
3	18.00	**********
4	19.00	**********
4	20.00	**********
7	21.00	**********
1	22.00	*****
3	23.00	**********
1	24.00	*****
4	25.00	**********
0	26.00	
2	27.00	**********
1	28.00	*****
1	29.00	*****
2	30.00	**********
1	31.00	*****

I.....I.....I.....I.....I.....I
0 2 4 6 8 10
HISTOGRAM FREQUENCY

MEAN	20.844	STD ERR	.716	MEDIAN	21.000
MODE	21.000	STD DEV	4.800	VARIANCE	23.043
KURTOSIS	-.423	S E KURT	.695	SKEWNESS	.298
S E SKEW	.354	RANGE	20.000	MINIMUM	11.000
MAXIMUM	31.000	SUM	938.000		

VALID CASES	45	MISSING CASES	2

Fig. K2 Distribution of scores from Multi-dimensional Locus of control - "Internal"

ACTIV1A

COUNT	MIDPOINT	ONE SYMBOL EQUALS APPROXIMATELY .20 OCCURRENCES
0	11	
0	16	
3	21	**********
3	26	**********
2	31	**********
2	36	**********
2	41	**********
4	46	**********
1	51	**********
1	56	**********
5	61	**********
3	66	**********
1	71	**********
6	76	**********
3	81	**********
3	86	**********
3	91	**********
3	96	**********
1	101	**********
1	106	**********
0	111	

I....+....I....+....I....+....I....+....I....+....I
0 2 4 6 8 10
HISTOGRAM FREQUENCY

MEAN	62.447	STD ERR	3.611	MEDIAN	64.000
MODE	26.000	STD DEV	24.755	VARIANCE	612.818
KURTOSIS	-1.140	S E KURT	.681	SKEWNESS	-.177
S E SKEW	.347	RANGE	85.000	MINIMUM	19.000
MAXIMUM	104.000	SUM	2935.000		

VALID CASES 47 MISSING CASES 0

Fig. K3 Distribution of scores from Activity questionnaire "Difficulty"

ACTIV2A

COUNT	MIDPOINT	ONE SYMBOL EQUALS APPROXIMATELY .10 OCCURRENCES
1	-1	**********
2	6	********************
4	13	**********
0	20	
5	27	**********
3	34	**********
2	41	**********
1	48	**********
3	55	**********
4	62	**********
1	69	**********
2	76	**********
3	83	**********
1	90	**********
2	97	**********
0	104	
1	111	**********
2	118	**********
0	125	
1	132	**********
1	139	**********

I....+....I....+....I....+....I....+....I....+....I
0 1 2 3 4 5
HISTOGRAM FREQUENCY

MEAN	56.846	STD ERR	5.945	MEDIAN	55.000
MODE	14.000	STD DEV	37.124	VARIANCE	1378.186
KURTOSIS	-.673	S E KURT	.741	SKEWNESS	.457
S E SKEW	.378	RANGE	135.000	MINIMUM	1.000
MAXIMUM	136.000	SUM	2217.000		

VALID CASES 39 MISSING CASES 8

Fig. K3 Distribution of scores from Activity questionnaire "Frequency"

