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CONCEPT MAPPING THE BELIEFS OF CHRONIC LOW BACK PAIN SUFFERERS

BY

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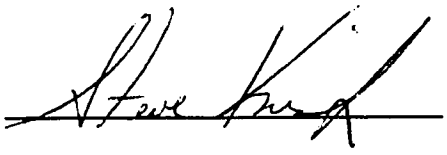

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DEDICATION

To Steve the gasman who let me play with his flashlight,
and Doris for taking me in as her own.

Abstract

The research related to individuals' beliefs about chronic low back pain have typically been theoretically driven as opposed to incorporating experiential data. In this study, concept mapping, an alternative methodological approach combining qualitative and quantitative strategies, was used to identify and categorize a set of these beliefs. The study consisted of a three phase process. Phase one employed a semi-structured interview to gather belief statements from chronic low back pain sufferers at a rehabilitation facility. A set of 83 belief statements, representing 65 functional, 14 dysfunctional and 4 neutral beliefs, were identified from interviews with eight individuals and by using an interrater agreement process involving four psychologists. In phase two, 48 members of multidisciplinary teams with expertise in the treatment of chronic back pain sorted the belief statements into homogeneous groups. The sorted data were analyzed using multidimensional scaling and cluster analytic techniques to produce a concept map that consisted of seven themes: denial/regret, self-defeating/passive, medications/pain focus, cautious realism, accepting limitations, adaptive coping, and responsibility for rehabilitation. In phase three, a three-part questionnaire was administered to 115 low back pain sufferers at the beginning of their rehabilitation program to determine the prevalence of the beliefs held within this population. The beliefs statements and themes could serve as the basis for the development of treatment plans and as a guide to assess progress during the course of, and following, treatment.

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CHAPTER 1: INTRODUCTION

Purpose of the Study

A part of the philosophical framework that guides the content, development and evaluation of programs for many pain management settings is the notion that psychological factors are as important as physical factors in determining how successful individuals are in their efforts to manage pain. Cognitive and cognitive-behavioral perspectives on the management of chronic pain have emphasized the importance of an individual's beliefs and appraisals about their pain and life situations as an integral aspect of treatment.

Two distinct trends have been pervasive in the beliefs and coping literature to this point. First, research has focused on theoretically driven constructs, such as locus of control, attribution and self-efficacy theory, as a means of identifying beliefs important to the treatment of chronic pain. One limitation of this approach is that our current understanding of the beliefs held by the chronic pain sufferer may be biased by the theories and definitions that have been applied to examining the problem. Second, investigators have produced a proliferation of scales measuring pain related beliefs and appraisals. The development of these scales has typically also relied on theoretical constructs and has used factor analytic methodology to organize the data. Most of the scales are in preliminary stages of development and require further investigation to establish their clinical utility.

Interestingly, few studies examining the beliefs of chronic pain patients have utilized experiential data. It appears that no research has utilized the concept mapping method to identify a set of beliefs associated with experiencing chronic low back pain, nor have researchers used this method to determine underlying themes in which these beliefs fall.

The purpose of the present study was to gain a better understanding of the beliefs held by chronic low back pain sufferers using concept mapping, an alternative methodological approach combining qualitative and quantitative strategies. In this regard three research questions were addressed: (1) Do individuals suffering with chronic low back pain hold a set of beliefs related to their condition and to what extent are these beliefs adaptive or dysfunctional in nature? (2) Once identified, do these beliefs fall into any themes or categories that help to define them and give meaning to the role they may play in the rehabilitation process? The concept mapping method was used to address these first two questions. (3) What was the prevalence of these beliefs in a larger sample of chronic low back pain sufferers, and do the beliefs that were held differ in a sample of low back pain sufferers who are not yet considered to be chronic?

It is hoped that the results of this investigation will be useful for assessing the prevalence of adaptive and maladaptive beliefs among chronic back pain sufferers to aid in the creation of more effective therapy techniques specifically designed to challenge dysfunctional beliefs and encourage adaptive thinking. The identification of such beliefs could have direct practical application for individuals of all disciplines

working on multidisciplinary teams and caring for chronic back pain patients. Finally, the belief statements may later be used in the development of a scale to aid in the formulation of treatment plans and predict and evaluate program outcomes.

Prevalence and Impact

Chronic low back pain (CLBP) is one of the most common chronic pain symptoms (Schmidt & Arntz, 1987). CLBP is a persistent unpleasant or noxious sensation of varying severity (ranging from mildly annoying to excruciating), with a severely debilitating prognosis, both physically and psychologically (Turk & Flor, 1984). It is typically regarded as benign refractory pain with unknown origin, cause and aetiology (Loeser, 1982) for which complaints persist for at least six months. Chronic low back pain is increasingly viewed as a psychophysiological and psychosocial disorder, coupled with emotional maladjustment and cognitive-behavioral dysfunction.

CLBP is a severe health and economic problem that plagues a large portion of the population. It has been shown that among all disorders only the common cold is more frequent than low back pain and that in the U. S. impairments of the low back are the most frequent chronic conditions causing limitations of activities among individuals under 45 years of age (Girolamo, 1991). According to the United States Vital and Health Statistics (1974), it is the third leading cause of physical limitation and disability in the U.S.A.; 3.9 % of the population are permanently disabled by it, and 80% of all adults are afflicted by at least one episode of severe low back pain (Turk & Flors, 1984), which can potentially evolve into chronic low back pain. Steinburg (1982) noted that, in most cases, pain is short-lived and that in 90% of the cases there is a remission in pain within two months from the occurrence of the disorder. He also stated that approximately 97% of patients avoid hospitalization and surgical intervention. However, relapse rates are very high accounting for 70%-80% of cases. Approximately 5% of patients have to deal with persistent symptoms after three months which can lead to chronic pain and accompanying disability.

It is estimated that more than 15% of all industrial injuries and more than 20% of all compensation payments in any given year are low back related (Sternback, Wolf, & Murphy, 1973). In their review, Webster and Snook (1990) found that the average cost of an episode of low back pain ranged from $2,911-$7,004 (U.S.) with the median cost of about $444 (U.S.). This skewed distribution demonstrates how a few of the severe cases account for most of the cost. In this regard the authors found that 25% of the cases were accounting for 90% of the cost, a finding consistent with other reported studies (Snook, 1988). Webster and Snook (1990) have estimated from private insurance data that the total compensable cost for all low back pain in the U.S. in 1986 was $11 billion, a 241% increase relative to 1980 costs. Direct medical costs, they reported, made up approximately one-third of the total.

Bonica asserts that 7 million Americans are disabled annually with low back pain, 250,000 undergo back surgery each year, and that more than 250 million work

days a year are lost. Bonica also reported that the direct and indirect cost of low back pain approaches $24 billion per year in the U.S. (cited in Girolamo, 1991).

According to The Back Association of Canada, in 1988 alone, 9 million working days were lost as a result of back pain, with the direct health cost at $2 billion. In 1992 the Alberta Workers' Compensation Board spent $9.2 million on 676 claims having over 150 compensation days occurring (or having at least a six month duration). These claims accounted for approximately 103,000 lost work days (D. Gent, personal communication, June 15, 1993).

In addition to the tremendous societal burden, there is an enormous emotional cost to individuals and family members (Brockopp & Brockopp, 1990; Turk, Flor & Rudy, 1987). Many individuals tend to experience persistent pain and functional disability, which is in excess of what would be expected on the basis of the identified, underlying pathology (Carron, 1985). Strong (1985) notes that as a result these individuals perceive themselves as passive victims of their own circumstances who have no mastery over their fate or destiny. Turk and Holzman (1986) state that the most common concomitants of CLBP are dependency, intrinsic anger, guilt, fear, anxiety, hopelessness, and depression. These psychological disorders tend to be intensified by repeated failures in obtaining relief (Turk & Flors, 1984).

Treatment of Chronic Low Back Pain

Psychotherapeutic approaches to assist those who suffer from CLBP focus on enhancing the individual's ability to cope with the various changes associated with personal injuries. The most common approaches used in counselling individuals with CLBP have been cognitive therapy, behavioral, and cognitive-behavioral. Cognitive approaches are designed to modify dysfunctional mental processes and emotional inferences, premises, and attitudes underlying one's cognitions, and include the use of (a) attention diversion, (b) imagery, and (c) self-statement strategies. Behavioral therapies treat pain as a learned behavior and focus on the pain behaviors themselves. The intention is to reduce the disability and expressions of suffering associated with chronic pain problems. Improvement is characterized when a decrease in specifically defined pain behaviors and an increase in "well" behaviors are displayed (Fordyce, Fowler, Lehman, Delateur, Sand & Treischman, 1973). Two major groups of behavioral therapies can be delineated: self-management relaxation techniques, in which the client is taught to directly alter behaviors; and operant-conditioning methods, in which an attempt is made to change behaviors by modifying their environmental consequences (Keefe, 1982). Cognitive-behavioral therapy, an amalgamation of the behavioral and cognitive approaches, is gaining wide-spread acceptance in the psychotherapeutic community as a treatment strategy for a variety of problems. Many cognitive-behavioral treatment approaches have been, and are, widely used as interventions for various pain disorders (Kerns, Turk, & Holzman, 1983; Meichenbaum, 1977; Turk, Meichenbaum, & Genest, 1983).

Statement of the Problem

Suffering from chronic low back pain involves various changes within the individuals' beliefs, emotional states, and behavior. It appears that analysis of the beliefs from general experiential data that reflect these changes may assist with the future development of therapeutic techniques. The hope is that these techniques will allow treatment team members to identify and assist clients in working through salient issues that may present a barrier to attaining their highest level of functioning, given their physical limitations and experience of pain. Examining their beliefs and the underlying themes of those suffering from CLBP has the potential to identify and prioritize psychologically significant issues so that they may be addressed as part of a multidisciplinary treatment approach or by health care professionals working in isolation. Our current understanding of the experience of CLBP may be biased by the theories and definitions that have been applied to the problem. No research utilizing concept mapping, an alternative methodological approach combining qualitative and quantitative strategies, has been applied to the problem of trying to gain a more clear understanding of the beliefs held by chronic low back pain sufferers. Results from this type of investigation would likely complement the existing theory driven literature investigating pain related beliefs.

Concept Mapping Method

Concept mapping is a set of statistical methods that can be used to cluster variables into their underlying themes. Kunkel (1991) suggests that concept mapping methods can lead to a greater understanding of the perceptual themes underlying psychological disorders. He states that concept mapping can add objectivity to the study of qualitative types of data that have typically been analyzed using non-statistical approaches.

Concept mapping also allows for the study of constructs as they are experienced by participants rather than as defined by researchers (Daughtry & Kunkel, 1991). Consequently, this approach to the analysis of qualitative data allows us to take a fresh look at the participant's perspective. It also allows confidence in the results because of the inherent objectivity in these methods. The development of concept maps of chronic low back pain sufferers' beliefs and determining their prevalence may prove useful for the assessment or development of treatment programs. Concept maps can also assist in the communicating of important concepts clearly and easily. These maps can be particularly useful in educating various health care professionals, given the trend toward a multidisciplinary approach for the treatment of chronic pain. Finally, concept maps can provide direction for future research.

Assumptions and Limitations

The sample of low back pain sufferers used in this study consisted of individuals who have sustained work related injuries and who have filed a claim with the Workers' Compensation Board (WCB) of Alberta. A brief description of the Board, its Rehabilitation Centre, and the definition of chronic pain used are presented within the context of assumptions and limitations of the study.

The Workers' Compensation Board (Alberta)

The Workers' Compensation Board of Alberta is a statutory corporation entirely founded by employers with the mandate to carry out the Workers' Compensation Act. This Act is a law stating, in general, that workers waive the right to file a law suit against employers for work related accidents. In turn, the workers are entitled to no-fault insurance coverage that provides compensation and rehabilitation for work related accidents.

The WCB Rehabilitation Centre is a division of the Board and is mandated to provide rehabilitative services to individuals who have been injured on the job and to their families. It is an out-patient facility serving approximately 250 injured workers at any time, via four interdisciplinary teams comprised of case manager, exercise therapist, occupational therapist, psychologist, physical therapist, and consulting physician. The Centre is accredited by the Commission on Accreditation of Rehabilitation Facilities (CARF).

As noted, chronic low back pain sufferers consisted of those individuals who were attending the Rehabilitation Centre located in Edmonton. This group was chosen in part because of its accessibility. To obtain a random sample of chronic low back pain patients from the general population would be difficult and very costly. This was an important group to study because of the magnitude of back problems among workers involved in WCB claims. For example, in 1993, 45% of the injured workers who attended the WCB Rehabilitation Centre were suffering with back related injuries (Voaklander, 1994).

Another advantage of using workers who have been admitted to the Rehabilitation Centre was that most of these individuals have been suffering from chronic low back pain and could be expected to have ongoing difficulty at the time of data collection. Thus, they were individuals who are most likely in need of counselling to help them adjust to the changes associated with their injuries and did not have to rely on long term memory to recall their experiences.

Limitations could arise using patients involved with the WCB related to difficulties with having one's claim processed within a large bureaucratic organization and with the possible contamination of the results attained from those whose perception of chronic low back pain may be influenced by secondary gains.

Definition of Chronic Low Back Pain

The term chronic low back pain is defined as a low back pain that has lasted for more than six months and whose origin is in the spine or surrounding tissue (Cailliet, 1981). Furthermore, chronic pain typically persists beyond the normal time of healing and has not responded to traditional medical intervention. These patients are generally assessed by physicians to warrant no further medical investigations or surgical intervention. A variety of diagnostic terms are associated with chronic low back pain: lumbar-sacral strain, lumbar disc disease, sciatica, lumbago, spinal stenosis, fibrosis, and degenerative disc disease (Cailliet, 1981).

Conclusion

Addressing the maladaptive beliefs held by chronic low back pain sufferers is an important, yet indirect, aspect of many current rehabilitation programs. Having a clearer understanding of these beliefs could lead to the creation of new, more effective treatment techniques specifically designed to challenge maladaptive beliefs. This clearer understanding, could have a direct practical application for treatment team members of all disciplines working with chronic low back pain sufferers. Understanding chronic low back pain sufferers' experiences, from their perspective, is needed to develop more effective programs. Assessing the prevalence of adaptive and maladaptive beliefs of individuals who suffer with chronic low back pain would also aid in the development of programs. The benefits to treatment would be gained by identifying areas of focus that could alert health care providers to clients' beliefs, which may become a barrier to their rehabilitation. The identification of these beliefs could also indicate healthy progress while on a therapeutic program. Having a clear understanding of the individuals' beliefs generated from the range of experiences associated with chronic low back pain will likely contribute to a treatment plan that will assist chronic low back pain sufferers to become more effective at addressing psychological and physical barriers that may interfere with the rehabilitation process.

This thesis has the following format. In Chapter 2 a review of the literature concerning cognitive and cognitive-behavioral therapy interventions with chronic low back pain is presented. Also, research investigating beliefs and appraisals related to coping with and adjusting to the consequences of having chronic pain is reviewed. As well, a general overview of the concept mapping methodology is described. Chapter 3 provides a more detailed description of the methodology used in all three phases of the research. In Chapter 4 the concept map is presented along with the results of the prevalence study. Finally, in Chapter 5 a summary and discussion of the major aspects of the overall research is presented.

CHAPTER 2: REVIEW OF THE LITERATURE

Introduction

A central component of the cognitive-behavioral approach to psychotherapy is to identify and attempt to modify dysfunctional beliefs that may be held by clients. As a result, in terms of treating individuals with chronic low back pain, or chronic pain in general, it is important to identify their various beliefs which could serve to influence their psychological or physical functioning. This chapter will include a review of studies using cognitive-behavioral approaches for the treatment of chronic pain, a critical review of literature specific to the beliefs/appraisals related to coping with, and adjusting to, chronic pain, and an overview of the concept mapping methodology.

Treatment of Chronic Low Back Pain

A wide range of interventions exist for the attenuation of CLBP. The medical treatment of CLBP is characterized by a somatosensory model. It assumes an underlying physiological cause, which is viewed as an abnormality in the function or structure of organs and systems. Pain is seen as a symptom of, and directly proportional to, the injury and biological disorder. Medical treatment is generally aimed at providing permanent symptomatic relief by eradicating the underlying pathology. Because physicians search primarily for physiological causes, typically little or no consideration is given to the role of psychological or socioenvironmental factors. The unfortunate consequence of this approach is that despite the advanced knowledge of anatomy and physiology, state of the art technology, and diagnostic procedures, the specific organic causes of most CLBP are unknown or cannot be identified. For example, Valfors (1985) found that despite very carefully described and standardized clinical examinations, no objective findings could be found to support 70% of the CLBP patients symptoms in his study.

As noted many cognitive-behavioral treatment approaches have been, and are, widely used as interventions for various pain disorders (Kerns, Turk, & Holzman, 1983; Meichenbaum, 1977; Turk, Meichenbaum, & Genest, 1983). Cognitive-behavioral interventions have been found to be generally effective in reducing psychological distress in chronic pain patients (Bradley et al., 1984; Keefe et al., 1990; Kerns, Turk, Holzman & Rudy, 1986; Moore & Chaney, 1985; Turner & Clancy, 1988). In addition, significant improvements have been observed in mood, coping skills, physical disability, analgesic consumption, and reported pain levels in group programs utilizing the cognitive-behavioral approach as part of a comprehensive treatment plan (Corey, Etlin & Miller, 1987; Skinner, Erskine, Pearce, Rubenstein, Taylor & Foster, 1990).

In terms of treating chronic low back pain specifically, Turner (1982) in contrasting the effects of cognitive-behavioral group therapy and group progressive relaxation training with 36 mildly disabled chronic low back pain patients, found that

both groups improved significantly on self-report measures of pain, depression, and disability, and on significant-other-rated measures of physical and psychosocial dysfunction pre-treatment to post-treatment. Further improvement was noted in the cognitive behavioral group therapy patients at one month follow-up and a one and a half to two year mail follow-up indicated that the cognitive behavioral group therapy patients had markedly improved in time spent working.

Nicholas, Wilson and Goyen (1991) randomly assigned 58 outpatients into one of six experimental conditions. The treatment conditions included: cognitive treatment (either with or without relaxation) and behavioral treatment (either with or without relaxation). The four treatment conditions all received physiotherapy. Two control groups were employed that consisted of attention (physiotherapy plus discussion sessions) and no-attention (physiotherapy only). Nicholas et al. found that the combined cognitive treatment and physiotherapy group, as well as the behavioral treatment and physiotherapy group, improved significantly more than physiotherapy-only conditions at post-treatment on measures of pain intensity, self-rated functional impairment, and pain-related dysfunctional cognitions for moderately disabled subjects. These differences were only "weakly" maintained at 6 and 12 month follow-ups.

Similarly, Nicholas, Wilson and Goyen (1992) employing 20 outpatients with a minimum six month history of chronic low back pain, reported that a cognitive-behavioral and physiotherapy treatment condition showed significantly more improvement than a combined attention-control (only discussing problems of living with chronic low back pain) and physiotherapy condition at post-treatment on measures of other-rated functional impairment, the employment of active coping strategies, medication use, and self-efficacy beliefs. These differences were maintained at a six month follow-up for the active coping strategies and to a lesser degree with the self-efficacy beliefs and other-rated functional impairment.