APPENDIX M Correlation matrix of variables from validation study

- - - - - - - - - - - - - - - PEARSON CORRELATION COEFFICIENTS - - - - - - - - - - - - - -

	PRISA	PRIAA	PRIEA	PRIHA	PRITOTA	PRITOTB	GENCOPA	ACTCOPA	AVOIDA	DRUGSA	SPEAKA
AGE	-.1383 (47) P= .353	-.1748 (47) P= .241	-.0269 (47) P= .858	-.0019 (47) P= .990	-.1284 (47) P= .405	.0166 (47) P= .912	-.0602 (45) P= .694	-.3825 (45) P= .010	.1587 (47) P= .299	.2138 (45) P= .159	-.1352 (47) P= .365
DURATION	-.1987 (47) P= .193	-.2043 (47) P= .168	-.1399 (47) P= .348	-.1705 (47) P= .252	-.2222 (47) P= .133	-.1673 (47) P= .261	-.1611 (45) P= .290	-.1689 (45) P= .267	.1225 (47) P= .412	.2185 (45) P= .149	-.0822 (47) P= .583
LEEDSDA	-.1641 (47) P= .273	.0138 (47) P= .926	.1853 (47) P= .212	.0842 (47) P= .573	-.0530 (47) P= .724	.1609 (47) P= .280	-.7581 (45) P= .000	-.2689 (45) P= .074	.4632 (47) P= .001	.2822 (45) P= .060	-.0585 (47) P= .696
LEEDSAA	.1589 (47) P= .286	.1919 (47) P= .196	.4375 (47) P= .002	.2679 (47) P= .069	.2623 (47) P= .075	-.0278 (47) P= .853	-.3965 (45) P= .007	.0008 (45) P= .996	.2633 (47) P= .076	.1406 (45) P= .357	.0939 (47) P= .530
SHLCIA	.1335 (45) P= .382	.0807 (45) P= .598	.4498 (45) P= .002	.1286 (45) P= .400	.1965 (45) P= .201	.0339 (45) P= .825	-.1065 (43) P= .497	-.2797 (43) P= .069	.2085 (45) P= .178	.2935 (43) P= .056	.1976 (45) P= .193
SHLCPA	-.2091 (45) P= .168	-.1358 (45) P= .375	.0187 (45) P= .903	.0175 (45) P= .909	-.1483 (45) P= .331	-.0570 (45) P= .710	-.1699 (43) P= .276	-.2777 (43) P= .071	.3890 (45) P= .008	.3044 (43) P= .047	.0629 (45) P= .682
SHLCCA	-.1318 (45) P= .389	-.2727 (45) P= .070	-.2236 (45) P= .140	-.2373 (45) P= .117	-.2237 (45) P= .140	-.3039 (45) P= .042	-.1561 (43) P= .317	-.1076 (43) P= .493	-.0896 (45) P= .558	.1645 (43) P= .292	-.0921 (45) P= .547
ACTIV1A	.0903 (47) P= .545	.0842 (47) P= .574	.1206 (47) P= .420	.0387 (47) P= .796	.0999 (47) P= .504	-.2054 (47) P= .166	-.3981 (45) P= .007	-.1108 (45) P= .469	.3396 (47) P= .020	.2972 (45) P= .047	-.1587 (47) P= .287
ACTIV2A	.3581 (39) P= .025	.2836 (39) P= .135	-.0971 (39) P= .556	.2491 (39) P= .126	.3153 (39) P= .051	-.0557 (39) P= .736	.2604 (37) P= .120	.2507 (38) P= .129	-.4730 (39) P= .002	-.2304 (38) P= .164	.0519 (39) P= .754
PPIA	.2817 (47) P= .102	.3477 (47) P= .017	.3113 (47) P= .033	.3128 (47) P= .033	.3382 (47) P= .020	.2717 (47) P= .065	-.1418 (45) P= .353	-.2484 (45) P= .112	.2838 (47) P= .053	.2766 (45) P= .066	.0538 (47) P= .719
HWCA	.8703 (47) P= .000	.8285 (47) P= .000	.3296 (47) P= .024	.8203 (47) P= .000	.9447 (47) P= .000	.4199 (47) P= .003	.1187 (45) P= .437	.3139 (45) P= .036	-.2238 (47) P= .131	-.1157 (45) P= .449	.2696 (47) P= .091