In an attempt to determine whether the addition of psychologically based treatment would enhance patient outcomes within a standard treatment program, Altmaier, Lehmann, Russell, Weinstein, and Feng Koa (1992) contrasted the outcomes of two programs. They randomly assigned 45 low back pain patients into a standard inpatient rehabilitation program which emphasized education and physical reconditioning and a psychologically based program that added to the standard program components of operant conditioning, relaxation, biofeedback, and coping skills training. Both programs included medication reduction and emphasis on family involvement after discharge. Measures of functional status were taken prior to the program, at discharge from the three week inpatient program, and at a six month follow-up appointment. Results revealed that patients improved their overall functioning at discharge, regardless of group assignment, and maintained their gains at follow-up. The authors noted that similar trends were observed for self-reported pain and interference. In addition, 81% of the patients had returned to work or were engaged in retraining at follow-up. There were no differences in improvements by treatment groups, suggesting that the psychological treatment failed to add to the effectiveness obtained by the standard program. Altmaier et al. noted that the results

may be explained in part by the fact that the standard program was having positive effects on behavioral and cognitive processes, likely important "active ingredients," although not specifically designed to do so. This was supported by the similarity between the two groups in terms of "process" indicators that were followed and included target exercise behaviors, confidence, and functional aerobic impairment. Another possible explanation may be linked to the criteria used, which included subjects who had been disabled for a minimum period of three months, were not involved in personal injury litigation, had no severe vertebral fracture, and were not demonstrating "significant levels of anger and depression." This group may have been experiencing less chronicity and fewer emotional issues that would respond to the psychologically based treatment.

Using self-report and observational data, Turner and Jensen (1993) examined the effects of cognitive therapy for chronic low back pain subjects with those experiencing mildly disabling low back pain. They employed three treatment conditions and a wait list control group with chronic low back pain patients whose pain persisted longer than six months and where infectious disease, cancer, rheumatoid arthritis, and connective tissue disease were ruled out. Also those with indications for surgical interventions were excluded. The treatments included relaxation, cognitive therapy, and a combination of both. The authors observed that pain intensity decreased significantly pre- to post-treatment for all treatment conditions but not in the waiting-list condition. Furthermore, depressive symptoms and disability improved significantly in three treatment conditions (including the waiting-list group) from pre-treatment to post-treatment with no statistically significant differences found among treatments. At six and twelve month follow-ups, all three treatment groups remained significantly improved from pre-treatment with no statistically significant differences between treatments.

A recent study has examined the effects of a short-term multidisciplinary pain management program and its influence on pain beliefs. Lipchik, Milles, and Covington (1993) compared the results of 50 patients in the treatment group who successfully completed an inpatient multidisciplinary pain management program with a control group of 46 patients who were treated at an outpatient pain centre. Both groups had varied pain complaints with the most common being low back (33%), followed by headaches (28%). Patients in the control group received a variety of outpatient treatment including antidepressant medication, nerve blocks or trigger point injections, physical therapy, transcutaneous electrical nerve stimulation (TENS), biofeedback, and further medical investigation but no psychotherapy. Patients in the treatment group participated in a short-term (3-4 week) inpatient program that consisted of biofeedback training, assertiveness training, individual, group and family psychotherapy, behavior modification, psychoeducational group therapy, a physical exercise program, occupational therapy, medications, and detoxification from addictive medications. It was noted that patients were required to participate in all aspects of the program. The authors observed that patients who completed the inpatient program reported significant decreases in subjective pain intensity despite the discontinuation of narcotic analgesics. As well, patients in the treatment involving

psychotherapy showed an increased sense of personal control over pain and substantial decreases in attributions of pain control to powerful others and chance. Finally, the authors reported that patients in the inpatient treatment group reported less of a belief that their pain was a mysterious phenomenon. Lipchik et al. (1993) concluded that the results suggest that an intensive interdisciplinary program, similar to the ones in the study, involving psychotherapy might be more effective with patients than outpatient treatment without psychotherapy.

Similarly, Rainville, Ahern and Phalen (1993) found that patients beliefs related to disability in chronic low back pain patients were altered during a functionally oriented multidisciplinary treatment program. The treatment period averaged seven weeks of outpatient care and included aggressive physical conditioning directed by physical and occupational therapists, education about pain related issues, psychological and behavioral support and disability case management. Using the Pain and Impairment Relationship Scale (PAIRS), the authors observed that beliefs associate chronic low back pain with physical impairments and disability were significantly decreased following completion of the treatment program and that post-treatment PAIRS scores correlated highly with disability measures. Thus, those who believed their chronic low back pain was less related to disability and impairment exhibited better physical function at the end of treatment.

The results of the treatment outcome literature reviewed lend support to cognitive strategies as a useful means by which to assist chronic pain sufferers. The last two studies reviewed demonstrated how specific beliefs can be altered during a multidisciplinary treatment program.

Pain Related Beliefs and Coping/Adjustment

Recent literature focusing on pain-related beliefs may be classified into roughly six categories: (a) beliefs about general locus of control; (b) beliefs about control over pain; (c) attributional style; (d) cognitive errors; (e) self-efficacy beliefs; (f) and a group that is difficult to categorize in one of the above groups but which has been described as "other pain appraisals" (Jenson, Turner, Romano & Karoly, 1991). Literature relative to these areas will be presented.

General Locus of Control

The notion of locus of control has evolved from Rotter's (1966) conceptualization and subsequent research. From his work, the notion has developed that the belief that outcomes are under the control of one's own behavior is reflective of an internal locus of control, while the belief that important outcomes are controlled by factors such as chance, luck, or other people is indicative of an external locus of control. In terms of pain patients, those who manifest an internal locus of control orientation, as opposed to an external one, have been hypothesized to be more likely to engage in active coping strategies (Crisson & Keefe, 1988) and to be less depressed (Skevington, 1983). In support of this hypothesis, Skevington (1983) examined a

sample of 25 back pain patients and 25 controls and found two measures of locus of control (belief in chance happenings and beliefs in internal control) to be related to depression and pain affect (distress associated with pain). As hypothesized, the more that patients attributed events to chance occurrences rather than to internal control, the more likely they were to be depressed ($r = -.53$, $p < .01$) and distressed about their pain ($r = -.56$, $p < .01$).

The Multidimensional Health Locus of Control (MHLC) scale (Wallston, Wallston & DeVellis, 1978) assesses three dimensions of perceived control over health. The first measures internal locus of control, while the other two assess perceived control of health from external sources (powerful others and chance). In a study examining general locus of control in chronic pain patients, the MHLC was administered, and three profiles of health locus of control beliefs were obtained for a sample of 160 subjects. The number of patients with CLBP were not reported except to say that they were among a group of 89 subjects suffering from chronic benign problems (Buckelew, Shutty, Hewett, Landon, Morrow, & Frank, 1990). Male patients were categorized as "pure internals" (those who reported high levels of internal locus of control), "double externals" (those who reported high levels of both chance and powerful others locus of control), and "naysayers" (those who reported low levels of each of the categories). It was reported that the pure internal and naysayers were also found in the female sample. A third female profile was observed and labelled "believers in control", which reflected high scores on the internal and powerful others scales, and a low score on the chance locus of control scale. Buckelew et al. (1990) reported that the male profiles were unrelated to coping behavior, similar results were not found in the female sample. Pure internals were more likely to employ information seeking and self-blame strategies. They also employed more threat minimization than believers in control. Finally, both pure internals and believers in control used more cognitive restructuring to cope with pain than did naysayers. Coping strategies were assessed by The Revised Ways of Coping questionnaire (WOC) (Fenton, Revenson, & Hinrichsen, 1984). This study focused on the relationship between locus of control and coping strategies; thus no measures of psychological and physical functioning were employed.

Harkapaa, Mellin, Hurri, and Luoma (1991) investigated health locus of control beliefs and their effects on treatment outcome in low back patients. Four hundred and fifty-nine patients were assigned to either an inpatient, outpatient, or control group. Significant decreases in disability due to low back pain and increases in the accomplishment and frequency of back exercises were shown in both treatment groups. A modified version of the Health Locus of Control (HLC) scale (Wallston, Wallston, Kaplan, & Maides, 1976), which included two additional items assessing beliefs in back pain control, was used to measure health locus of control beliefs. These beliefs were associated with a successful outcome. Harkapaa et al. (1991) found that those patients with stronger internal beliefs had gained more from the treatment, had learned their exercises better, and had done their exercises more frequently during a three month follow-up period. One problem with the study was that only an indirect relationship between psychological distress and health locus of

control beliefs could be made. Psychological distress was significantly associated with the accomplishment of exercise, that is, those with distress demonstrated a smaller number of well performed back exercises. According to the authors, psychological distress was seen as having a detrimental effect on the learning process.

Harkapaa (1991) examined the relationships among health locus of control, psychological distress, and the use of coping strategies in 415 chronic or recurrent low back pain patients from the Harkapaa et al. (1991) sample that completed a 1.5 year follow-up survey. Health locus beliefs were assessed by a modified version of the Health Locus of Control Scale (HLC). Coping strategies were measured by a revised version of the Coping Strategies Questionnaire (CSQ) (Rosenstiel & Keefe, 1983). Significant but moderate associations (ranging from $r = .18$ to $-.21$, $p < .01$) in the expected directions were found between locus of control and pain severity. Interestingly, only internal control ($r = .13$, $p < .01$) showed a significant relationship with psychological distress in the expected direction. In terms of coping strategies, greater use of coping self-statements was significantly predicted by a high internal locus of control. The strongest associations were observed with the two items that assessed a belief in control over pain and use of preventative actions. Positive responses to these items were associated with the use of more active self-care coping strategies.

In a complex path analytic research design, Rudy, Kerns, and Turk, (1988) examined the relationships among depression, perceived control of pain, and perceived pain interference in life activities. Perceived control was measured by higher levels of perceived control over pain and lower levels of perceived pain interference with life activities; both were associated with lower levels of depression. Furthermore, the authors reported that both predictor variables made independent contributions to the prediction of depression, suggesting that each may play an important role in determining psychological adaptation to chronic pain. Finally, Rudy et al. (1988) asserted that their findings lend support to the notion that perceived control and perceived interference mediate the relationship between pain severity and depression. Moderate relationships were found between perceived self-control and pain severity, as well as between perceived control and depression. The authors noted that taken as a whole, the factors of pain, perceived interference, and lack of self-control accounted for over 68% of the variance in depressed mood.

The five studies discussed above all lend some support to the relationship between internal locus of control and positive adaptation to pain. They also suggest that locus of control is related to various pain coping efforts. Chronic low back pain patients have been well represented in these studies. However, it appears that the associations between locus of control, although typically found in the predicted direction, are usually modest at best, explaining only a small portion of the variance that accounts for psychological and physical functioning. A lack of consistency has been found with respect to locus of control and the use of coping strategies. For example, in the Buckelew et al. (1990) study, locus of control was able to predict coping strategies for women but not for men, and Harkapaa (1991) found internal

locus of control to be associated with only one positive coping strategy, while chance control had no significant relationships to self-reported methods of coping with pain.

Perceived control over pain

Following from the relationship between general beliefs about locus of control and coping and adjustment, a number of studies have examined the association between pain specific control appraisals (i.e., belief in personal control over pain specifically) and positive adaptation to chronic pain. For example, Strong, Ashton, Cramond, and Chant (1990) found that the more chronic low back pain patients ($n = 50$) endorsed a sense of control over pain, the less likely they were to report that pain interfered with their daily activities ($r = 0.54$, $p < .005$). In the process of developing the Survey of Pain Attitudes (SOPA), a questionnaire designed to assess five attitudes considered important in long term adjustment to chronic pain, Jensen, Karoly, and Huger (1987) found that perceived pain controllability predicted self-reported use of relaxation to cope with pain ($r = .54$ $p < .01$). Their results were based on a sample of 55 chronic pain patients, 20% of whom suffered from back pain alone. The attitudes assessed included: 1) belief in a medical cure for pain; 2) belief in one's ability to control pain; 3) belief that it is the responsibility of others to assist patients who are experiencing pain; 4) belief that the patient is disabled because of pain; and 5) belief that medication is the best treatment strategy for pain. Pain controllability was also found to interact with gender in the prediction of exercise immediately following treatment in multidisciplinary pain programs. A pre-treatment belief that one could control pain was associated with more frequent exercise post-treatment for males but not for females. The scale used to make comparisons consisted of only six items, and preliminary studies have produced only "reasonable" levels of internal consistency, test-retest reliability and concurrent validity (Strong et al., 1990). In a recent study, Strong, Ashton, and Chant (1992) re-examined the psychometric properties of the SOPA(R) (Jensen & Karoly, 1987), a modified version of the SOPA, with a sixth subscale that reflects that attitude that pain may be influenced by emotional factors. The findings essentially replicated the SOPA(R) factor structure reported by Jensen and Karoly (1987) and revealed satisfactory internal consistency. However, the "medication" subscale showed weak factor loadings and reliability in both studies (Jensen, Karoly, 1987; Strong et al., 1992). Similarly, Jensen and Karoly (1992) found a low reliability coefficient for the medication subscale.

Crisson and Keefe (1988), using the Multidimensional Health Locus of Control, reported that the belief that pain severity is due to chance was associated with (a) greater anxiety, depression, and obsessive-compulsive symptoms and (b) generally greater psychological distress on the Symptom Checklist-90-Revised (SCL-90-R) (Derogatis, 1977). The study employed a sample of 62 chronic pain patients, 82% of whom were suffering from chronic low back pain. As well, patients high on chance locus of control reported feeling helpless to deal effectively with their pain problems, and they reported a greater reliance on diverting attention and

praying/hoping strategies to cope with their pain. Significant relationships found were rather small and, interestingly, no association was observed with an internal locus of control and pain coping strategies. Keefe and Williams (1990) observed that patient ratings of control over pain and their ability to decrease pain was associated negatively with depression, but not with a general measure of psychological distress. Using the Pain Locus of Control Scale (PLCS), a modification of the Multidimensional Health Locus of Control, Toomey, Mann, Abashian, and Thompson-Pope (1991) explored the relationship between an internal locus of control and ratings of pain intensity, frequency, and pain related behavioral functioning. From a university based pain clinic, a sample of 51 patients suffering from chronic myofacial pain was examined. Results were consistent with previous studies and indicated a relationship ($r = .50$ $p < .001$) between perceived control over pain and pain intensity and frequency. Patients above the median on the internality dimension on the PLCS reported less intense and less frequent pain than those below the median on the same scale. No differences, however, were found on the behavioral functioning measures, a fact which the authors attributed to the lack of validity in such measures.

Jensen and Karoly (1991) in the prediction of functioning with 118 chronic pain patients examined the interaction of pain severity with patients' appraisals of pain control. Almost half of these subjects were suffering from low back pain. They observed that the belief in control over pain was associated positively with activity level for only those reporting relatively low levels of pain. No significant positive results were observed for subjects who rated themselves as high in pain severity. A multiple regression analysis indicated that the interaction between control appraisals and pain severity accounted for about 17% of the variance with respect to activity. Control appraisals, as measured by the Survey of Pain Attitudes (Jenson et al., 1987), were positively associated with psychological functioning in the expected direction among all patients regardless of their level of pain and in this respect accounted for generally 24% of the variance.

Affleck et al. (1987) studied pain control appraisals in a group of rheumatoid arthritis patients. They reported that patients' perceived control over the course of their treatment was associated positively with mood and with global adjustment as rated by treatment providers. Conversely, patients who believed that their health care worker controlled their symptoms were more likely to be depressed. For patients who were experiencing more disease symptoms and greater disease severity, patient-rated personal control over symptoms and disease course was correlated positively with measures of well-being and adjustment.

A construct closely related to perceived control over pain is perceived helplessness. Apart from two studies, Flor and Turk, (1988) and Skevington, (1983) most research in this area has not employed samples of chronic low back pain sufferers. In fact, most of the work has been done with samples of patients with arthritis. Employing Seligman's learned helplessness model of depression, Nicassio, Wallston, Callahan, Herbert, & Pincus (1985) developed a measure designed to assess patients' perceptions regarding their ability to control arthritis symptoms (the Arthritis

Helplessness Index). Patients with scores indicating perceived helplessness on this scale showed a passive pain coping style (Stein, Wallston, & Nicassio, 1988; Stein, Wallston, Nicassio, & Castner, 1988) and a greater degree of psychological and physical disability (Nicassio et al., 1985; Smith, Peck, & Ward, 1990; Stein, Wallston, & Nicassio, 1988; Stein, Wallston, Nicassio, & Castner, 1988). The scale has also demonstrated a negative relationship to active coping efforts (Stein, Wallston, & Nicassio, 1988; Stein, Wallston, Nicassio, & Castner, 1988). Smith et al. (1990), using path analysis, found support for the hypothesis that helplessness (as measured by the Arthritis Helplessness Scale) mediates the relationship between disease severity and depression among rheumatoid arthritis patients. For example, a significant relationship between disease severity and depression was vitiated when helplessness was controlled. These findings, in addition to those of Rudy et al. (1988), lend support to the notion that beliefs about one's ability to control pain play a role in determining adaptational differences among chronic pain patients.

In general, the studies reviewed indicated a consistent relationship between pain control beliefs and physical and psychological functioning. However, similar to the studies dealing with more general locus of control, the associations observed with the various measures of pain severity, coping strategies used, and psychological distress are accounting for a small share of the variance between beliefs/appraisals and psychological and physical functioning. The results from the locus of control studies have contributed to the development of treatment strategies by highlighting the need for those experiencing chronic pain to develop self-responsibility by taking an active approach to managing their pain. The purpose of this study is to compliment the locus of control literature by generating specific beliefs that are held by the patient and that may be addressed in therapy. These beliefs could serve to assist pain suffers in developing more self-responsibility and increase their understanding and flexibility in terms of becoming more psychologically and physically functional. Most importantly, the studies reviewed have focused on beliefs as clinically relevant constructs, the experience of which can be reduced to questionnaire responses and self-ratings.

Attributional style

Abramson, Seligman and Teasdale (1978) have asserted that an individual's attributional style is related to and is a risk factor for depression. They maintain that individuals are more likely to become depressed following uncontrolled events if they attribute these events to internal, stable, or global causes. An internal attribution reflects a belief that outcomes result from something about the person. A stable attribution is a belief that outcomes are the result of non-transient factors and, thus, are long lasting. A global attribution is a belief that similar outcomes can be expected across a wide variety of situations. In an attempt to test the formulation of Abramson et al. (1978), the Attributional Style Questionnaire (ASQ) was developed by Peterson, Semmel, Von Baeyer, Abramson, Metalsky, and Seligman (1982).

Three studies, with inconsistent results, were found that examined responses to the ASQ and psychological functioning in chronic pain patients. Love (1988), using a sample of CLBP patients, found that depressed pain patients are more likely than non-depressed patients to endorse all three attributional styles, resulting in negative rather than positive outcomes. Cheatle, Brady, and Ruland (1990), also using samples of CLBP patients, found that a composite score of internal, stable, and global attributional styles in response to negative outcomes was associated with depression. However, Ingram, Atkinson, Slater, Saccuzzo, and Garfin (1990) were unable to find differences between depressed and non-depressed chronic pain patients on their ASQ scores.

Cognitive errors

The notion of cognitive errors was derived from the work of Beck (1967, 1976) and Ellis (1962) and may be defined as a negatively distorted belief about oneself or one's situation. These errors have been hypothesized to contribute to the maintenance and severity of depression (Beck 1967, 1976; Ellis, 1962) and include, among others, catastrophizing (misinterpreting an event as a catastrophe), personalization (taking personal responsibility for negative events), selective abstraction (selectively attending to the negative aspects of a situation), and overgeneralization (assuming that the outcome of one experience applies to the same experience in the future or to even slightly similar experiences).

A number of studies have examined the relationship between cognitive errors and adjustment among chronic pain patients. For example, in chronic back pain, as well as in rheumatoid arthritis patient samples, a higher frequency of cognitive distortions has been linked consistently to symptoms of depression (Keefe & Williams, 1990; Lefebvre, 1981; Slater, Itall, Atkinson, & Garfin, 1991; Smith, Aberger, Follick, & Ahern, 1986; Smith, Aberger, Follick, Ahern, & Adams, 1986; Smith, Peck, Milano, & Ward, 1988; Smith, Peck, & Ward, 1990; and Sullivan & D'Eon, 1990).

Lefebvre (1981) attempted to measure the tendency to make cognitive errors in four groups of subjects: 18 depressed psychiatric patients, 19 depressed low back pain (LBP) patients, 29 non-depressed LBP patients, and 23 non-depressed persons without LBP. Derived from the central component of Beck's theory of depression, the Cognitive Error Questionnaire (CEQ) (Lefebvre, 1980) was administered in two forms that focused on either general or low back pain-related life experiences. The instruments were designed to measure general cognitive distortion, as well as four dysphoric cognitive errors (catastrophizing, overgeneralization, personalization, and selective abstraction). To demonstrate reliability of the Cognitive Errors Questionnaire measures of internal consistency (Cronbach's Alpha) were calculated and found to range from .62 to .94 on the combined experimental group data. Depression was measured by the Beck Depression Inventory (BDI) (Beck, Steer, & Garbin 1988; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). Results indicated that cognitive errors were endorsed significantly more by depressed subjects with or

without low back pain than those who were not depressed with or without low back pain. Of particular importance was the finding that low back pain subjects were observed to endorse more strongly three out of the four errors focused on low back pain experiences than depressed non-pain patients. As a result Lefebvre asserted that depression is a function of both low back pain and cognitive errors. These results lend support to Beck's contention that each syndrome or emotional disturbance carries with it a specific set of dysfunctional beliefs and that the Cognitive Errors Questionnaire may tap into unique cognitive characteristics of pain patients.

Slater, Itall, Atkinson, and Garfin (1991) also observed a relationship between cognitive distortion and depression among CLBP patients as measured by the Cognitive Errors Questionnaire and Beck Depression Inventory ($r= 0.54$ $p< .001$). The authors attempt to extend the validation of the Pain and Impairment Relationship Scale (PAIRS) for which preliminary data were developed by Riley, Ahern, and Follick (1988). During the initial development of the scale a moderate degree of internal consistency was observed; in addition, a positive relationship between attitudes and beliefs about pain and impairment, as well as a self-rated global measure of functional impairment, was identified. Slater et al. (1991) used a sample of 31 chronic low back pain patients and 19 healthy no-pain controls. Their results indicated that the impairment beliefs assessed by the PAIRS were more prominent in CLBP patients than in controls. A reasonable degree of convergent validity was observed as beliefs regarding impairment were distinguishable from cognitive distortions or errors; a correlation ($r= -.035$, $p> 0.40$) was obtained between the CEQ and the PAIRS. Other results indicated fair test-retest reliability ($r= .66$, $p< .05$). Consistency over time was affected by the fact that the number of weeks between administrations ranged from 4 to 39 weeks. Retest scores were higher, and the authors asserted that this indicated that impairment beliefs become more predominant with continued chronicity of pain. The PAIRS relationship to physical impairment was moderate as the instrument correlated ($r= .54$, $p< .005$) with the Sickness Impact Profile (SIP) (Bergner, Bobbit, Carter, & Gibson, 1981). No relationship, however, was found with a physician's rating of disease severity. Data showed that the instrument appeared to be free from self-report bias. A limit of the PAIRS is its consideration of only one attitude or belief about pain. That is, the link between pain and impairment. To conclude, the PAIRS is a relatively new instrument, which, based on two studies found for this review, has shown "at least preliminary utility for applications by researchers and clinicians interested in chronic pain" (Slater, et al., 1991, p. 51).

Sullivan and D'Eon (1990) examined the relationship between catastrophizing, depression and pain in 125 chronic pain patients, 101 of which were being treated for chronic lower back pain. They found a significant relationship between catastrophizing and depression ($r= .42$, $p< .001$). All items on the Catastrophizing scale of the Coping Strategies Questionnaire (CSQ) were rated as being reflective of depression and were removed from the CSQ. When the scale was removed, none of the remaining coping subscales were associated with depression. The authors assert that catastrophizing measures may be tapping into the cognitive and affective

components of dysphoria rather than measuring distinct aspects of pain-related cognition. These results raise the question of overlap between constructs being used in many of the belief studies. More specifically, it challenges the validity of the Catastrophizing subscale of the CSQ.

In addition, a number of studies have reported significant positive relationships between pain-specific cognitive distortions (but not general cognitive distortions about non-pain events) and disability (Flor & Turk, 1988; Smith, Aberger, Follick, Ahern, & Adams, 1986; Smith, Peck, Milano, & Ward, 1988).

Flor and Turk (1988), using a sample of CLBP patients (n=30) and a second sample of patients suffering from rheumatoid arthritis (n = 40), studied cognitive variables postulated to be of importance by the cognitive-behavioral model: situation specific pain related self-statements as measured by the Pain Related Self-Statement Scale (PRSS) and an individual's more general cognitive schemata regarding convictions of personal control, as assessed by the Pain Related Control Scale (PRCS). Associations between these two scales and pain severity and disability levels were examined. The two instruments were developed specifically for the study. Statements were derived from extensive interviews with chronic pain patients and then factor analyzed. The PRSS yielded two subscales, "Catastrophizing" and "Coping", each consisting of nine items and explaining 45% and 35% of the variance respectively. The factor analysis of the PRCS also revealed two subscales, which were labelled "Helplessness" and "Resourcefulness". These subscales accounted for 28% and 16% of the common variance and consisted of 15 items each. Construct validity was assessed using the Multidimensional Health Locus of Control, West Haven-Yale Multidimensional Pain Inventory (MIP; Kerns, Turk, & Rudy, 1985) and Hopelessness Scale (HS); (Beck & Weismann, 1974). All correlations were statistically significant in the expected direction with the above instruments except for the Resourcefulness subscale of the PRCS with the HS and the MPI. In the CLBP sample, pain and disability statements were highly correlated with catastrophizing self-statements as well as the Helplessness subscales. Similar results were reported from the rheumatoid arthritis group. Results of multiple regression analyses revealed that cognitive variables explained significantly more variance (44-54%) than disease related variables (duration of pain and amount of degenerative change on spinal x-rays), which accounted for between 12% and 28%. Sample sizes were relatively small, and the majority of the subjects were female.

Most recently, Flor, Behle, and Birbaumer (1993) described two studies that re-examined the psychometric properties of the Pain Related Self-Statement Scale (PRSS) and Pain Related Control Scale (PRCS). Study 1 included 120 pain clinic patients suffering from various types of chronic pain, 50% of which experienced chronic back pain. This study included data summarized in Flor and Turk (1988) and produced similar results in terms of factor structure and reliability. Study 2 involved 213 chronic back pain patients as well as two control groups. The factor structure found in Study 1 and the initial sample reported in Flor and Turk (1988) was essentially replicated in Study 2 with the exception of the Resourcefulness subscale. Internal consistency was reported to be "excellent" for the PRSS, while only marginal

for the PRCS in Study 2. It was also reported that the measures were able to differentiate chronic pain patients from healthy controls in terms of pain-related negative self-statements, convictions of helplessness, and active coping self-statements, but not thoughts about resourcefulness. To summarize, the results of the studies Flor et al. (1993) asserted that "the PRSS has been found to have a stable factor structure, while further analyses are required for the PRCS to determine if lower consistency across the analyses and lower stability are related to sample differences (heterogenous versus back pain) or are based on conceptual problems inherent in the scale" (p. 71).

To increase the utility of Lefebrve's (1981) finding, Smith, Aberger, Follick, and Ahern (1986) tried to determine whether cognitive distortion, using the Cognitive Errors Questionnaire (CEQ), was associated with elevations on somatization or with more general distress in a sample of 138 CLBP patients. High scores on not only the Depression (D) scale of the Minnesota Multiphasic Personality Inventory (MMPI), but also on the Psychasthenia (Pt), and Schizophrenia (Sc) scales correlated significantly with high CEQ scores. Alternately, no association was found between cognitive distortion and scores on the Hypochondriasis and Hysteria scales. The results of a canonical correlation revealed that the relation between distortion and the MMPI scales is accounted for primarily by an association between low back distortion and both the D and Sc scales. Moreover, the correlations between individual variables indicated that the distortion variate was almost completely defined by the low back distortion, although general distortion was highly correlated as well. Thus, Smith et al. (1986) asserted that cognitive distortion is a correlate of general distress but not of somatization.

Smith, Follick, Ahern, and Adams (1986) examined the relationship between cognitive distortion and disability in 138 CLBP patients. Cognitive distortions were measured by the Cognitive Errors Questionnaire, and disability was measured by the Sickness Impact Profile. Using multiple regression analysis, the authors found that cognitive distortion was associated with several aspects of disability (depression, as measured by the Depression Scale of the MMPI, pain ratings monitored in a pain diary, and number of treatments). Overgeneralization was the most closely and consistently cognitive error related to disability. Smith, Follick, Ahern, and Adams (1986) noted that this cognitive error is related to disability in that "if patients assume that disability in a circumscribed set of movements or activities implies disability in related areas of functioning (i.e., overgeneralization), they may curtail their activities unnecessarily" (p. 208). In addition, Smith, Follick, Ahern, and Adams (1986) asserted that overgeneralization may serve to maintain disability by falsely assuming that limitations in their current activities indicate that they will be limited in the same or similar areas of functioning in the future and so lead to maladaptive reductions in self-efficacy expectations (Bandura, 1982). A combination of decreases in functional behavior and reductions in self-efficacy expectations are consistent with a self-exacerbating cycle common in many patients suffering with chronic pain. Also, as predicted, cognitive distortion concerning low back situations was more closely correlated to disability than distortion concerning general, non-pain situations. Both

this study and the previous one undertaken by Smith and his colleagues support the notion that cognitive factors are important in CLBP, and, more specifically, that two important aspects of CLBP (disability and distress) are closely related to cognitive processes.

Another instrument developed to assess negative thoughts is the Automatic Thoughts Questionnaire (ATQ) (Hollon & Kendall, 1980). This measure consists of 30 self-referent negative statements (e.g., "There's something wrong with me.") and was developed from the items generated by 788 undergraduate students who were asked to re-create a depressing time in their lives and record the thoughts that "popped into their heads". The selection of items was based on their ability to discriminate between depressed and non-depressed criterion groups. Ingram et al. (1990) administered the questionnaire to a group of depressed and non-depressed low back pain patients and to a group of healthy controls. As predicted, and consistent with the previous research discussed above relating to cognitive distortion and depression, depressed pain patients were more likely to endorse negative self-statements than either the non-depressed or healthy control group. On a measure of automatic positive thoughts styled after the Negative Automatic Thoughts Questionnaire, non-depressed pain patients and healthy controls were more likely to endorse positive thoughts. This measure has been the most widely utilized to assess the type and frequency of negative thoughts in depressed or anxious individuals (Ingram & Wisnicki, 1988). However, although many pain patients are depressed and anxious, pain is their primary concern, and their response to pain is the main focus of treatment. (Gil et al., 1990) state that the primary concern with the use of the ATQ is that it may be tapping the effects of depression and anxiety rather than the effects of pain specific beliefs.

Other instruments have been used to assess patients tendencies to engage in negative thinking. Gil, Williams, Keefe, and Beckham (1990) developed the Inventory of Negative Thoughts in Response to Pain (INTRP), a 21-item pain rating scale that is specific to pain flare-ups. This instrument was administered to three samples of patients: chronic pain (including those suffering primarily from CLBP and headaches), sickle cell disease, and rheumatoid arthritis. A factor analysis of statements derived from interviews revealed three factors which Gil et al. (1990) labelled Negative Self-Statements, Negative Social Cognitions, and Self-Blame. These factors accounted for 50%, 30% and 20% of the common variance respectively. According to Jensen, Turner, Romano, and Karoly (1991), the INTRP items represent automatic negative thoughts very similar to those assessed by other measures of cognitive errors. The Negative Self-Statements and Negative Social Cognitions scales were associated positively with pain intensity ($r = .30$, and $r = .26$, $p < .007$), and all three factors were positively associated with psychological distress as measured by the SCL-90-R (correlations ranging from $r = .27$ to $.63$, $p < .007$). In addition, subjects' ratings of the frequency with which they have negative thoughts and the pervasive nature of these thoughts were related positively to psychological distress; feelings of control over these thoughts were negatively related with psychological distress. The INTRP appears to be psychometrically sound (Gil et al.,

1990) and is able to differentiate patterns of negative thinking across different patient populations. The limitation of most of the studies reviewed holds true for the (Gil et al., 1990) study as well, namely the reliance of self-report pain measures and an inability to infer causation from correlational data. Test-retest reliability, discriminant validity checks comparing the INTRP with normal and chronically ill subjects without pain, and replication of the factor structure would all contribute to the psychometric relevance of this measure.

Philips (1989) developed another measure of cognitive responses, the Cognitive Evaluation Questionnaire, with a group of 127 chronic pain patients, 72 of which suffered from CLBP. This questionnaire was derived from the Headache Assessment Questionnaire (HAQ) developed by Bakal (1982) which assessed the thoughts, feelings, and/or attitudes provoked by the onset of headache. Philips (1989) modified the HAQ in order to make it an appropriate assessment tool for any type of chronic pain problem. It is a unique instrument in that it focuses on cognitions associated with increments in pain. An exploratory cluster analysis of the items yielded seven clusters, six of which represented negative automatic thoughts. Four of the six clusters (labelled "Desire to Withdraw", "Disappointment in Self", "Helplessness", and "Emotional Reactivity") were associated positively with depression. Correlations ranged from $r = 0.36$ to 0.52, (no p values reported). All six of the clusters representing the negative thoughts (which include "Casual Rumination" and "Concern Regarding the Effects of Pain" in addition to the above clusters) were positively associated with affective subscale of the McGill Pain Questionnaire (Melzack, 1975); correlations ranged from $r = 0.35$ to 0.52 (again no p values were reported). Philips (1989) noted that development and replication of the scale is needed since an unequal number of statements fell into the seven clusters, and given that the results of this study were different from those found in a discriminant functional analysis undertaken by Penzien, Holroyd, Holm, and Hursey (1985) using a group of headache sufferers. Philips asserted that the dissimilarity of pain sites did not seem to explain the differences between samples, as none were observed between headache patients and those with other pain loci in her study.

Three studies using more sophisticated methodologies to examine the relationship between cognitive errors and adjustment to chronic pain have not involved patients with CLBP, but rather those suffering from rheumatoid arthritis. Keefe, Brown, Wallston, and Caldwell (1989) examined the relationship between catastrophizing (as assessed by the Catastrophizing subscale of the Coping Styles Questionnaire) and adjustment in a longitudinal study. Demographic variables, disability support status, duration of pain, and initial scores on measures of adjustment were all controlled in the data analysis. Results indicated that initial pain-related catastrophizing scores were associated positively, both initially and six months later, with pain intensity, physical disability, and depression. Using path analytic procedures Smith, Peck, Milano, and Ward (1988) found that a measure of cognitive distortion mediated a significant amount of the variance between arthritis disease severity and depression. Finally, Smith, Peck, and Ward (1990) found that cognitive

distortion made a unique contribution to the prediction of depression, even when the measure of perceived self-control over pain was controlled.

The results of the studies examining cognitive errors/distortion provide strong evidence for a role of negative cognitions in the adjustment to chronic pain. The more sophisticated longitudinal, path analytic, and mediational analyses suggest that such negative thoughts: 1) can predict long-term adjustment to chronic pain; 2) may mediate a portion of the relationship between disease severity and adjustment; and 3) make a unique contribution (over and above that of other cognitive factors) to the prediction of adjustment. Unfortunately, patients with chronic low back pain were not represented in these studies. The group of studies reviewed has identified a number of specific beliefs which are relevant to treatment and, in general, have employed samples of chronic low back pain patients. However, as noted earlier there is uncertainty about the validity of the concept of catastrophizing, specifically with respect to the subscale of the Cognitive Styles Questionnaire because of its overlap with depression. The instruments used to assess cognitive errors have shown moderate to good psychometric properties, but many are in the preliminary stages of development and have yet to be replicated. Similar to the locus of control literature, the studies examining cognitive errors have produced relatively low to moderate correlations between measures. Because these studies focused on dysfunctional beliefs/ cognitive errors, they have provided minimal insight into the beliefs or cognitions that are associated with good psychological and physical functioning. Most importantly, with the exception of Flor and Turk (1988) and Gil et al. (1990), studies have utilized theoretically driven constructs and have failed to seek the experience of chronic pain patients as a means of assessing their beliefs and cognitions to generate scale items.

Self-efficacy beliefs

A self-efficacy belief has been described as a judgement about one's ability to perform a specific behavior (Bandura, 1977). According to social learning theory, such beliefs can greatly influence the initiation and persistence of behavior (Bandura, 1986). The following studies have examined chronic pain patients' self-efficacy beliefs and their relationship to exercise. Dolce, Crocker, Moletteire, and Doleys (1986) reported that self-efficacy expectations were found to closely parallel increases in actual exercise levels during treatment ($r = .69$, $p < .001$) in a behavioral chronic pain treatment program which implemented exercise quotas. The study utilized an A-B multiple baseline design across behaviors. Patient rated worries about exercise were found to decrease over treatment. In a related study (Dolce, Crocker, & Doleys, 1986), a composite measure of self-efficacy beliefs regarding exercise, work and ability to engage in medication-free coping completed during treatment was positively associated with post-treatment work status and exercise level. These self-efficacy beliefs were negatively associated with post-treatment medication use. Finally, Council, Ahern, Follick, and Kline (1988) found that CLBP patient ratings of their ability to perform ten specific movements varied directly with observed

performance of the movements, and inversely with pain behaviors observed during the movements.

Kores, Murphy, Rosenthal, Elias, and North (1990) had two groups of chronic pain patients rate their perceived ability to engage in five activities which included walking, lifting, coping with pain, work, and family or vocational activities during treatment in a multidisciplinary pain treatment program. In the first group, subjects scoring higher on a composite of the five self-efficacy ratings (assessed during their last week of treatment) were observed to have longer concurrent sitting and standing times than those with lower self-efficacy scores. The patients with the greater sense of self-efficacy also rated themselves as having improved more in their ability to work, to engage in social activities, and to use fewer medications 3-11 months post-treatment. No relationship was reported between self-efficacy scores and follow-up measures of pain reduction, up time or down time. In a second group of patients studied, post-treatment measures of self-efficacy were associated with lower rates of observed pain behavior at 2-14 month follow-up.

It appears that self-efficacy beliefs are related to the use of coping strategies. Jensen, Turner, and Romano (1991) asked 114 chronic pain patients (28% of which were suffering with low back pain) to rate the degree to which they believed they were capable of using eight different pain coping strategies. These strategies included engaging in aerobic exercise, stretching exercises, keeping busy with something interesting, muscle strengthening, ignoring the pain, relaxation exercises, avoiding rest, and avoiding opiate medication use. Patients were then asked to disclose how often they had employed the strategies during the previous week. While controlling for self-reported pain severity, results indicated that patients' beliefs about their abilities were consistently related to self-reported use of coping strategies. These relationships remained significant even when beliefs about the effects of the coping strategies on pain were controlled. This finding, the researchers note, suggested the importance of emphasizing the actual practice and use of adaptive coping strategies over education about their outcome.