PRISA	1.0000 (47) P= .	.6500 (47) P= .000	.2211 (47) P= .135	.6846 (47) P= .000	.9420 (47) P= .000	.4168 (47) P= .004	.2263 (45) P= .135	.3786 (45) P= .010	-.2864 (47) P= .051	-.0861 (45) P= .574	.2113 (47) P= .154
PRIAA	.6503 (47) P= .000	1.0000 (47) P= .	.2102 (47) P= .156	.6507 (47) P= .000	.7901 (47) P= .000	.5025 (47) P= .000	-.0215 (45) P= .888	.1567 (45) P= .304	-.0950 (47) P= .525	-.0036 (45) P= .981	.1605 (47) P= .281
PRIEA	.2211 (47) P= .135	.2102 (47) P= .156	1.0000 (47) P= .	.4084 (47) P= .004	.4176 (47) P= .003	.1504 (47) P= .313	-.0968 (45) P= .527	-.1293 (45) P= .397	-.0011 (47) P= .994	.0335 (45) P= .827	.2483 (47) P= .092
PRIHA	.6846 (47) P= .000	.6507 (47) P= .000	.4084 (47) P= .004	1.0000 (47) P= .	.8446 (47) P= .000	.3787 (47) P= .009	-.0349 (45) P= .820	.1167 (45) P= .445	-.0083 (47) P= .977	-.1296 (45) P= .396	.2498 (47) P= .090
PRITOTA	.9423 (47) P= .000	.7901 (47) P= .000	.4176 (47) P= .003	.8446 (47) P= .000	1.0000 (47) P= .	.4710 (47) P= .001	.1154 (45) P= .450	.2784 (45) P= .068	-.1986 (47) P= .181	-.0777 (45) P= .612	.2566 (47) P= .082
PRITOTB	.4163 (47) P= .004	.5025 (47) P= .000	.1504 (47) P= .313	.3787 (47) P= .009	.4710 (47) P= .001	1.0000 (47) P= .	-.0825 (45) P= .590	.1129 (45) P= .460	.1758 (47) P= .237	.0869 (45) P= .570	.2442 (47) P= .098
GENCOPA	.2263 (45) P= .135	-.0215 (45) P= .888	-.0968 (45) P= .527	-.0349 (45) P= .820	.1154 (45) P= .450	-.0825 (45) P= .590	1.0000 (45) P= .	.1544 (44) P= .317	-.5286 (45) P= .000	-.2915 (43) P= .058	.1052 (45) P= .492
ACTCOPA	.3785 (45) P= .010	.1567 (45) P= .304	-.1293 (45) P= .397	.1167 (45) P= .445	.2784 (45) P= .068	.1129 (45) P= .460	.1544 (44) P= .317	1.0000 (45) P= .	-.4506 (45) P= .002	-.5828 (43) P= .000	.2567 (45) P= .089
AVOIDA	-.2864 (47) P= .051	-.0950 (47) P= .525	-.0011 (47) P= .994	-.0083 (47) P= .977	-.1986 (47) P= .181	.1758 (47) P= .237	-.5286 (45) P= .000	-.4506 (45) P= .002	1.0000 (47) P= .	.4557 (45) P= .002	-.1001 (47) P= .503
DRUGSA	-.0861 (45) P= .571	-.0036 (45) P= .981	.0335 (45) P= .827	-.1296 (45) P= .396	-.0777 (45) P= .612	.0869 (45) P= .570	-.2915 (43) P= .058	-.5828 (43) P= .000	.4557 (45) P= .002	1.0000 (45) P= .	-.2128 (45) P= .160
SPEAKA	.2113 (47) P= .154	.1605 (47) P= .281	.2483 (47) P= .092	.2498 (47) P= .090	.2566 (47) P= .082	.2442 (47) P= .098	.1052 (45) P= .492	.2567 (45) P= .089	-.1001 (47) P= .503	-.2128 (45) P= .160	1.0000 (47) P= .
STATUSA	.1821 (47) P= .222	.0156 (47) P= .917	-.2186 (47) P= .140	-.0872 (47) P= .560	.0651 (47) P= .664	.0996 (47) P= .505	.5387 (45) P= .000	.4200 (45) P= .004	-.4551 (47) P= .001	-.5265 (45) P= .000	.1717 (47) P= .248

(COEFFICIENT / (CASES) / 2-TAILED SIG) " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

APPENDIX M Correlation matrix for variables from validation study

- - - - - - - - - - - - - - - - PEARSON CORRELATION COEFFICIENTS - - - - - - - - - - - - - - -

	AGE	DURATION	LEEDSDA	LEEDSAA	MHLCIA	MHLCPA	MHLCCA	ACTIV1A	ACTIV2A	PPIA	NWCA
AGE	1.0000	.4194	.0802	.0675	.1304	.1700	.1187	-.1748	.0369	-.1849	-.1316
	(47)	(47)	(47)	(47)	(45)	(45)	(45)	(47)	(39)	(47)	(47)
	P= .	P= .003	P= .592	P= .652	P= .393	P= .264	P= .437	P= .240	P= .824	P= .213	P= .378
DURATION	.4194	1.0000	.0603	.1144	.2287	-.0268	.3536	-.1450	-.1449	-.2316	-.1202
	(47)	(47)	(47)	(47)	(45)	(45)	(45)	(47)	(39)	(47)	(47)
	P= .003	P= .	P= .687	P= .444	P= .131	P= .861	P= .017	P= .331	P= .379	P= .117	P= .421
LEEDSDA	.0802	.0603	1.0000	.4091	.1542	.1920	-.0054	.4331	-.2842	.2911	-.0920
	(47)	(47)	(47)	(47)	(45)	(45)	(45)	(47)	(39)	(47)	(47)
	P= .592	P= .687	P= .	P= .004	P= .312	P= .206	P= .972	P= .002	P= .079	P= .047	P= .538
LEEDSAA	.0675	.1144	.4091	1.0000	.4126	.1921	-.1491	.0025	.1715	.1399	.2529
	(47)	(47)	(47)	(47)	(45)	(45)	(45)	(47)	(39)	(47)	(47)
	P= .652	P= .444	P= .004	P= .	P= .005	P= .206	P= .328	P= .987	P= .296	P= .348	P= .086
MHLCIA	.1304	.2287	.1542	.4126	1.0000	.1743	.0036	.0964	-.1717	.1735	.1692
	(45)	(45)	(45)	(45)	(45)	(45)	(45)	(45)	(38)	(45)	(45)
	P= .393	P= .131	P= .312	P= .005	P= .	P= .252	P= .981	P= .529	P= .303	P= .254	P= .267
MHLCPA	.1700	-.0268	.1920	.1921	.1743	1.0000	.0774	.0814	-.2547	.1235	-.2585
	(45)	(45)	(45)	(45)	(45)	(45)	(45)	(45)	(38)	(45)	(45)
	P= .264	P= .861	P= .206	P= .206	P= .252	P= .	P= .613	P= .595	P= .123	P= .419	P= .086
MHLCCA	.1187	.3536	-.0054	-.1491	.0036	.0774	1.0000	-.1762	-.0082	-.4173	-.1635
	(45)	(45)	(45)	(45)	(45)	(45)	(45)	(45)	(38)	(45)	(45)
	P= .437	P= .017	P= .972	P= .328	P= .981	P= .613	P= .	P= .247	P= .961	P= .004	P= .283
ACTIV1A	-.1748	-.1450	.4331	.0025	.0964	.0814	-.1762	1.0000	-.4747	.3991	.0180
	(47)	(47)	(47)	(47)	(45)	(45)	(45)	(47)	(39)	(47)	(47)
	P= .240	P= .331	P= .002	P= .987	P= .529	P= .595	P= .247	P= .	P= .002	P= .005	P= .904
ACTIV2A	.0369	-.1449	-.2842	.1715	-.1717	-.2547	-.0082	-.4747	1.0000	-.1041	.3412
	(39)	(39)	(39)	(39)	(38)	(38)	(38)	(39)	(39)	(39)	(39)
	P= .824	P= .379	P= .079	P= .296	P= .303	P= .123	P= .961	P= .002	P= .	P= .528	P= .034
PPIA	-.1849	-.2316	.2911	.1399	.1735	.1235	-.4173	.3991	-.1041	1.0000	.1782
	(47)	(47)	(47)	(47)	(45)	(45)	(45)	(47)	(39)	(47)	(47)
	P= .213	P= .117	P= .047	P= .348	P= .254	P= .419	P= .004	P= .005	P= .528	P= .	P= .231
NWCA	-.1316	-.1202	-.0920	.2529	.1692	-.2585	-.1635	.0180	.3412	.1782	1.0000
	(47)	(47)	(47)	(47)	(45)	(45)	(45)	(47)	(39)	(47)	(47)
	P= .378	P= .421	P= .538	P= .086	P= .267	P= .086	P= .283	P= .904	P= .034	P= .231	P= .
PSISA	-.1343	-.1947	-.1641	.1589	.1335	-.2091	-.1314	.0904	.3581	.2417	.8703
	(47)	(47)	(47)	(47)	(45)	(45)	(45)	(47)	(39)	(47)	(47)
	P= .368	P= .190	P= .270	P= .286	P= .382	P= .168	P= .389	P= .546	P= .025	P= .102	P= .000