No other reported studies examining the relationship between self-efficacy beliefs and the use of coping strategies have utilized a CLBP population. However, four additional studies have been carried out with rheumatoid arthritis patients.

Blalock, DeVellis and Devellis (1989) found that beliefs regarding one's ability to perform activities of daily living were associated positively with self-esteem, positive affect, and satisfaction, but negatively with patient-reported symptoms of depression. Lorig, Chastain, Ung, Shoor, and Holman (1989) developed the Arthritis Self-Efficacy scale to assess patients' beliefs in their abilities to manage pain, to perform nine basic activities such as walking and dressing without difficulty, and to manage non-pain arthritis symptoms such as fatigue, frustration, and activity level. Greater beliefs in ability to manage pain have been found to be associated with lower levels of pain intensity, depression, and disability (Lorig et al., 1989; O'Leary, Shoor, Lorig, & Holman 1988; Reagan, Lorig, & Thoresen, 1988). Stronger beliefs in ability to perform activities of daily living were associated with less disability, joint impairment, pain, and depression (Lorig et al., 1989; O'Leary et al., 1988; & Reagan

et al., 1988). Stronger beliefs in ability to manage symptoms other than pain were associated with less depression, stress, pain, and disability (Lorig et al., 1989; O'Leary et al., 1988; & Reagan et al., 1988).

As Jensen, Turner, Romano, and Karoly (1991) have reported, "the research on self-efficacy beliefs has provided strong evidence for their relationship to coping behaviors and adjustment" (p. 265). It appears that people are more likely to engage in activities that they believe they are capable of doing. In general, a greater sense of self-efficacy is associated with better psychological functioning. These studies have also been some of the few that have looked at chronic pain beliefs in relation to actual behavioral measures. Unfortunately, only one of the studies focused on the effects of self-efficacy beliefs and the use of coping strategies with a sample of CLBP patients, and this one did not study these effects over time. One limitation of these studies is the lack of a standardized procedure for assessing self-efficacy expectations because these beliefs are behavior specific (Bandura, 1977; Lorig et al., 1989).

Other Pain Beliefs

A large number of pain-related beliefs which are not easily categorized into the above classifications have been examined through the development of a variety of scales. A number of scales used to identify these beliefs have been discussed earlier and include the Survey of Pain Attitudes (Jensen, et al., 1987), the PAIRS (Riley, et al., 1988), the Pain Related Self-Statement Scale and Pain Related Control Scale (Flor & Turk, 1988). In this section six other scales that have focused on identifying various pain related beliefs will be reviewed. In addition, the associations between some of the various beliefs and their relationship with adjustment to chronic pain will be discussed.

Interestingly, two distinct scales have been found using the name The Pain Beliefs Questionnaire (PBQ). One developed by Gottlieb (1984, 1986) and another most recently reported by Edwards, Pearce, Turner-Stokes, and Jones (1992). Gottlieb's work, perhaps the first published scale measuring beliefs towards pain, is represented by a 43-item questionnaire which assesses four dimensions that were derived through factor analysis: (1) disability expectations, (2) self-efficacy, (3) depression, and (4) pain as threat. According to DeGood and Shutty (1992), Gottlieb's version of the (PBQ) is easily administered with good face validity likely to minimize an individual's reluctance to complete a psychologically oriented test. Preliminary research with 116 outpatients undergoing an eight-week behaviorly based rehabilitation program found the PBQ to be related to treatment outcome. Gottlieb reported that patients with "dysfunctional cognitions" at the onset of the program tended to make significantly less progress during the course of treatment than those who endorsed less negative thoughts at the beginning of their programs. Furthermore, patients judged to be successful evidenced a reliable decrease in dysfunctional cognition scores over the course of treatment. DeGood and Shutty (1992) assert that one difficulty with this measure is that it seems to blend several distinct constructs such as self-efficacy expectancies, cognitive coping strategies, and

specific beliefs about treatment, making it difficult to interpret. They note that it warrants further attention to better establish its clinical utility given that it has demonstrated potential as a clinical tool in two studies.

The other Pain Beliefs Questionnaire (Edwards et al., 1992) is a 20-item questionnaire that covers beliefs about the cause and treatment of pain. The instrument was developed using 294 subjects, which included 100 chronic pain patients and 194 controls. The authors reported that the items were chosen to reflect the common beliefs about the experience of pain, its causes, and factors influencing its severity. No mention was made of the extent to which subjects actual experiences were ascertained to directly influence the generation of the items. Patients suffering with pain for a minimum of six months with mixed aetiologies were included in the study. The percentage of chronic low back patients that made up the sample was not reported. An exploratory factor analysis identified two factors accounting for 68% of the variance: the first called Organic Beliefs and the second called the Psychological Beliefs scales comprising eight and four items respectively. The construct validity was assessed in two ways. First, the responses of chronic pain patients and non-patient controls were contrasted, and significant differences between the groups were found indicating that the chronic pain patients were more likely to endorse items on the Organic Beliefs scale. Second, as predicted, significant correlations were noted between scores on the Organic Beliefs scale and scores on the Chance and Powerful Others scales of the Multidimensional Health Locus of Control (MHLC). As well, a significant association was observed between the Psychological Beliefs scale and the Internal scales of the MHLC. No relationship was observed between scale measures and pain intensity.

The Pain Beliefs and Perceptions Inventory (PBAPI) (Williams and Thorn, 1989) is a 16-item scale that measures three factors assessing a patients beliefs about the stability of pain over time, pain as a mystery, and self-blame. The measure evolved from work by Williams (1988) who informally asked 90 chronic pain patients to describe their beliefs about pain. Another 121 chronic pain patients then rated their level of agreement with these beliefs in relation to their own pain experience. A factor analysis of these responses lead to the three factor solution described above. Given the focus on patients' experience of pain in the development of the items, the PBAPI is one of the few belief instruments that is not theoretically driven. In a preliminary study in which 87 chronic pain patients with a variety of pain sites receiving compensation benefits participated, Williams and Thorne (1989) reported that the pain stability or "Time" factor was positively and significantly associated with increased subjective reporting of pain intensity and decreased treatment compliance with conservative therapy. Also, subjects who were more likely to hold the belief that "pain is mysterious" (that pain has no explanation) were less likely to improve on a measure of somatization and less likely to improve on all measures of psychological distress. Finally, both "pain as stable" and "pain as mysterious" beliefs were associated significantly, and in a positive direction, with negative self-perceptions inversely with an internal heath locus of control.

Williams and Keefe (1991) studied the relationship between patients' beliefs as assessed by the Pain Beliefs and Perceptions Inventory (PBAPI) and coping strategies. A cluster analysis of the PBAPI responses to the Stability of Pain and Pain as Mysterious scales indicated three patient subgroups that differed in patterns of coping styles were used. It was observed that patients who believed that their pain was likely to persist and were without explanation about the cause of their symptoms reported a greater tendency to catastrophize their pain and used fewer cognitive strategies in relation to subjects who believed their pain was of short duration and understandable.

A recent attempt was made by Strong, Ashton, and Chant (1992) to investigate the psychometric properties of the Pain Beliefs and Perceptions Inventory and the Survey of Pain Attitudes. Strong et al. (1992) were unable to replicate the original factor structure. The "mystery" factor found in the original study was identified, but the "time" and "self-blame" factors were not clearly distinguished. Strong and his colleagues identified a four factor solution which they labelled as "acceptance", "constancy," "self-blame," and "mystery." Differences may be explained considering the Strong et al. sample used all chronic low back pain patients who were not on compensation benefits and who had been experiencing pain for a shorter time (an average of 34.6 months versus 10.0 years). Degood and Shutty (1992) note that although further research is needed to test the clinical utility of the Pain Beliefs and Perception Inventory, preliminary findings are promising as a result of the associations found with short-term treatment outcome.

The Pain Information and Beliefs Questionnaire (PIBQ) (Schwartz, DeGood, & Shutty, 1985; Shutty & DeGood, 1990) which was developed to assess factual information about conservative pain management and the degree to which patients agreed to this type of approach. The scale consists of a 2-part questionnaire containing 18 true-false questions on factual information and 13 questions regarding beliefs using a six point rating scale. The authors recommend that the questionnaire be administered directly following the viewing of a psychoeducational video tape about chronic pain. Shutty and DeGood (1990) note that psychometric analysis of the beliefs portion reveal high internal consistency and reliability and that the scale taps a single factor, specifically, agreement with conservative strategies as an approach to the treatment of chronic pain. Shutty et al. (1990) stated that patients who did not initially agree that the information presented on the videotape applied to their particular case reported more pain and disability. Furthermore, they were less satisfied with their treatment at a one-month follow-up in relation to patients who did agree with the videotape presentation.

One of the difficulties with the scale is the limited information gained about individuals' beliefs about their pain, more specifically, that it only assesses pain sufferers' beliefs about the type of treatment they will undergo. Also, the authors suggest the development and use of locally produced videotapes unique to each pain treatment setting. Strong et al. (1992) note that the use of different videotapes would introduce variability into the procedure. Although the scale can be used without the videotape, studies have not been carried out evaluating such use (DeGood & Shutty, 1992). As a result the Pain Information and Beliefs Questionnaire is not easily

adaptable to other pain programs, as well, it is difficult to generalize the findings to a wide range of treatment programs.

The Pain Cognitions Questionnaire (PCQ) (Boston, Pearce, & Richardson, 1990) is a 30-item questionnaire. In the pilot phase of developing the scale 23 chronic pain patients (pain sites not reported) attending a hospital based pain clinic were asked, "What do you find yourself thinking at times when you are in pain?" The 193 statements were reduced to 60 items and then rated by 12 clinical psychologists in terms of their adaptive or maladaptive function. Items with 100% agreement were chosen for the final questionnaire which includes 15 positive and 15 negative items. A preliminary factor analysis accounted for 42% of the variance and identified four factors: (1) active coping strategies (2) hopelessness (3) helplessness and (4) passive optimism. Internal consistency was considered to be adequate with Cronbach's alpha reliability coefficients ranging from .80 (Factor 1) to .66 (Factor 4) on the four factors. In their initial study using the Pain Cognitions Questionnaire, Boston et al. (1990) observed that scores on the negative factors (hopelessness and helplessness) were significantly associated in a positive direction with measures of pain intensity ($r = .25$, $p < .05$; $r = .21$, $p < .05$), distress ($r = .52$, $< .001$; $r = .46$, $p < .001$), and behavioral disruption ($r = -.22$, $p < .05$; $r = -.24$, $p < .05$). However, the authors reported that the positive factors were not associated with the various measures of patient functioning; this finding is consistent with the results of Chaves and Brown (1978) and Rosenstiel and Keefe (1983) identifying that successful coping is more the consequence of avoiding negative cognitions and, more specifically, extremely negative "catastrophizing cognitions". No other studies were found in this review that employed the PCQ, and thus it appears that further research is needed to establish its clinical and research utility.

Most recently, Jacob, Kerns, Rosenberg, and Haythornthwaite (1993) introduced the Chronic Pain Intrusion and Accommodation Scales (CPIAS). Initially twenty-five items were written by the second and the fourth authors "consistent with both theory and clinical observations" to assess patients' beliefs about their ability to cope with the negative emotional and behavioral impact of their pain problems; to predict and influence fluctuations in their pain levels; to solve daily problems despite their pain; and, generally, to lead a satisfactory life despite the pain. A factor analysis, performed with the responses of 144 chronic pain patients, produced a final two factor solution consisting of 14 items. A confirmatory factor analysis with an additional 44 chronic pain patients supported the original factor structure. Internal consistency of the factors ranged from .80 to .71 for the Pain Intrusion Scale and .82 to .64 for the Pain Accommodation Scale respectively. To address the issue of validity, the scales were correlated with a number of measures. The authors observed that the Pain Intrusion Scale was related significantly to greater depressive symptom severity, as measured by the Beck Depression Inventory (Beck et al., 1961; Beck et al., 1988), and pain behaviors reflecting affective distress (Keefe & Block, 1982). Conversely, the Pain Accommodation Scale was associated with self-reports of greater control, viewing oneself as a problem solver, fewer depressive symptoms, and fewer pain behaviors reflecting affective distress. Because the CPIAS is the most recently

measure of pain beliefs found for this review, there will likely have to be more systematic research to validate its psychometric properties and clinical relevance in chronic pain settings.

To conclude this section, some of the associations identified between pain related beliefs and adjustment among various groups of chronic pain sufferers will be highlighted. First, a number of beliefs have been associated with physical disability and include an expressed belief in oneself as disabled (Jensen et al., 1987; Strong et al., 1990); a belief that medication use is an appropriate treatment for chronic pain (Jensen et al., 1987); a belief that pain necessarily impedes normal functioning (Riley et al., 1988; Slater et al., 1991); not understanding why one is experiencing pain (Strong et al., 1990); and a belief of hopelessness while being confronted with pain (Boston, Pearce, & Richardson, 1990). Beliefs associated with better physical functioning include a belief in the right to have a solicitous response from others when in pain (Jensen et al., 1987); a belief that pain patients should cope with their pain (Flor & Turk, 1988); and a belief in one's ability to cope with and accept one's pain (Boston et al., 1990). In terms of beliefs regarding treatment programs, Shutty, DeGood, and Tuttle (1990) found patients' pre-treatment agreement with the philosophy of the chronic pain management program to be related to post-treatment improvement in pain and disability.

Pain related beliefs associated with psychological dysfunction include the judgement that pain is stressful, harmful, and threatening (Regan et al., 1988); the belief that pain is stable (Williams & Thorn, 1989); the belief that one is hopeless and helpless in the face of pain (Boston et al., 1990); the belief that flare-ups are one's own fault (Manne & Zautra, 1990); and a belief that one can rely on the health care system (Vlaeyen, Geurts, Kole-Snijders, Schuerman, Groenman, & van Eek, 1990). Cognitions related to better psychological functioning include a belief that one can cope with and accept the pain (Boston et al., 1990) and thoughts about support from others (Boston et al., 1990).

In their review, Jenson, Turner, Romano, and Karoly (1991) note that some pain beliefs have also been associated with coping efforts. Jenson et al. (1987) found that a desire for solicitous responses was associated negatively with the use of rest; a belief in the appropriateness of using medications for pain control was associated positively with medication use; and a belief that one is disabled was associated negatively with the use of rest, and, among female pain patients, the use of exercise. Furthermore, they reported that a belief in a "medical cure for pain" was associated with the use of rest. Turner, Clancy, and Vitaliano (1987) found that a belief that the pain problem is something that must be accepted is correlated positively with problem-focused coping. In addition they found that 1) believing that one's pain requires activity restriction correlated negatively with problem-focused coping and positively with self-blame; 2) having experienced pain before associated negatively with social support seeking; 3) believing one can change pain was associated positively with wishful thinking; and 4) believing that the pain problem will be resolved in four years was associated with the use of avoidance coping strategies.

Although promising, the research on these other pain beliefs has produced tentative conclusions. It appears that these results need to be replicated as most of the scales used were in preliminary stages of development and have only good to moderate reliability and validity. Many of the beliefs identified are based on rather modest correlations between self-report dependent measures and scales typically consisting of only a few items. In addition to the preliminary nature of the measurement instruments, as noted with the other areas reviewed, the research in this area has not used experiential data to develop constructs related to coping with chronic pain. However, this type of research can be complemented by data collected to determine how chronic pain sufferers, in contrast to researchers, perceive the situation. The experience of chronic low back pain patients has not been fully utilized to develop a set of beliefs that influence the way they cope with chronic pain. Even when extensive interviewing is undertaken to assess various beliefs with less of a theoretical framework imposed on the data (Flor & Turk, 1988; Gil et al., 1990; Boston et al., 1990), these studies have generally focused on more specific aspects of having pain such as situational or pain specific self-statements. Williams and Thorn (1989) appear to have used the most comprehensive and least theoretically focused method in developing the items for their scale by informally interviewing 90 chronic pain patients to generally describe their beliefs about pain.

Summary of Relationship Between Belief/Appraisals and Adjustment

Research on pain beliefs/appraisals is in its early stages and given the correlational nature of the data, conclusions are tentative. A few trends have been described by Jensen, Turner, Romano, and Karoly (1991). First, patients who reveal an internal locus of control and patients who believe that they have control over pain appear to function better than those who do not. Second, endorsement of cognitive errors, especially catastrophizing the consequences of pain and overgeneralizing about pain related events, seems to be related to both psychological and physical functioning. Third, self-efficacy expectations appear to be related to coping and adjustment because patients typically engage in activities and coping strategies they believe they can perform and seem to avoid those they do not. Finally, a number of studies have identified additional pain related beliefs with some positive findings; however, for the most part, replication of these results is needed before validity of the scales used to identify the beliefs can be established. In terms of methodology, studies have not been designed that have allowed the experience of the chronic pain patient to identify a set of functional and dysfunction beliefs or underlying themes that may be present.

Critique of the Beliefs and Coping/Adjustment Literature

The research regarding beliefs and chronic pain has appeared to focus on beliefs as clinically reliable constructs, the experience of which is reducible to questionnaire responses and self-ratings. Maladaptive or functional beliefs have not

been studied directly. Such beliefs are thought to be maladaptive or adaptive, based on their relationship to physical and psychological dysfunction. To this point, it appears that chronic pain sufferers, and certainly chronic low back pain sufferers, have not been given an opportunity to reflect upon their experience of CLBP so that investigators might identify and categorize a set of beliefs that could lead to effective therapeutic interventions.

Beck (1976), in developing cognitive therapy, has found that the beliefs involved in any particular emotional disorder are idiosyncratic. That is, that beliefs are similar in all individuals experiencing the same type of problems and are specific to that problem. The notion of problem-specific beliefs, using Beck's construct of cognitive distortion, was supported in findings from a sample of depressed chronic low back pain patients by Lefebrve (1981). It has also been reported by Smith, Follick, Ahern, and Adams, (1986) who have observed the relationship between cognitive distortions (concerning low back situations) and perceived disability.

Research concerned with beliefs/appraisals and their relationship to coping with, and adjusting to, chronic pain has been theoretically driven with an emphasis on methodologies that have not examined experiential themes that may identify a set of functional or dysfunction beliefs. One such method is concept mapping. Concept mapping includes a qualitative component but is also made up of multivariate statistical techniques which cluster the data to generate an aggregate map. The technique is appropriate for clustering variables such as beliefs. Borgen and Barnett (1987) note that clustering is also a useful form of analysis when a research area is relatively new and the goal is exploration of the structure of a data set. They describe cluster analysis as a "classification technique for forming homogeneous groups within complex sets of data" (p. 456). The concept mapping method allows data to be grouped by many sorters. This reduces the potential for bias and subjectivity which may be present when qualitative data is sorted and grouped by an individual researcher (Kunkel, 1991). A search of the literature undertaken for this review was unable to identify concept mapping studies that have examined the experience of chronic low back sufferers to define a set of beliefs they may hold.

Once identified through extensive patient interviews, beliefs can be analyzed using the concept mapping approach for theme groupings which can offer a number of benefits. For example, themes may represent underlying assumptions which CLBP patients hold about their condition. Determining what these assumptions are could potentially facilitate the development of treatment techniques. Furthermore, categorizing these beliefs could aid in describing them. Belief statements could be examined in a larger group of chronic low back pain sufferers to determine their prevalence. Finally, the beliefs identified could later be developed into a clinically useful instrument that would assist in the development of a treatment plan and help establish an individual's progress in therapy. There may also be potential for the instrument to aid in the process of predicting treatment outcome and evaluating programs.