	(47)	(47)	(47)	(47)	(45)	(45)	(45)	(47)	(39)	(47)	(47)
	P= .241	P= .168	P= .926	P= .196	P= .598	P= .375	P= .070	P= .574	P= .135	P= .017	P= .000
PRIBA	-.0269	-.1399	.1853	.4375	.4494	.0187	-.2236	.1206	-.0971	.3113	.3296
	(47)	(47)	(47)	(47)	(45)	(45)	(45)	(47)	(39)	(47)	(47)
	P= .858	P= .348	P= .212	P= .002	P= .002	P= .903	P= .140	P= .420	P= .556	P= .033	P= .024
PRIMA	-.0019	-.1705	.0842	.2679	.1286	.0175	-.2373	.0387	.2491	.3124	.8203
	(47)	(47)	(47)	(47)	(45)	(45)	(45)	(47)	(39)	(47)	(47)
	P= .990	P= .252	P= .573	P= .069	P= .400	P= .909	P= .117	P= .796	P= .126	P= .033	P= .000
PRITOTA	-.1244	-.2222	-.0530	.2623	.1945	-.1483	-.2237	.0999	.3153	.3382	.9447
	(47)	(47)	(47)	(47)	(45)	(45)	(45)	(47)	(39)	(47)	(47)
	P= .405	P= .133	P= .724	P= .075	P= .201	P= .331	P= .140	P= .504	P= .051	P= .020	P= .000
PRITOTB	.0166	-.1673	.1609	-.0278	.0339	-.0570	-.3039	.2054	-.0557	.2717	.4199
	(47)	(47)	(47)	(47)	(45)	(45)	(45)	(47)	(39)	(47)	(47)
	P= .912	P= .261	P= .280	P= .853	P= .825	P= .710	P= .042	P= .166	P= .736	P= .065	P= .003
GENCOPA	-.0602	-.1611	-.7581	-.3965	-.1065	-.1699	-.1561	-.3981	.2604	-.1418	.1187
	(45)	(45)	(45)	(45)	(43)	(43)	(43)	(45)	(37)	(45)	(45)
	P= .694	P= .290	P= .000	P= .007	P= .497	P= .276	P= .317	P= .007	P= .120	P= .353	P= .437
ACTCOPA	-.3825	-.1689	-.2689	.0008	-.2797	-.2777	-.1074	-.1108	.2507	-.2404	.3139
	(45)	(45)	(45)	(45)	(43)	(43)	(43)	(45)	(38)	(45)	(45)
	P= .010	P= .267	P= .074	P= .996	P= .069	P= .071	P= .493	P= .469	P= .129	P= .112	P= .036
AVOIDA	.1547	.1225	.4632	.2633	.2045	.3890	-.0896	.3396	-.4730	.2838	-.2238
	(47)	(47)	(47)	(47)	(45)	(45)	(45)	(47)	(39)	(47)	(47)
	P= .299	P= .412	P= .001	P= .074	P= .178	P= .008	P= .558	P= .020	P= .002	P= .053	P= .131
DRUGSA	.2138	.2185	.2822	.1406	.2935	.3044	.1645	.2972	-.2304	.2766	-.1157
	(45)	(45)	(45)	(45)	(43)	(43)	(43)	(45)	(38)	(45)	(45)
	P= .159	P= .149	P= .060	P= .357	P= .056	P= .047	P= .292	P= .047	P= .164	P= .066	P= .449
SPEAKA	-.1352	-.0822	-.0585	.0939	.1976	.0629	-.0921	-.1587	.0519	.0538	.2496
	(47)	(47)	(47)	(47)	(45)	(45)	(45)	(47)	(39)	(47)	(47)
	P= .365	P= .583	P= .696	P= .530	P= .193	P= .682	P= .547	P= .287	P= .754	P= .719	P= .091
STATUSA	-.0591	-.1610	-.4133	-.1255	-.2026	-.2915	-.2510	-.2986	.2809	-.2356	.1110
	(47)	(47)	(47)	(47)	(45)	(45)	(45)	(47)	(39)	(47)	(47)
	P= .693	P= .280	P= .004	P= .400	P= .182	P= .052	P= .096	P= .041	P= .083	P= .111	P= .457