Conclusions

In summary, upon examination of the review of literature there is a need for further exploration, from the pain sufferer's perspective, of the beliefs that are tied to the relevant issues that must be addressed in order to effectively cope with chronic low back pain. Furthermore, it appears that no studies have been conducted that attempt to develop a concept map of adaptive or maladaptive beliefs associated with experiencing chronic low back pain. The following is an overview of the concept mapping methodology.

Concept Mapping

This section presents an overview of the concept mapping methodology. The beliefs held by chronic low back pain sufferers were examined in this study using concept mapping techniques. Details of the study are presented in chapters four and five.

Background

Concept mapping is a structured conceptualization process which consists of three main components. First, ideas or statements are generated about a specific research question by a specified group of subjects. Second, the interrelationships between the ideas or statements are articulated by having a group of people sort the statements into sets containing a common theme. Multivariate statistical techniques are applied to this information to determine underlying categories. Finally, the concepts generated are depicted in the form of a picture or map which represents the ideas of interest (Trochim, 1989).

Kunkel (1991) says that concept mapping can add objectivity to the study of more qualitative types of data that have typically been analyzed using non-statistical approaches. Concept mapping allows for the study of constructs as they are experienced by participants in contrast to those defined by researchers (Daughtry & Kunkel, 1993). As a result, this new approach to the analysis of the qualitative data allows a fresh look to be taken at the participants perspective. A further advantage of the concept mapping method is that it allows the data to be grouped by many sorters. This reduces the potential for influence or subjectivity that can be present when qualitative data are sorted and grouped by an individual researcher. Finally, "it results in a graphic representation which at a glance shows all of the major ideas and their interrelationships" (Trochim, 1989, p. 16).

Preparation

There are two preparatory steps necessary before beginning the concept mapping process: choosing who will participate in the process, and deciding on the specific focus for the conceptualization (Trochim, 1989). Initially, a decision must be

made regarding who will participate in the process. Trochim has constructed concept maps using a wide variety of relevant people, small homogenous groups, and even random sampling schemes. He states that there is no set limit on the number of people who can participate, and he has worked with groups as large as 75 to 80 people. Typically, 10 to 20 people were involved in his studies (1989). Next, it is important to carefully define the focus of the study. This is accomplished by wording the research question clearly and simply. As well, the question must have a single focus which limits confusion (Trochim, 1989).

Generation of Statements

The beginning of the concept mapping process is the generation of a set of statements, or ideas, about the research question. Ideally, the set of statements should represent the entire conceptual domain for the topic of interest. The statements can be generated through a brainstorming process, in which a selected group of subjects state in sentence form all the ideas regarding the research question (Trochim, 1989).

The statements from all subjects are collected to redundancy. Following the removal of the redundant statements, the other statements are further reviewed and, if necessary, again reduced so there is a maximum of 100 statements. More than 100 statements has been found to be extremely difficult to sort into theme groups (Trochim, 1989).

Categorization of Statements

The initial step in identifying interrelationships between statements is to perform a card sorting procedure on the set of statements. Each statement is printed on a separate index card and the cards arranged in random order. Next, a group of sorting participants is chosen. These may, or may not, be the same individuals who participated in the generation of the statements. A complete set of cards is given to each sorter. That sorter is asked to sort the statements into groups having a common theme or idea. Trochim notes that some restrictions are placed on this procedure: "each statement can only be placed in one pile (i.e., an item cannot be placed into two piles simultaneously); all statements cannot be placed into one single pile; and, all statements cannot be put into their own pile, (although some items may be sorted by themselves)" (1989, p. 5). Apart from these conditions, Trochim (1989) notes, sorters may pile the cards in any way that makes sense to them.

Development of Themes

The sets of grouped statements collected from the sorting participants are then analyzed using multivariate statistical techniques which include multidimensional scaling (MDS) and a cluster analytic technique. These analyses will identify common underlying conceptual phenomenon or categories through the generation of point and

cluster maps, which emerge when item groupings determined by individual sorters are considered in combination (Trochim, 1989).

Development and Interpretation of Maps

Each group of statements, or themes, derived from the statistical analysis can be visually inspected and given a title, analogous to naming factors in a factor analysis, which seems to describe the contents of that group.

Trochim (1989) notes that a method to assist the researcher in determining the number of clusters and their labels is the computation of a "bridging index". The index is designed to help determine whether an item on a concept map is a good representation of the space in which it is located or whether it may be located where it is a compromise by the MDS algorithm. A higher value indicates that an item is more likely a "bridge" item having been sorted with statements in various locations on the map. The lower the bridging value the more likely the item was sorted primarily with statements that are close to it on the map. An average bridging index can also be computed for a cluster. In this case clusters with lower bridging values generally represent a more coherent set of statements (Trochim, 1987b). In general, the lower the bridging, the more central the statement is for the meaning of the cluster.

As another part of this interpretation process, sorters can be asked to have input by reading through the set of statements for each cluster and coming up with a short word or phrase that seems to describe or name the set of statements (Trochim, 1989). Novak and Gowin (1984) qualitatively classify the ideas into hierarchial concepts after the initial articulation of themes. This development of a hierarchy may be useful with some data sets.

The final result is a visual representation, or map, of the concepts developed in the analysis of the interrelationships among the sorted statements. Trochim (1989) notes that this map provides an easy to understand summary of the conceptualization process.

Utilization of Maps

The results of the concept mapping process can be used to plan or evaluate treatment programs and provide an understanding of the issues of interest from the participants perspective. Each category or grouping can be viewed as a measurement construct and can be used to provide direction for future research. Furthermore, the pictorial format of the actual map is likely to help people understand and retain the essential ideas more easily. In the latter regard it can be used for communication and educational purposes (Trochim, 1989). Once developed, the map can be distributed to a number of individuals who participated in the sorting or who are familiar with the area being examined to establish the validity of the concepts identified.

Statistical Analysis

Comparison of Techniques

Several multivariate statistical techniques are available to organize data into groups or categories. These methods include factor analysis, multidimensional scaling, and cluster analysis.

Factor analysis is based on an extensive body of statistical reasoning which makes it a strong model (Aldenderfer & Blashfield, 1984). In factor analysis, the variance of a variable is distributed among several factors. It is used to understand how variables are structured. This method has been the basis of statistical analysis in much of the work related to the beliefs of coping with or adjusting to chronic pain, also in particular as a means of developing new scales or questionnaires. Borgen and Barnett (1987) note that both cluster analysis and factor analysis are methods for identifying the "underlying structure in a multivariate data set" and that both can be used to simplify a set of variables. However, the distinction between the two methods has been explained succinctly by Borgen and Weiss (1971) when they state:

> The central difference is treatment of the variance of the variable. Factor analysis usually partitions the variance among several sources or factors, while cluster analysis assigns the total variance to an underlying source. Thus, cluster analysis yields results where variables are grouped into discrete sets or 'clusters', while the results of factor analysis are typically less clear, with parts of the variance of each variable attributed to each of the several 'subsets' or factors. (p. 583)

Borgen and Barnett (1987) state that cluster analysis can be employed to identify homogenous subtypes within a complex set of data where the a priori natural groupings are not known and one wishes to identify subtypes within a data set; and to form classifications, taxonomies, or typologies that represent different patterns in the data. Both these features are consistent with the focus of the first part of the present study where the research question is to determine whether CLBP sufferers hold a set of beliefs and if these beliefs can be categorized into underlying themes. As was noted, the factor analytic method tends to partition the variance to many sources and is not appropriate when the goal is to assign variables to discrete categories (Tinsley & Tinsley, 1987).

Multidimensional Scaling

Multidimensional scaling (MDS) is an entirely quantitative model. It determines the interrelationships between individual items and can be used to develop a point map of items for conceptual purposes. The model does not categorize the items into groups and is therefore used in combination with some other subjective or statistical clustering method (Miller, Wiley, & Wolfe, 1986; Trochim, 1989).

Multidimensional scaling is the first statistical procedure carried out on the sort data in the concept mapping system described by Trochim (1989), which locates each statement as a separate point on a map (i.e., the point map). In concept mapping, the multidimensional scaling analysis, using a nonmetric two-dimensional solution, places the set of points into a bivariate distribution which is suitable for plotting on an X-Y graph. A map of points is created which represents the set of statements that were based on a similarity matrix resulting from the sorting task. Statements that are closer to each other are more likely to have been sorted together more frequently, and therefore be related to the same concept. The opposite is true for statements which are found far apart. Nonmetric multidimensional scaling is a technique that, when applied to a similarity matrix, can represent any number of dimensions as distances between the original items in the matrix (Kruskal & Wish, 1978). In summary, multidimensional scaling takes the table of similarities or distances and repetitiously places points on a map so the original table is represented as accurately as possible.

When using multidimensional scaling, the analyst must set the number of dimensions or set of points to be fit into. It has been suggested by Kruskal and Wish (1978) that in some contexts the use of two dimensional configurations be used that negate the need to examine diagnostic statistics (to find the best fit of one- to five-dimension solutions for example), an operation similar to examining J-plots or eigenvalues in factor analysis to determine the number of factors. More specifically, Kruskal and Wish state:

> Since it is generally easier to work with two-dimensional configurations than with those involving more dimensions, ease of use considerations are also important for decisions about dimensionality. For example, when an MDS configuration is desired primarily as the foundation on which to display clustering results, then a two dimensional configuration is far more useful than one involving three or more dimensions. (1978, p. 58)

Kruskal and Wish's (1978) suggestion is supported by Trochim (1989), who notes "in studies where we have examined other than two-dimensional solutions, we have almost universally found the two-dimensional solution to be acceptable, especially when coupled with cluster analysis" (p. 8). Consequently, Trochim (1989) states that in concept mapping, he typically uses a two-dimensional multidimensional scaling analysis to map the statements into a two-dimensional plot before applying a cluster analytic technique.

Cluster Analysis

As noted cluster analysis assigns the total variance of a variable to one underlying source and can therefore be used to categorize data (Borgen & Weiss, 1971). There are a variety of computational methods that can be used in the model. Regardless of the computational approach, the analysis yields discrete sets of variables which are interrelated. Trochim (1989) states that the second analysis in the concept

mapping process, to represent the conceptual domain, is called a hierarchical cluster analysis (Anderberg, 1973; Everitt, 1980). This cluster analytic technique is applied to the X-Y multidimensional scaling coordinate values for each point. The purpose of this analysis is to group individual statements on the map into clusters of statements which presumably reflect similar concepts. Borgen and Barnett (1987) state that Ward's (1963) minimum variance technique is one of the most commonly used agglomerative hierarchical techniques, particularly in the behavioral sciences. Edelbrock (1979) found Ward's to be very effective in classifying psychopathology. In a thorough review of the of the Monte Carlo validation studies of cluster methods, Milligan (1981) reported that Ward's method showed superiority in early studies. More recent research indicates that with methodological refinements and a greater diversity of data types, Ward's method continues to rate as one of the most effective clustering analysis techniques for recovering underlying structure (Aldenderfer & Blashfield, 1984; Blashfield, 1984). Initially hierarchical cluster analysis give as many cluster solutions as there are statements (Everitt, 1980). Ward's method is designed to minimize the variance with clusters at each stage of grouping. The method begins by considering each statement as its own cluster. The approach proceeds by merging those single objects or statements, or group of objects or statements that result in the least increase in the within-groups sums of squares (or error sums of squares). That is, at each stage of analysis the algorithm combines two clusters until, at the end, all statements form one cluster. This approach tends to optimize within-cluster homogeneity at each stage of grouping. The method does not ensure optimum homogeneity of final clusters because once joined, objects are not separated at later stages of grouping. Borgen and Barnett (1987) assert that "this does not, however, constitute a major practical difficulty with Ward's method" (p. 465). Trochim (1989) also observed the utility of Ward's method in the concept mapping process stating that it "generally gave more sensible and interpretable solutions than other approaches" (p. 8).

Summary of Concept Mapping Statistical Analysis

Following the generation of statements through brainstorming or interviews, and structuring of statements through completion of the card-sort technique by participants, the results are combined across people. First, the results for each person are put into a square table or binary symmetric similarity matrix. Second, the individual sort matrices are added together to form a combined group similarity matrix. This final similarity matrix is considered the "relation structure" of the conceptual domain as it provides information about how the participants grouped the statements.

Multidimensional scaling techniques are then applied to the similarity matrix using a two-dimensional solution. This procedure locates each statement as a separate point on a map (i.e., the point map); statements which are closer to each other on this map are typically sorted together more frequently. These points are subjected to a

hierarchical cluster analysis which produces a cluster map. Finally, each of the statements contained in the various clusters are read to describe or name the cluster.

Application to Current Research

As identified in the literature review, most of the work related to beliefs and coping with, or adjusting to, chronic pain have employed theoretically driven constructs such as locus of control, self-efficacy or attribution theory. Typically, these theoretically driven scales regarding subjects' beliefs have been correlated with measures of physical or psychological functioning. To this point, individuals with chronic pain and, more specifically, those suffering with chronic low back pain have not been enlisted to describe their experience in identifying a set of beliefs. Studies that have not been theoretically driven by interviewing individuals to gain their perspective have generally focused on more specific aspects of having pain, such as perceived level of impairment, situation specific pain-related self-statements, cognitive reactions to pain increment, or beliefs regarding treatment programs. As well, these studies have generally developed assessment instruments using factor analytic methodology to organize the data. It appears that no studies have been conducted using the concept mapping method to identify the beliefs associated with experiencing chronic low back pain, nor have studies used this method to determine underlying themes within which these beliefs can be categorized. Once identified, the prevalence of the beliefs could be determined in a sample population of chronic low back pain sufferers. The purpose of this research was to attempt to answer three research questions: (1) Do individuals suffering with chronic low back pain hold a set of beliefs related to their condition, and to what extent are these beliefs adaptive or dysfunctional in nature? (2) Once identified, do these beliefs fall into any themes or categories that help to define them and give meaning to the role they may play in the rehabilitation process? The concept mapping method was used to address these first two questions. (3) What is the prevalence of these beliefs in a larger sample of chronic low back pain sufferers, and do the beliefs that are held differ in a sample of low back pain sufferers who are not yet considered to be chronic?

CHAPTER 4: METHODOLOGY

Introduction

A review of the literature related to beliefs and chronic low back pain reveals a need for examining pain sufferers beliefs from their perspective. This would compliment the previous literature that has primarily focused on theoretically defined constructs and help develop new therapy techniques that would assist individuals cope effectively with the challenges of experiencing chronic pain. The concept mapping methodology utilized in the present study represents an alternative approach that combines qualitative and quantitative research strategies and would provide a strong focus on gaining the pain sufferers perspective.

Concept mapping is a structured conceptualization process which consists of three main components. First, ideas or statements are generated about a specific research question by a specified group of subjects. Second, the interrelationships between the ideas or statements are articulated by having a group of people sort the statements into sets containing a common theme. Multivariate statistical techniques are applied to this information to determine underlying categories. Finally, the concepts generated are depicted in the form of a picture or map which represents the ideas of interest.

Phase One: Generation of Statements

To address the first research question, low pain sufferers were interviewed and their responses were analyzed by a team of psychologists who work with this population to identify whether these individuals hold a distinct set of beliefs and to what extent these beliefs are adaptive or maladaptive in nature. The following is a detailed description of this process.

Participants

Eight male injured workers ranging in age from 22 to 43 years, experiencing chronic low back pain, and attending the Workers' Compensation Board's (WCB) Rehabilitation Centre were interviewed. Participants were 5 months to 10 years post-accident and were diagnosed with a range of problems that result in chronic low back pain (e.g., musculoligamentous strain, mechanical or facet joint abnormalities, disc involvement such as herniation or bulging, and post-surgery recuperation and complications). The injured workers were participating in a Work Hardening program (which focuses on simulation of the return to work environment and lasts approximately 8 to 10 weeks) and were solicited on a volunteer basis to participate in an interview lasting approximately one hour. Participants in various stages of the program and from varied occupational backgrounds were solicited to ensure the entire domain of beliefs was obtained. Demographic data describing the eight participants interviewed are summarized in Table 1.

Table 1 Characteristics of Male Chronic Low Back Pain Sufferers Interviewed

Participant	Age	Time Since Injury (mths)	Diagnosis	Pre-accident Occupation	Time on Program (Weeks)	Marital Status
1	22	13	Discogenic back pain; previous surgery (L4-5 discectomy)	Sheet Metal Work Apprentice	4 of 11	Single; no children
2	37	12	Musculoligamentous strain; degenerative disc disease	Partsman	6 of 12	Married; 2 children
3	29	6	musculoligamentous lumbar strain	Labourer	4 of 8	Married; 2 children
4	43	13	Lower back strain; possible facet joint problem	Automotive Mechanic	5 of 10	Married; 2 children
5	28	12	Discogenic back pain; disc impinging on L5-S1 nerve root	Welding Apprentice	1 of 5	Divorced; presently engaged; 2 children
6	30	5	Acute back strain; features compatible with sacroiliac strain	Tireman	4 of 11	Commonlaw; no children
7	49	15	Disc protrusion (L5-S1)	Heavy Duty Mechanic	1 of 8	Remarried; 5 children
8*	42	3	Musculoligamentous lumbar strain; degenerative disc disease	Truck Driver	10 of 14	Separated; 3 children

(*) This worker had a previous back injury 10 years ago which forced him to miss six months of employment.

Participants completed a consent form (see Appendix A) that informed them of the purpose of the study. The consent form also provided information stating that interviews would be audio-taped, the content of the interviews would be discussed with them, material from the interviews would be transcribed then erased, and their confidentiality would be maintained. Finally, clients were assured that they could discontinue the interviewing process at any time and that doing so would have noimpact on their participation in the Work Hardening Program or to receive WCB benefits. Following the interviews, the participants were given the opportunity to access all psychological services ordinarily available to WCB clientele. For those participants who did wish psychological services, the beliefs, and other pertinent information identified during the interviews were made available to the treating psychologists. Ethical approval to conduct this portion of the research was obtained from both the Department of Educational Psychology Research and Ethics Committee and the Research Review Committee at the WCB Rehabilitation Centre.

Interviews

The participants underwent semi-structured interviews in which they were asked to respond to a series of open-ended questions that included: (a) What is it like for you to have this back injury? (b) What kinds of things do you do to manage with your injury? (c) What kinds of things do you say to yourself about having chronic low back pain and your recovery? and (d) How has the injury affected your family and social life? These questions were intended to address the first research question; to identify the beliefs held by chronic low back pain sufferers. The questions were developed from reviewing the chronic pain literature, discussions with psychologists working with chronic pain sufferers, and with the primary supervisor of this thesis. Probes and encouragement were occasionally used in order to obtain fuller responses.

The use of general as well as specific open-ended questions as well as employing probing and encouragement is an appropriate method for understanding experiences in descriptive, exploratory studies (Field & Morse, 1985; Schneider & Conrad, 1983). The interview should resemble a conversation between two trusting parties rather than a formal survey handed down by an authority as recommended by Bogdan and Bilken (1982). These authors also note that tape recording and transcribing interviews are beneficial.

Individual interviews were concluded when all the questions were asked and no new topics or themes were presented. Typically, clients would begin to reiterate previously discussed material indicating that the clients' experience had been adequately covered and that a type of saturation had been reached. Before the interview was concluded, clients were given an opportunity to introduce new information. With respect to the number of interviews needed, a criterion for terminating data collection was established prior to the interview process. The entire concept domain was considered to be adequately sampled when three or fewer unique belief statements were identified over two consecutive interviews. That is, it was deemed that at this point beliefs statements would have been collected to redundancy.

Interrater Agreement Process

Initially four participants were interviewed, and the transcribed interviews were analyzed to distil an inclusive subset of meaning units (Rennie, Phillips, & Quartaro, 1988, p. 142), that captured the essence of the participants' experience while maintaining their language. Ninety-eight meaning units were extracted by the author from the transcribed interviews.

Next these meaning units were put in a rating task and given to three Ph.D. level psychologists who were familiar with cognitive therapy and had experience working with chronic low back pain sufferers. Raters, who included the present author and the three Ph.D. psychologists were asked to determine if a statement was functional, dysfunctional, neutral or as not fitting any of these categories. Dysfunctional beliefs were defined as those that would negatively influence physical or mental functioning and/or coping with pain. In contrast, those statements that identified beliefs that have adaptive value for physical or mental functioning and/or coping with pain were to be categorized as functional beliefs. Meaning units or belief statements that attained similar ratings by three of the four raters were included for further scrutiny. The first rating task resulted in the identification of 69 functional, and, 13 dysfunctional beliefs. Twenty-five beliefs were considered to be redundant by raters and were excluded.

The author then proceeded to carry out interviews with participants five, six and seven. Transcripts were analyzed by the author and an additional 55 meaning units were identified. These meaning units were again subjected to a rating task similar to the first, with the addition of asking the raters to add any statements not included in the rating task that their clients had identified during therapy. The results of the second rating task identified 26 functional, 8 dysfunctional, and 2 neutral beliefs. Of these new statements, three statements were added based on raters report of beliefs frequently disclosed by clients during treatment.

At this point the present author met with the three other psychologists to analyze the list of 109 meaning units made up from the results of the previous two rating tasks. During the analysis the group examined the meaning units to determine that they maintained the participants' language and reflected belief statements relevant to the experience of chronic low back pain. In addition, these units were analyzed to ensure they were clearly grounded in the material from which they were reduced and credible to the research team. Next, the meaning units were scrutinized for redundancies and a list of unique 80 statements was compiled. It was noted that five and three unique statements had been identified from participants six and seven respectively. This prompted the need for an additional interview to fulfil the criteria for the termination of data collection.

Interview 8 was completed and 15 new meaning units were identified. These meaning units were then presented to the research group to screen for credibility and redundancies; three additional belief statements were added for a total of 83. Of these 83 statements, 65 were considered to be functional, 14 dysfunctional, and 4 neutral. The raters acknowledged the limitation of attempting to attach a direction to

some of the statements due to their context-specific nature. The list of the 124 meaning units scrutinized following the two rating tasks is presented in Appendix B.

Given that the last two interviews produced less than four unique belief statements, the criteria for terminating data collection had been satisfied. Various criteria for terminating grounded theory study have been suggested including saturation of categories (when no new categories are present in the data). A number of researchers using the grounded theory approach assert that saturation of categories can occur in as few as five to ten protocols (Conrad, 1978; Glaser & Strauss, 1967; Quartaro, 1986). Thus, an adequate sampling of the concept domain was judged to have been satisfied following the eight interviews.

Changes from verbatim retention in the final list of the 83 qualitative belief statements were kept to a minimum. However, consistent with the procedure used by Daughtry and Kunkel (1993), each item was equated for tense. All modifications made in the belief statements were intended to maximize the interpretability of the concept map "through equating the level of abstraction and providing parallel grammatical structure for each item" (p. 318).

Phase Two: Structuring of Statements

Following the identification and rating of belief statements, the second research question was addressed. A sorting of the statements was carried out by a group of multidisciplinary team members to determine if the belief statements could be included into distinct categories that would help give meaning to them and possibly define their role in the rehabilitation process. A detailed outline of the sorting procedure used to aid in the development of themes contained in the concept map is provided in this section.

Sample

Seventy sorts were distributed to staff members of various disciplines who assess and treat clients with chronic low back pain at the WCB Rehabilitation Centre. Forty-eight sorts were completed for a return rate of 68.8%. The sorters included 1 addictions counsellor, 5 case management specialists, 6 exercise therapists, 11 occupational therapists, 10 physical therapists, 4 psychologists, 3 psychological assistants, and 4 technical instructors who assist the occupational therapists with the task of simulating critical job demands for the injured workers. Four of the sorts were returned without identifying information regarding occupation. Twenty-three women and 21 men completed the sorts; 3 sorts were returned without identifying gender. The age of the sorters ranged from 21 to 62 years and the average age of the sorters was 34.5 years.

Sorting

To prepare the data set for the concept mapping procedure, volunteer team members from various disciplines were asked to sort the belief statements generated from the interviews and interrater agreement process into theme groups. Each of the belief statements was placed on a individual index card. A complete set of statements was given to each volunteer with a cover letter and instructions to sort the statements into groups which contain common themes (see Appendix C). The cover letter was also used to inform the sorters about the purpose and nature of the research and that the return of the sorting task will be viewed as consent to participate in the research. The sorters were also made aware that they could discontinue their participation at any time. The sorters were told to make as many groups as they wished and that statements could be kept separate if they did not seem to fit into any group. In addition, the volunteer sorters were instructed that each statement could be placed in one pile only; all statements could not be put in the same pile; and that all statements could not be placed in 83 separate piles causing each item to represent a separate theme. The sorters were informed that the task would require approximately 45 minutes to complete and that the research was supported by the management at the Rehabilitation Centre so that they could complete the sort during program time. To ensure anonymity, the sorters were asked not to sign their names and were informed that only group results would be reported.

Data Analysis

Descriptive statistics on the volunteer sorters were computed. Next, individual matrices, also termed the binary symmetric similarity matrices were computed for the sorted items. Then individual sort matrices were aggregated to obtain a combined group similarity matrix. The data from the group similarity matrix were then subjected to a nonmetric multidimensional scaling (MDS) procedure. MDS arranges the sorted statements into a point map representing an X-Y coordinate for each statement, such that the distance between any two points reflects the frequency with which items were sorted together. Discussions on this statistical technique (e.g., Fitzgerald & Hubert, 1987; Kruskal & Wish, 1978) have supported the suitability of MDS for spatially representing latent relations among variables, especially when these relationships are unknown.

The data obtained from the MDS similarity matrix were subjected to a hierarchical cluster analysis to group sorted items into internally consistent clusters. In this process, the cluster solution is superimposed on the MDS point plot. Cluster analysis is especially suited for identifying subgroups of participants with similar responses on a particular variable; however, its use is also appropriate for direct measures of proximity (Borgen & Barnett, 1987) such as MDS matrices. Ward's (1963) minimum variance method was used to identify the maximum degree of distinctiveness across clusters. Following the statistical analysis, and based on the inspection of grouped items, the author along with the three psychologists who

participated in the interrater agreement process, met to determine the most interpretable cluster solution (i.e., number of clusters) and then reach consensus about an appropriate label for each cluster.

Validation Questionnaire

In order to facilitate validation of the concept map, a questionnaire was developed to obtain feedback from people who have experience treating low back pain sufferers. The questionnaire contained a brief description of each of the clusters and a copy of the labelled concept map. The data were presented in a format whereby the raters could indicate if they agreed with the concepts and could add comments in the spaces provided. In addition to gaining feedback regarding agreement or disagreement, respondents were requested to identify any concepts, themes or information that might be missing from the map. A copy of the validation questionnaire is shown in Appendix D.

Validation Sample

The validation questionnaire was distributed to clinicians who provide care to clients suffering with low back pain as physiotherapists, psychologists, occupational therapists or exercise therapists. This group is similar to the one that originally sorted the statements from which the concept map was derived. This group of participants were known to have had appropriate experience in their field of expertise, and they had expressed a willingness to read the questionnaire and give feedback based on their professional knowledge.

Phase Three: The Prevalence Study

To what extent do chronic low back pain sufferers hold a variety of beliefs about their conditions was the third research question. To answer this question, the belief statements identified in the first phase of the study were included in a survey and given to a sample of pain clients awaiting treatment. This next section presents a detailed description of the survey, and the procedure followed to collect the prevalence data.

Subjects

Volunteers were solicited from an orientation program that took place upon their arrival to the Rehabilitation Centre. A group of 141 workers with back pain awaiting treatment at the WCB Rehabilitation Centre were asked to volunteer. Of those 141 individuals attending the orientation, 129 completed the survey for a return rate of 91.5%. Of these 129 surveys, 21 were not included because 12 respondents had previously participated in the program, 5 were discarded due to inappropriate

pain site (e.g., shoulder pain) and 4 other surveys were not used because of incomplete data. Seven surveys were completed by individuals awaiting assessment who were not scheduled to attend a treatment program. This accounted for a total of 115 that were included in the data analysis.

The sample was comprised of 79% males and 20% females. One individual did not identify gender. Average age of subjects was 37.2 years, and the average time that respondents reported suffering from back pain was 17.4 months. The standard deviation for length of time in pain was 36 months and for the range was 2 to 242 months. On average, subjects had received WCB benefits for a period of 6.9 months. With the exception of one subject, who was involved in the program for one week, none of the respondents had attended the Work Harding program for their back condition.

In terms of marital status of the respondents, 51.3% reported they were married, 20.9% were single, 14.8% were living common-law, 9.6% were divorced, and 3.5% were separated. Most respondents were involved with unskilled work (64.3%), while 27% were employed in skilled occupations and 1.7% were involved in professions or management. Seven percent of the respondents did not indicate their occupation at the time of their injury. The average number of years of education reported by subjects was 11.3 years.

A question was included to try and determine how many of the workers attending the Rehabilitation Centre had an understanding of the diagnosis of their injury. In this regard, 25.2% subjects reported that they did not know. As well, another 4.5% were not able to provide any specific description of their diagnosis, leaving a total of 29.7% who likely were unclear about the cause of their pain. Approximately 13% of the respondents had undergone previous back surgery. A summary describing the sample who completed the survey is found in Table 2.

Measures

A questionnaire was developed containing three separate parts (see Appendix E).

Part one:. This section consisted of demographic questions (e.g., gender, age, education, marital status, and occupation) and chronic low back pain-specific questions (e.g., length of time experiencing chronic low back pain, length of time receiving WCB benefits, and understanding of diagnosis). Two questions were also included to determine if volunteers had previously attended the Work Hardening Program.

Part two:. This section of the questionnaire consisted of a number of pain-related items to identify subjects' perceptions of pain severity, how much control they have over their pain, and how stable over time they believe their pain to be. That is, to identity whether they are resigned to living with their present condition or whether they believe that there is a cure for their pain. The pain stability measure was

Table 2 Characteristics of Survey Sample

Gender

Male	Female	Unreported
79%	20%	1%

Marital Status

Common-Law	14.8 %
Divorced	9.6%
Married	51.3%
Separated	3.5%
Single	20.9%

Pre-accident Employment

Unskilled	64%
Skilled	27%
Professional/Management	1.7%
Unreported	70%

Age

Mean	Std. Dev.	Minimum	Maximum
37.24	9.16	19	61

Time Since Injury (in months)

Mean	Std. Dev.	Minimum	Maximum
17.41	36.03	2	242

Education (in years)

Mean	Std. Dev.	Minimum	Maximum
11.36	2.91	1	17

Benefits (in months)

Mean	Std. Dev.	Minimum	Maximum
6.92	8.34	0	70

assessed using the Pain Beliefs and Perceptions Inventory, (PBAPI) (Williams & Thorne, 1989). This 16-item scale rates level of agreement on a 4-point scale and was discussed in more depth in Chapter 2. The instrument was found to tap into three factors: stability of pain over time, pain as mystery, and self-blame.

Part three:. The final part of the questionnaire consisted of the 83 belief statements derived from client interviews and the interrater agreement procedure. This instrument was designed to assess the beliefs held by chronic low back pain sufferers. Each item consisted of a belief related to experiencing chronic low back pain. Respondents were asked to rate the degree to which they either believed or disbelieved the statement. A six-point scale was used that included a "N/A (not applicable) response option.

Procedure

The questionnaire was administered to volunteers with back pain on their first day at the WCB Rehabilitation Centre. This administration was included as part of their orientation to the Work Hardening Program to obtain a sample that had not been exposed to treatment that may alter their beliefs. The author met with each group to discuss the nature and the purpose of the study. It was also made clear that participation was strictly voluntary and that not participating in the study would have no effect on admission to the program or their WCB benefits. They were told that their responses would remain anonymous and instructed to not put their names on the survey. Potential volunteers were also given time to read the cover letter explaining the study (see Appendix E). Those who chose to participate stayed on to complete the survey. The author then read aloud the instructions for each section of the survey and was available to answer any questions that arose. With the exception of 12 individuals, respondents completed the survey and handed it in during this meeting.

Data Analysis

Basic descriptive statistics were examined for the demographic and chronic low back pain variables found in Part 1 of the questionnaire. For Part 2 an item by item frequency count was obtained. In addition, comparisons were carried out based on time since injury. Chi square and ANOVAs were conducted to determine any differences between the respondents with chronic pain (over six months) and the pre-chronic group (those who have been suffering from back pain for less than six months) on all the belief statements, factors of the PBAPI, and pain-related variables.

CHAPTER 5: RESULTS

ntroduction

The purpose of the present study was to gain a better understanding, using the concept mapping methodology, of the beliefs held by chronic low back pain sufferers. The results of the three phases of the study that correspond with the three research questions will be reviewed. First, the belief statements derived from interviews and the interrater agreement process, in phase one, to identify a set of beliefs held by chronic low back pain sufferers will be presented. Next, the results of the multidimensional scaling, the cluster analysis, and the validation questionnaire will be discussed to explain the concept map. This second phase of the study attempted to identify themes within which these belief statements might fall. Finally, the results of the survey data will be presented to establish the prevalence of the beliefs and to contrast groups with chronic pain lasting over six months with those experiencing low back pain for less than six months.

Phase 1: Generation of Statements

The first phase of the study, in which the interview and interrater agreement process was employed, resulted in the identification of a set of 83 belief statements. These statements represented 65 functional, 14 dysfunctional and 4 neutral beliefs and were the basis for the development of the concept map and the back pain survey. The 83 belief statements are presented in Table 3.

Phase 2: Structuring of Statements

Once identified, the 83 belief statements made up the basis for a sorting task that was completed by 48 multidisciplinary team members who had experience treating chronic low back pain. The sorters were asked to categorize the statements by creating piles or groups that made sense to them. To develop the concept map, this sort data was analyzed using multidimensional scaling (MDS) and cluster analysis.

Multidimensional Scaling

The MDS procedure resulted in a final stress value of .27 for a two-dimensional solution. The stress value is an index of the stability of an MDS solution and ranges from zero (perfectly stable) to one (perfectly unstable) and indicates the proportion of the total variance that accounts for error. Although .27 is not optimal, it represents a reasonably stable solution producing an $R^2 = .71$. The R^2 is a simple correlation that indicates that 71% of the variance found in the original similarities identified in the sort data is accounted for by the transformed data of a two-dimensional MDS solution. The analysis of additional dimensions revealed that a 5-dimensional solution was optimal; computing 6 or more dimensions reduced the stress value by less than .02, the value suggested as a guideline for stability by Kruskal and Wish (1978). The computed R^2 with the 5-dimensional solution was .85. The selection of a two-dimensional solution is consistent with the concept mapping approach in which "the MDS configuration is desired primarily as a foundation on

which to display clustering results" (Kruskal & Wish, 1978, p. 58); the two-dimensional solution is thus "far more useful than one involving three or more dimensions" (Kruskal & Wish, 1978, p. 58.) In addition, a recent study employing the concept mapping methodology by Daughtry and Kunkel (1993) accepted a similar .27 stress value derived from a two-dimensional solution.

The concept map of the 83 belief statements from chronic low back pain sufferers is presented in Figure 1. In that this is a unique way in which to present data, a detailed explanation of the map will be provided. The 83 belief statements reduced from interviews from chronic low back pain sufferers through the interrater agreement process are represented as points on the map. The placement of the points is derived from the MDS solution. The distance between the points represents the frequency with which the beliefs statements were sorted together by the volunteer team members who provide care for individuals suffering with chronic low back pain. That is, points that are relatively close together represent items that are placed together in participants' sorts more frequently than items represented by points more distant from each other. A cluster analytic technique is performed on the points found on the MDS solution to assist in defining theme groupings.

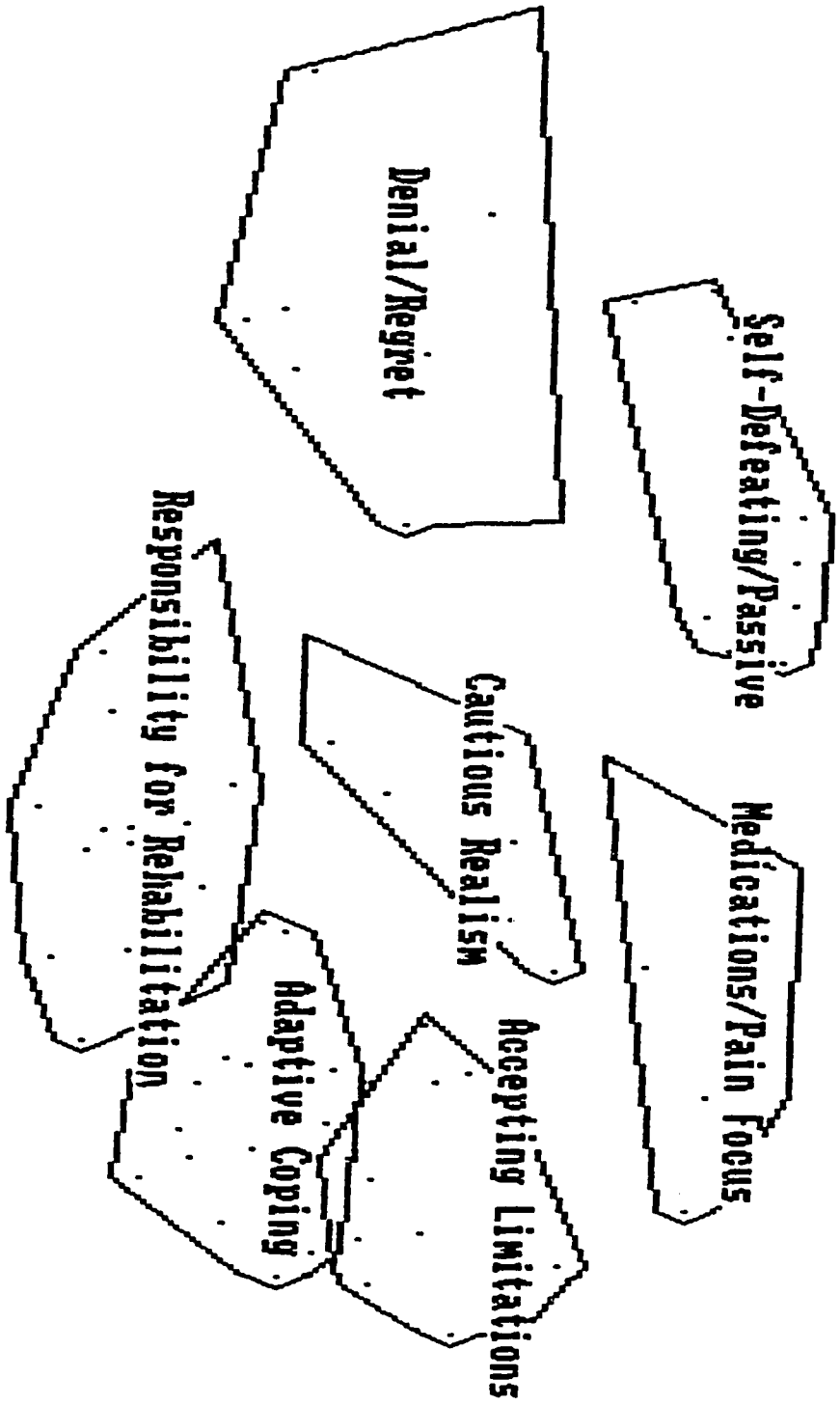
Cluster Analysis

The second quantitative analysis in the concept mapping process is called a hierarchical cluster analysis. The purpose of this analysis is to group individual statements on the map into clusters which presumably reflect similar concepts. Ward's (1963) minimum variance clustering technique was used in this study.