(COEFFICIENT / (CASES) / 2-TAILED SIG) " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

Appendix N.1

SOUTH SEFTON HEALTH AUTHORITY

Tel. 051-525 3611

When telephoning or calling please ask for:

WALTON HOSPITAL
RICE LANE
LIVERPOOL
L9 1AE

Our Ref.

Your Ref.

November, 1985

Dear

I am currently conducting research into the problem of chronic pain. I am trying to find out how people who suffer from pain cope with the various problems. As part of this research, I would be very grateful if you would kindly fill in the enclosed questionnaires and return them to me as soon as possible.

I have obtained your name from Walton Pain Clinic and The Pain Relief Foundation. Your answers will be treated confidentially. Please return the questionnaires using the enclosed pre-paid envelopes. It is possible that I have contacted you before. Please fill in the questionnaires even if you have completed similar forms before.

Thank you once again for your kind cooperation. We hope that the results of this survey will increase our understanding of the problem of pain and lead to better treatments for this difficult problem.

If you would like further information please contact me on extension 479/641.

Yours sincerely,

Anne Wright

pp

E. J. GHADIALI
PRINCIPAL NEUROPSYCHOLOGIST TO PAIN CLINIC

APPENDIX P

Hypothesis 1:

The General Coping Measure is a measure of the affective component of pain experience and will therefore be highly related to other psychological measures of affect and emotionality. It will be related to the Leeds Scale for the Self Assessment of Anxiety and Depression.

Hypothesis 2:

The Active Coping Strategies scale is a measure of the cognitive rather than affective component of pain experience and will therefore be related to other psychological measures of cognitive aspects of pain experience. It will be related to the scales on the Multi-Dimensional Health Locus of Control Scales.

Hypothesis 3:

The Avoidance scale is a measure of beliefs in the use of passive pain coping strategies. Scores on this scale will be related to self-report ratings of activity frequency and difficulty.

Hypothesis 4:

The Pain Coping Scales measure psychological adjustment to chronic pain and belief in the use of positive and negative pain coping strategies. The scales will be unrelated to measures of the sensory component of pain experience.