Similar to other procedures, such as factor analysis, naming of the clusters is influenced by both statistical and conceptual considerations. Trochim (1989) notes that when using cluster analysis in his concept mapping technique, he begins by examining all cluster solutions from approximately 20 to 3 clusters. Furthermore, he states that the groupings obtained should be viewed as suggestive and that at times it is appropriate to visually adjust them. "We examine which statements were grouped together at a step and attempt to decide whether that grouping makes sense for the statements in the conceptualization" (Trochim, 1989, p. 8). This is done in the context of maintaining the integrity of the multidimensional scaling results so that a clustering solution is obtained which does not allow any overlapping clusters (providing a true partitioning of the space). Trochim (1989) maintains that the mathematical basis for the multidimensional scaling is stronger than that of the cluster analysis and therefore more weight should be given to the multidimensional scaling results to depict the basic inter-statement conceptual similarities.

Consistent with placing more importance on the multidimensional scaling results, Trochim (1989) notes that a method to assist the researcher in determining the number of clusters and their labels is the computation of a "bridging index." The bridging index is calculated as a weighted average of the distances between the item and all the other items contained in the multidimensional solution found on the concept map (W. M. Trochim, personal communication, March 10, 1994). The index is designed to help determine whether an item on a concept map is a good representation of the space in which it is located or whether it may be located where it is a compromise by the MDS algorithm. The index is represented by a number between 1 and 0. A higher value indicates that an item is more likely a "bridge" item having been sorted with statements in various locations on the map. The lower the

Figure 1. Concept map of 83 belief statements from chronic low back pain sufferers developed from sorts by 48 multidisciplinary treatment team members.



bridging value the more likely the item was sorted primarily with statements that are close to it on the map. An average bridging index can also be computed for a cluster. In this case clusters with lower bridging values generally represent a more coherent set of statements (Trochim, 1987b). In general, the lower the bridging, the more central the statement is for the meaning of the cluster.

In terms of making sense of the map Daughtry and Kunkel (1993) state "Interpretation of the concept map involves informed conjecture about the possible structure participants imposed on the items in their sorting [as well as that] the inspection of the placement and adjacency of items and clusters can also be helpful . . . to identify apparent regions of the map and potentially related constructs" (p. 320). The final cluster solution was determined by the author with the assistance of the same Ph.D. psychologists who were part of the interrater process that identified the final 83 statements. In this analysis, consideration was given to the items in each cluster and to those items contributing most to the uniqueness of each cluster. Uniqueness was determined, in part, by the average bridging index for each cluster and the individual index for each belief statement. A final solution of seven clusters was determined to be most appropriate based on the above criteria. To determine the appropriate number of clusters, cluster solutions ranging from 3 to 16 were examined.

The 16 cluster solution included clusters that were deemed to be too fragmented. In many cases clusters contained few items and no clear themes were emerging. Next, solutions were examined by reducing the number of clusters by one. Moving from 16 to 15 clusters had a slight effect by only bringing clusters 1 and 2 together. Further reducing the number of clusters by one again produced little change at each individual step. However, the reduction from 15 to 10 clusters served to develop the lower right portion of the map and gave more interpretability to these positive clusters that appeared in the final solution. These three clusters represented accepting limitations, adaptive coping and responsibility for rehabilitation.

Further reduction of the cluster solution was deemed appropriate with 10 clusters due to the difficulty encountered when interpreting the remaining 7 clusters. Decreasing the solution from 10 to 8 served to collapse the clusters in the central upper region of the map and was useful in improving their interpretability. These two clusters appeared to be describing themes related to medication use and cautious realism towards the changes associated with the injury. Also, these two clusters remained intact in the final solution. Although the reduction of the cluster solution from 10 to 8 was useful in interpreting the upper central region of the map, this step did little to give meaning to the three clusters in the extreme left portion of the map. Clarification of the portion of the map that was difficult to interpret was provided during the next step when the solution was set at seven. This step resulted in the collapse of clusters one and two, leaving two clusters in this region of the map. These clusters were interpreted to include items reflecting the themes of denial/regret and beliefs statements that were self-defeating in nature (refer to concept maps and cluster solutions in Appendix F).

Once examined, further reduction of the seven cluster solution was deemed to be inappropriate. An analysis of six clusters was observed to combine the clusters

three (medications/pain focus) and four (cautious realism). Although the cautious realistic theme appeared to be inherent to some extent in cluster three, the third cluster was judged to be distinct with its items reflecting a very specific focus on the use of medications. Reducing the solution to five clusters combined the concepts of accepting limitations, cautious realism and medications/pain focus. Upon examination of this solution, the items combined from the three clusters tended to reflect beliefs that indicate acceptance. However, this interpretation seemed to overgeneralize the contents in these three clusters and was not maintained. Any further reduction in the number of clusters analyzed (e.g., four, three or two) was judged to also produce an overgeneralization of the results. Appendix F includes the various cluster solutions examined as well as a summary describing how the final solution was determined. Items found within each cluster of the final seven cluster solution, together with their individual bridging indexes, are found in Table 3.

Cluster one - denial/regret. Cluster one was deemed to represent a concept that had a negative valence and included beliefs that featured denial of and regret about th[illegible]atements representative of denying aspects of the injury included: " I don[illegible]nk I have a serious back injury so I put it out of my mind" and " I kept w[illegible]he original injury because I didn't think it was serious." The other ele[illegible]s cluster was represented by two items and seemed to reflect beli[illegible] retrospective in nature, focusing on regret as to how the injury had arisen: "If I was more physically fit I wouldn't be in this position" and "If you have done the things that I have done over the years you can expect to have a worn out back." Finally, two items in this cluster are related to surgery and seem to fit less well with the denial/regret theme. In this case it is important to note that cluster one had the highest bridging values of any cluster, indicating that these items had a tendency to fit in other areas on the map. These higher bridging values may also show that this particular cluster is most affected by the less than optimal stress value attained by the MDS routine.

Cluster two - self-defeating/passive. The second cluster, which is adjacent to the first, also includes beliefs that have a negative valence and that are self-defeating in nature (e.g., "It's my fault that I am in pain"). In addition, this group of beliefs seems also to reflect a passive approach in dealing with or perceiving the pain related condition. An element of magnification (e.g., "I think I can become paralysed because of the injury") seems to be present, as well as isolation (e.g., "People don't want to have much to do with me because they are scared I might hurt myself" and "I have to limit how close I stay to friends so I don't put pressure on them to make sure that I am enjoying myself"). In terms of the bridging index, this cluster attained the second highest average bridging values. Interestingly, the clusters representing negative beliefs were less likely to be sorted together and they attained the highest bridging values, indicating their greater multidimensionality.

Table 3 Cluster Items and Bridging Values For Concept Map Of Chronic Low Back Pain Belief Statements

Cluster/Items	Bridging Index
Cluster #1 - Denial/Regret	
I would have to have good odds before I would have surgery.	0.43
If you have done the things that I have over the years you can expect to have a worn out back.	0.46
I think I can control the pain by doing the same activities and work I was doing before the injury.	0.58
If I was more physically fit I would not be in this position.	0.60
I think that by working through excessive pain I can prevent losing my job.	0.61
I don't want to think I have a serious back injury so I put it out of my mind.	0.62
I have to go back to work and that's all there is to it.	0.64
I kept working after the original injury because I didn't think it was serious.	0.82
The worst thing that could happen is that I would have to go in for a back operation.	0.83
Sports are my life.	1.00
Cluster Average	**0.66**
Cluster #2 - Self-Defeating/Passive	
At times I think there is no way to control the pain.	0.35
When I am having a pain flare-up I need it to stop immediately.	0.38
People don't want to have much to do with me because they are scared that I will hurt myself.	0.39
It has been difficult being around healthy people because they can do activities I can't do because I might hurt myself.	0.40
I have to limit how close I stay to friends so I don't put pressure on them to make sure I am enjoying myself.	0.41

Cluster/Items	Bridging Index
I think pain is depressing.	0.41
It is my fault that I am in pain.	0.43
I think I can become paralysed because of the injury.	0.47
I don't know when to stop activities because I am not sure if the pain is caused by a normal reaction to exercise or because I am doing further harm to my back.	0.60
Specialists just tried to ship me out as quickly as possible without providing a good explanation about my injury.	0.61
Cluster Average	**0.45**
Cluster #3 - Medication Use/Pain Focus	
I don't do things that I think will hurt me and this can keep me from doing things I might be able to do.	0.36
At times pain can hurt or effect my family as much as it does me.	0.40
I can get addicted to medications that have codeine in them.	0.41
Taking too much pain medication can cause me to focus more on the pain.	0.46
There is no prescription drug that can get rid of pain without causing some type of problem.	0.46
At times when I am having pain so severe I have to take some pain medications.	0.48
Cluster Average	**0.43**
Cluster #4 - Cautious Realism	
Having had a bad pain flare-up makes the next one easier to deal with.	0.18
There is going to be a time when it gets worse before it gets better.	0.20
My back injury can contribute to pain in other parts of my body.	0.24
I can't control my back condition with heat or other temporary kinds of relief because it will eventually get worse if I don't modify my activities.	0.25

Cluster/Items	Bridging Index
I don't think I will ever be 100%.	0.27
I would rather change to some form of lighter work and live with what I have than have back surgery.	0.30
At times my mood can really bring on the pain more than what I am doing physically.	0.30
I distract myself from the pain by watching a lot of television and it helps me cope with the pain.	0.32
Cluster Average	**0.26**
Cluster #5 - Accepting Limitations	
I have to change my lifestyle to a degree to accommodate my limitations.	0.05
My limits are different for different situations and depend upon what I am doing.	0.08
I am still learning the things that I can and can't do.	0.11
Holding things in that are bothering me can create pain in other areas of my body.	0.13
People with back injuries have to cope with big changes in their lives.	0.16
I have to accept that I need help to do some things.	0.20
It is important to let people know where I am at and what my limitations are.	0.20
The TENS unit is a better way to cope with pain than any prescription drug.	0.22
Once I have found my limits I have to stick to them.	0.23
I think that if you have a problem with drugs or alcohol it is important to get some kind of help.	0.38
The first step to improving my life is to get off the pain medication.	0.39
Pain medication only masks pain which can lead to more damage in the long run.	0.39
Cluster Average	**0.21**

Cluster/Items	Bridging Index
Cluster #6 - Adaptive Coping	
When you understand the pain from your injury it helps you to deal with it better.	0.00
The most important thing to help cope is to accept the injury.	0.00
If my injury does not get better over time I will have to learn to live with it.	0.01
I know it is going to take a while to heal and I have accepted that.	0.02
It is helpful to be with other injured people as a start to getting motivated again.	0.02
I believe it is important to pace myself.	0.03
Learning about my injury will help me deal with the injury better by helping me understand my limitations.	0.03
I would need counselling or some form of help to learn to live with big changes in my lifestyle.	0.04
It doesn't do any good to think about pain all the time.	0.05
My pain is the same as it was but now I feel better.	0.05
I can learn to control my pain to a certain degree if I have the proper training and I apply myself.	0.05
I can still be involved with my children even though I can't participate in as much physical activities with them.	0.05
I think that talking to people about my injury and pain helps.	0.05
Doing activities with my family is an important part of dealing with my injury.	0.06
I can use positive thoughts to focus away from the pain and get some relief.	0.07
You have to think positively and not think you can't make it because you have a sore back.	0.08
It helps me deal with my injury when I compare it to others and realize that it could be much more serious.	0.12
I need to find my limits through trial and error.	0.13

Cluster/Items	Bridging Index
I have to take it step by step and hope for the best.	0.19
I know I can find some type of work even with my limitations.	0.19
Cluster Average	**0.06**
Cluster #7 - Responsibility for Rehabilitation	
I can relieve stress by keeping busy with activities.	0.01
Being physically and mentally fit is the most important thing when you have constant back pain.	0.06
I am doing many things to compensate for stiffness and soreness.	0.06
I may not get rid of some of the pain but I am going to get the best physical function that I can with what I have left.	0.07
Regular exercise and strengthening will improve my posture and stop some of the pain.	0.07
Some good opportunity may still come out of this back injury.	0.08
By strengthening my back and abdominal muscles I can go over the hump and carry on.	0.10
Improving my overall fitness has got me feeling better both physically and mentally.	0.11
I think I can still participate in recreational activities to a lesser degree to stay involved.	0.12
I can coach or instruct to stay involved in recreational activities I can't participate in.	0.12
I have to cooperate and communicate with my therapists for my rehabilitation to be successful.	0.16
My rehabilitation program is helping.	0.17
I think my rehabilitation is a full-time job.	0.21
Being in poor physical condition (like being overweight) will increase my pain level.	0.22
I can use the resources available through WCB to help me find work.	0.31
WCB is an employer who is employing me to be rehabilitated.	0.34

Cluster/Items	Bridging Index
It doesn't help to focus on the possibility that employers will be biased against workers who have been on WCB.	0.45
Cluster Average	**0.16**

Cluster three - medications/pain focus. The third cluster is more central and at the top of the map. Although containing the fewest items, this cluster clearly represents a medication theme with two other items reflecting a focus on pain. The most representative item appears to be the belief statement, "Taking too much pain medication can cause me to focus more on the pain."

Cluster four - cautious realism. The most central cluster in terms of region is cluster four. There seems to be a more neutral valence or balance to the beliefs contained in this cluster, such as "There is going to be a time when it gets worse before it gets better" and "Having a bad pain flare-up makes the next one easier." Inherent in this cluster there appears to be a cautious but realistic set of beliefs about experiencing pain, such as "I don't think I will ever be 100%," "My mood can really bring on the pain more than what I am doing physically" and "My back injury can contribute to pain in other parts of my body." This cluster, based on its region on the map, may be representative of a transition phase in the rehabilitation process where individuals move from a more negative self-defeating set of thoughts and beliefs to ones that are adaptive, more specific to coping and behaviorally-oriented.

Having noted the more neutral and possibly transitory nature of the fourth cluster, the remaining clusters located in approximately the bottom left region of the map reflect a strongly positive valence towards coping with pain and, more specifically, rehabilitation itself. These three clusters, numbers five, six and seven have the lowest bridging values indicating a high degree of similarity in the frequency with which these items were rated together in this region of the map. As well, in terms of the clusters, as areas of overlap are present the concepts represented here appear to be highly related

Cluster five - accepting limitations. The item with the lowest bridging value and likely the most representative of this cluster is "I have to change my lifestyle to a degree in order to accommodate my limitations." This cluster contains items that indicate beliefs about accepting limits related to general physical functioning (e.g., "I have to accept that I need help to do some things"), and not addressing psychological issues (e.g., "Holding things in that are bothering me can create pain in other areas of my body"). As well, four belief statements highlight the limitations of medication use, such as "Pain medication only masks the pain which can lead to more damage in the long run." This cluster also contains belief statements that include accepting

limitations in the context of ways of coping with pain. Many items are solution focused, (e.g., "I think that if you have a problem with drugs or alcohol it is important to get some kind of help") and in this way makes cluster five appear similar to the adjacent cluster number six.

Cluster six - adaptive coping. Cluster six appears to contain belief statements that are adaptive, solution focused, and indicate ways of coping with the consequences of having an injury; a logical progression from accepting limitations associated with the items contained in the previous cluster. As noted, some overlap is present with cluster five, more specifically, that acknowledging limitations can aid in the process of coping with pain (e.g., " Learning about my injury will help me to deal with the injury better by helping me understand my limitations" and "I believe it is important to pace myself"). Within the context of this adaptive coping concept, also consistent in this cluster are the themes of understanding and accepting the injury. These two themes are represented by items such as "When you understand the pain from your injury it helps you to deal with it better" and "The most important thing to help cope is to accept the injury." Other more specific adaptive coping beliefs in this cluster include: "Doing activities with my family is an important part of dealing with my injury," "I can use positive thoughts to focus away from the pain and get some relief," and "It helps me deal with my injury when I compare it to others and realize that it could be much more serious."

Cluster seven - responsibility for rehabilitation. The seventh cluster found in the lower left region of the map and slightly overlapping cluster six also reflects the notion of activities that support adaptive coping (e.g., "I can relieve stress by keeping busy with activities"). However, the items in this cluster suggest more of a focus on specific tasks and activities that are important to the rehabilitation process such as "Regular exercise and strengthening will improve my posture and stop some of the pain." As well as including beliefs about the role of activities, belief statements in this cluster also suggest optimism or positive expectations about being rehabilitated (e.g., "My rehabilitation program is helping" and "By strengthening my back and abdominal muscles I can go over the hump and carry on"). These items appear to represent beliefs that reflect an acceptance of a conservative (versus surgical) and active treatment approach and, more generally, indicate an attitude of self-responsibility for being rehabilitated.

Finally, given that the interviewees were injured workers receiving benefits from the Workers' Compensation Board of Alberta (WCB), an important aspect of their rehabilitation process was securing gainful employment following their stay at the Rehabilitation Centre. Three items in this cluster are representative of an affiliation with the WCB and of the need to get back to work while staying within the theme of self-responsibility (e.g., "I can use the resources available through the WCB to help me find work"). As noted previously, the WCB of Alberta is a statutory corporation entirely founded by employers with the mandate to carry out the Workers' Compensation Act. This Act is a law stating, in general, that workers

waive the right to file a law suit against employers for work related accidents. In turn, the workers are entitled to no-fault insurance coverage that provides compensation and rehabilitation for work related accidents.

Other Information

In addition to naming the clusters, other useful information can be interpreted from the map. Buser (cited in Daughtry & Kunkel, 1993) notes that part of the initial examination of the MDS plots can involve "attempts to identify implicit dimensional axes around which points may be configured" (p. 320). Inspection of the map suggests that, in general, these beliefs are organized along two dimensions: items with a positive versus negative valence, and those that are realistic versus unrealistic. The map can be described as being divided vertically by a realistic versus unrealistic dimension. Moving from the left region of the map to the right, statements seem to reflect beliefs that are less accurate and unrealistic and change to statements that become more realistic. This becomes apparent when contrasting the most extreme items in the right region of the map, such as " I think that if you have a problem with drugs or alcohol it is important to get some kind of help," and "If my injury does not get better over time I will have to learn to live with it," with those items found in the further left hand region of the map, such as "I kept working after the original injury because I didn't think it was serious," and "I think that by working through excessive pain I could prevent losing my job"). It also appears that horizontally the map is interpretable in terms of the lower items having a more positive valence (e.g., "Improving my overall fitness has got me feeling better both physically and mentally"), and the upper items being more negative in nature (e.g., "It is my fault that I am in pain"). Thus, generally speaking, the upper left region of the map contains negative, unrealistic belief statements, while the lower left region is marked with statements that are postive but unrealistic in nature. Contrastingly, the upper right portion of the map is represented with statements that focus on the negative aspects of experiencing chronic low back pain, but the statements are still realistic. The lower right region is marked with postive and realistic statements. The items found in the central region of the map tend to represent neutral beliefs.

Validation Questionnaire

The validation questionnaire was completed by ten clinicians at the Workers' Compensation Board (Alberta) Rehabilitation Centre. A brief description of the validation sample is shown in Table 4.

All seven of the themes presented in the concept map were validated by this sample. The percentage of agreement observed was as follows: cluster one - denial/regret, 90%, cluster two - self-defeating/passive, 90%, cluster three - medications/pain focus, 80%, cluster four - cautious realism, 90%, cluster five - accepting limitations, 100%, cluster six - adaptive coping, 100%, and cluster seven - responsibility for rehabilitation, 100% . Cluster three attained the lowest rating.

Table 4 Characteristics of Validation Sample

Participant	Gender	Profession	Experience in Rehabilitation (Years)	Sorter
1	M	Exercise Therapist	1.5	Yes
2	M	Psychologist	6	Yes
3	F	Physical Therapist	23	Yes
4	M	Occupational Therapist	22	Yes
5	F	Psychologist	8	Yes
6	M	Physical Therapist	12	Yes
7	F	Occupational Therapist	5	Yes
8	M	Physician	2	No
9	F	Occupational Therapist	7	Yes
10	F	Exercise Therapist	3.5	No

Feedback indicated that raters were not in conflict with the concept itself, rather that the negative aspects of medication use or misuse were absent in the representative items. For example, raters reported that "While I agree, I also believe that there are people who do not see the problem with taking meds," and some clients believe that "Medications are the only way to deal with pain."

Raters were also asked to identify any concepts or information that might be missing from the map. In this regard, raters proposed four clusters that they felt would make the map more complete. First, a cluster representative of a locus of control located between clusters one and two and including items indicating beliefs that rehabilitation should be about what is done "to" them and "for" them. Second, a cluster, again situated between clusters one and two, that represents anger, frustration and blaming others. A third was recommended that is similar to the second but more specific to those beliefs that indicate blame towards the WCB for personal difficulties. Finally a theme was proposed that represents a responsibility for others. Within this theme an individual who has successfully completed the program would begin to teach co-workers and family about proper body mechanics and exercises, while stressing their importance in the prevention of back injuries.

Additional comments stated agreement with the overlapping nature of clusters five and six and four with five. Also a number of comments were made indicating support for the notion that the map was organizing beliefs into themes that could be

held through stages of the rehabilitation process. For example, "It looks like there is a progression of themes from negative and non-adapting to positive and good coping."

Phase 3: Prevalence Study

Back Pain Survey

To address the third research question a survey instrument was developed to determine the prevalence of beliefs held within a sample of chronic low back sufferers prior to recieving treatment at a rehabilitation facility. The survey consisted of three parts: demographic questions, pain items (e.g., related to severity, percieved control, and percieved stability), and the belief statments. Frequency data was calculated for the beleif statements. Also the sample was divided into two groups: those with chronic pain that had lasted six months and beyond, and those who had been suffering with back pain for less than six months. Group comparisons were made on all the survey questions.

Frequency data

Frequencies were calculated for each of the belief statements to determine the extent to which these beliefs are held by chronic low back pain sufferers. These data are presented in Table 5.

The statement most frequently believed by this sample was "I have to take it step by step and hope for the best" (96.5%). The majority of the beliefs endorsed were positive and adaptive in nature. For example, "I think that if you have a problem with drugs or alcohol it is important to get some kind of help" (92.8%), "I have to cooperate and communicate with my therapist for my rehabilitation to be successful" (90.2), and "It doesn't do any good to think about pain all the time" (88.7%). Statements which received the least agreement were: "I distract myself from the pain by watching a lot of television and it helps me to cope with the pain" (15%), "I think I can control the pain by doing the same activities and work I was doing before the injury (15.2%), and "If I was more physically fit I would not be in this position" (23%).

Although most beliefs endorsed were adaptive in nature, a degree of maladaptive thinking was observed. First, 36.9% of the respondents reported that they believed that they didn't want to think they had a serious back injury, so they put it out of their minds. Another 25.2% indicated ambiguity towards this statement. As well, 29.6% of the subjects stated that they thought they could prevent losing their jobs by working through excessive pain. Another area of maladaptive thinking, which seemed to be prevalent, highlighted the difficulty individuals were experiencing in determining their social roles while living with pain. For example, 80.5% of the respondents indicated that they believed it has been difficult being around healthy

Table 5 Percentage of Chronic Low Back Pain Sufferers Endorsing Belief Statements by Item

Statement		% Endorsing Belief		
		Disbelieve	Neutral	Believe
1.	I kept working after the original injury because I didn't think it was serious.	52.1	6.4	41.5
2.	Taking too much pain medication can cause me to focus more on the pain.	52.1	19.1	28.7
3.	I have to accept that I need help to do some things.	10.8	13.5	75.6
4.	There is no prescription drug that can get rid of pain without causing some type of problem.	15.9	10.3	73.9
5.	Specialists just tried to ship me out as quickly as possible without providing a good explanation about my injury.	33.7	12.9	53.5
6.	The TENS unit is a better way to cope with pain than any prescription drug.	28.1	41.4	31.6
7.	I would have to have good odds before I would have surgery.	10.4	9.4	80.2
8.	At times pain can hurt or effect my family as much as it does me.	12.1	10.3	77.6
9.	I can get addicted to medications that have codeine in them.	13	12	75
10.	The worst thing that could happen is that I would have to go in for a back operation.	13.6	11.7	74.7
11.	At times when I am having pain so severe I have to take some pain medications.	13.1	5.6	81.4
12.	It has been difficult being around healthy people because they can do activities I can't do because I might hurt myself.	13.3	6.2	80.5
13.	The first step to improving my life is to get off the pain medication.	16.3	29.1	54.7
14.	It is helpful to be with other injured people as a start to getting motivated again.	26.1	27.9	55.9

Statement		% Endorsing Belief		
		Disbelieve	Neutral	Believe
15.	I have to limit how close I stay to friends so I don't put pressure on them to make sure I am enjoying myself.	43.9	30.8	25.2
16.	When you understand the pain from your injury it helps you to deal with it better.	8.9	8.9	82.2
17.	Doing activities with my family is an important part of dealing with my injury.	6.6	17.0	76.5
18.	My rehabilitation program is helping.	8.9	37	53.6
19.	It doesn't help to focus on the possibility that employers will be biased against workers who have been on WCB.	13.2	17.9	68.9
20.	I have to cooperate and communicate with my therapists for my rehabilitation to be successful.	3.6	6.3	90.2
21.	WCB is an employer who is employing me to be rehabilitated.	13.3	11.5	75.2
22.	Some good opportunity may still come out of this back injury.	24.1	21.4	54.5
23.	I think my rehabilitation is a full-time job.	9.1	4.5	86.4
24.	I have to take it step by step and hope for the best.	2.6	0.9	96.5
25.	I think I can become paralysed because of the injury.	18.7	20.6	60.7
26.	My pain is the same as it was but now I feel better.	42.6	31.7	25.8
27.	Holding things in that are bothering me can create pain in other areas of my body.	21.1	19.3	52.7
28.	I am doing many things to compensate for stiffness and soreness.	6.1	11.3	82.6

Statement		% Endorsing Belief		
		Disbelieve	Neutral	Believe
29.	I don't know when to stop activities because I am not sure if the pain is caused by a normal reaction to exercise or because I am doing further harm to my back.	28.8	17.3	51.5
30.	Sports are my life.	36.4	32.3	31.3
31.	I believe it is important to pace myself.	2.7	10	87.3
32.	Being in poor physical condition (like being overweight) will increase my pain level.	5.6	15	79.5
33.	If I was more physically fit I would not be in this position.	54.1	22.9	23
34.	I have to go back to work and that's all there is to it.	16.2	19.8	63.9
35.	There is going to be a time when it gets worse before it gets better.	18.4	21.1	60.6
36.	By strengthening my back and abdominal muscles I can go over the hump and carry on.	8.7	26.1	65.3
37.	At times my mood can really bring on the pain more than what I am doing physically.	49.1	20.5	30.3
38.	Regular exercise and strengthening will improve my posture and stop some of the pain.	8	21.2	70.8
39.	Being physically and mentally fit is the most important thing when you have constant back pain.	5.4	16.2	78.3
40.	I think pain is depressing.	7.1	6.2	86.7
41.	It is my fault that I am in pain.	8.4	11.1	80.6
42.	I think that by working through excessive pain I can prevent losing my job.	29.6	21.3	49.1
43.	I don't want to think I have a serious back injury so I put it out of my mind.	36.9	25.2	37.8
44.	I don't do things that I think will hurt me and this can keep me from doing things I might be able to do.	54.5	17	28.6

Statement	% Endorsing Belief		
	Disbelieve	Neutral	Believe
45. Pain medication only masks pain which can lead to more damage in the long run.	6.3	7.2	86.5
46. I think I can control the pain by doing the same activities and work I was doing before the injury.	67.9	17	15.2
47. I can use the resources available through WCB to help me find work.	6.5	23.7	39.9
48. At times I think there is no way to control the pain.	20.9	12.2	67
49. I think that if you have a problem with drugs or alcohol it is important to get some kind of help.	2.7	4.5	92.8
50. When I am having a pain flare-up I need it to stop immediately.	19.5	15.9	64.6
51. I can't control my back condition with heat or other temporary kinds of relief because it will eventually get worse if I don't modify my activities.	24.5	20.9	54.6
52. I would need counselling or some form of help to learn to live with big changes in my lifestyle.	23.6	16.4	60
53. I need to find my limits through trial and error.	12.4	23.9	63.7
54. I can use positive thoughts to focus away from the pain and get some relief.	21.6	21.6	56.7
55. You have to think positively and not think you can't make it because you have a sore back.	9.7	14.2	76.1
56. I can relieve stress by keeping busy with activities.	14.3	24.1	61.6
57. Having had a bad pain flare-up makes the next one easier to deal with.	50.5	26.1	23.4
58. It doesn't do any good to think about pain all the time.	3.5	7.8	88.7

Statement		% Endorsing Belief		
		Disbelieve	Neutral	Believe
59.	It helps me deal with my injury when I compare it to others and realize that it could be much more serious.	15.2	13.4	71.4
60.	The most important thing to help cope is to accept the injury.	13.2	12.3	74.5
61.	I know it is going to take a while to heal and I have accepted that.	8	5.3	86.7
62.	People with back injuries have to cope with big changes in their lives.	5.3	17.5	77.2
63.	If my injury does not get better over time I will have to learn to live with it.	4.4	13.5	82.3
64.	If you have done the things that I have over the years you can expect to have a worn out back.	32.1	25.5	42.6
65.	Once I have found my limits I have to stick to them.	13.1	20.4	63.3
66.	It is important to let people know where I am at and what my limitations are.	9.6	17.5	72.8
67.	I can coach or instruct to stay involved in recreational activities I can't participate in.	21.7	19.6	58.7
68.	I don't think I will ever be 100%.	22.3	12.5	65.2
69.	My limits are different for different situations and depend upon what I am doing.	4.4	8.8	86.7
70.	I am still learning the things that I can and can't do.	6.1	0.6	83.2
71.	I may not get rid of some of the pain but I am going to get the best physical function that I can with what I have left.	1.8	6.1	92.1
72.	I think I can still participate in recreational activities to a lesser degree to stay involved.	16.7	14.8	69.5
73.	I can learn to control my pain to a certain degree if I have the proper training and I apply myself.	13.3	14.2	72.6

Statement		% Endorsing Belief		
		Disbelieve	Neither	Believe
74.	I would rather change to some form of lighter work and live with what I have than have back surgery.	20.8	15.8	63.4
75.	People don't want to have much to do with me because they are scared that I will hurt myself.	26.6	23.9	49.5
76.	I can still be involved with my children even though I can't participate in as much physical activities with them.	6.1	9.8	84.1
77.	I have to change my lifestyle to a degree to accommodate my limitations.	7.2	6.3	86.4
78.	My back injury can contribute to pain in other parts of my body.	6.2	12.4	82.4
79.	Learning about my injury will help me deal with the injury better by helping me understand my limitations.	4.5	2.7	92.9
80.	Improving my overall fitness has got me feeling better both physically and mentally.	4.7	15.1	80.3
81.	I think that talking to people about my injury and pain helps.	25.2	19.8	52.9
82.	I distract myself from the pain by watching a lot of television and it helps me cope with the pain.	63.3	21.1	15.6
83.	I know I can find some type of work even with my limitations.	3.7	22.9	73.4

people because they didn't want to hurt themselves engaging in potentially harmful activities with them. In terms of beliefs that would lead more explicitly to social isolation and compound the difficulties of trying to cope with chronic pain, 26.6% endorsed the statement "People don't want to have much to do with me because they are scared that I will hurt myself". Another 23.9% neither believed nor disbelieved this statement. As well, 25.2% believed, and 30.8% were ambiguous about the statement "I have to limit how close I stay to friends so I don't put pressure on them to make sure that I am enjoying myself."

For the most part, beliefs held about the use of pain medications were

adaptive. For example, 86.5% endorsement was given to the belief that "Pain medication only masks pain which can lead to more damage in the long run, 73.9% believed that "There is no prescription drug that can get rid of pain without causing some type of problem, and 75% believed that "I could get addicted to medications that have codeine in them." However, responses to statements "The first step to improving my life is to get off the pain medication" (54.7% believe), and "At times when I am having pain so severe I have to take pain medications" (81.3% believe) indicate the probable high rate of medications use in this sample. Furthermore, it was interesting to note that 52.1% of the sample did not believe that "Taking too much pain medication can cause me to focus more on the pain."

The results of this survey also reflected the respondents difficulties with understanding the diagnosis and dynamics of their injuries. As noted previously, approximately 29% of respondents were unclear about why they were in pain. With respect to medical consultation, of those who responded, 53.5% believed that "Specialists just tried to ship me out as quickly as possible without providing a good explanation about my injury." Approximately 40% believed or were unsure as to whether they could become paralysed because of there injury. In terms of physical function, only 28.8% did not believe the statement "I don't know when to stop activities because I am not sure if the pain is caused by a normal reaction to exercise or because I am doing further harm to my back." Similarly, only 28.6% responded negatively to the statement "I don't do things I think will hurt me and this can keep me from doing things I might be able to do." Two items that reflect understanding as integral to coping and that were positively endorsed are "Learning about my injury will help me deal with the injury better by helping me understand my limitations," (92.9%), and "When you understand the pain from your injury it helps you to deal with it better," (82.2%).

The following beliefs related to specific coping strategies were endorsed as follows: "Doing activities with my family is an important part of dealing with my injury," (76.5%), "The most important thing to help cope is to accept the injury," 74.5%, "It helps me to deal with my injury when I compare it to others and realize that it could be much more serious," 71.4%, "By strengthening my back and abdominal muscles I can go over the hump and carry on", 65.3%, and "The TENS unit is a better way to cope with pain than any prescription drug," 31.6%.

Group Comparisons

A wide variation in length of time respondents had been suffering with back pain was observed; time since injury for the sample ranged from 2-240 months. Analysis was conducted comparing the chronic pain group, those suffering from chronic pain for six months and longer and a pre-chronic pain group consisting of those who had been in pain for less than six months. It appears that the six month distinction is mostly an arbitrary one, but one widely employed in the chronic pain literature. This comparison presented below, provided information about the homogeneity of the groups and the appropriateness of the chronic versus non-chronic

distinction for this sample. Of the 115 surveys completed, 61 reported having experienced pain for over six months, while 54 stated that their pain had lasted less than six months.

Demographics. An analysis of variance was computed on the variables related to age and education. No statistically significant differences were observed between the chronic and non-chronic group on these variables, for age $F(1, 111)$ 1.72, p = .192 and for education $F(1, 107) = 1.20$, $p = .276$. Chi-square statistics were calculated and no significant differences were observed for gender, $X^2(1, N = 114) = .79$, $p = .37$, employment (unskilled, skilled and management/professional) $X^2(2, N = 107) = 2.86$, $p = .24$ and, marital status, $X^2(4, N = 115)$, $= 7.56$, $p = .11$. Finally, as expected, fewer individuals in the chronic group were unclear about the diagnosis of their injuries, 20% versus 41%, and they reported having had more surgery than the non-chronics, 20% as opposed to 6%.

Pain ratings. Four questions made up the pain section of the back pain survey. The first was comprised of three pain ratings asking respondents to indicate their level of pain: at the time of completing the questionnaire, and during their most and least severe levels of pain experienced in the prior week. No significant differences were found between the two groups $F(1,113) = .01$, $p = .92$). As well, no significant differences were found between the two groups in terms of the frequency with which they responded to the items asking respondents how much control they felt they had over their pain $F(1, 113) = .50$, $p = .49$, and how often they felt they could do something to reduce their pain $F(1, 113) = .48$, $p = .49$. The only difference on the pain-related questions was noted for the question "Do you still feel you will be in pain in two years?" For this item a chi-square was computed revealing that the chronic pain group was less likely to state that they did not know and more likely to indicate that they would be experiencing pain in two years $X^2(3, N = 111) = 11.93$, $p = .007$.

Pain Beliefs And Perceptions Inventory. As noted previously, the Pain Beliefs And Perceptions Inventory (PBAPI) is a 16-item inventory develped by Williams and Thorne (1989). It was designed to assess individuals' beliefs about how stable their pain is, to what extent they blame themselves for their pain, and how much they believe the cause of their pain to be a mystery. An analysis of variance on the mean responses indicated no significant differences between groups for any of the three meausures: mystery, $F(1, 113) = .013$, $p = .91$, blame, $F(1, 113) = 1.43$, p = .23, and stability, $F(1, 113) = 2.42$, $p = .123$.

Belief statements. The pre- and post six month low back pain respondents were compared on the 83 statements. A chi-square statistic was calculated for each of the 83 statements. A significant effect was found for only two of the statements. The chronic group were more likely to believe they could relieve stress by keeping busy with activities, $X^2(4, N = 112) = 18.06$, $p = .001$, and those with chronic pain for

more than six months were less likely to believe that, in general, they would ever be 100%, $X^2(4, \underline{N} = 112) = 2.59$ $\underline{p} = .04$. Given that 83 consectutive chi-square statistics were run and a .05 significance level was established, differences would be expected for at least four items by chance. Differences for only two statements were observed. This lack of differences supports the assertion that subjects with varing degrees of pain chronicity responded similarly to the belief statements.

CHAPTER 6: DISCUSSION

Introduction

The present study was guided by the lack of research literature utilizing chronic low back pain sufferers' experience when examining their beliefs. The concept mapping methodology, which utilizes experiential data, was used to identify a set of beliefs and to determine if these beliefs fall into specific categories or themes. The extent that these beliefs were held by a sample of chronic low back pain sufferers prior to entering a treatment program was then examined. Eighty-three belief statements were identified using an interrater agreement process involving four psychologists. These statements were then sorted by multidisciplinary team members and analyzed using multidimensional scaling and cluster analytic techniques. This process resulted in the development of a concept map that included seven themes. In this chapter, the results of the study are reviewed and discussed, implications are presented and recommendations are made for future research.

Concept Map

In addressing the first research question, a set of beliefs held by chronic low back pain sufferers about their pain were identified. The interview and interrater agreement process produced a set of 83 beliefs statements. When these 83 belief statements were presented to a sample of 115 injured workers with back pain, as part of a survey, all of the statements were endorsed by at least 15% of the sample prior to beginning their treatment program at a Rehabilitation Centre. This high rate of endorsement indicates a form of validation for the interview and interrater process which identified the belief statements.

Of these 83 statements, 65 were rated as functional beliefs, while 14 were rated as dysfunctional. Four other statements were rated as neutral. Clearly this study identified more adaptive beliefs held by the interviewees. Subsequently, the data provides primarily information about the beliefs of individuals' experiencing more positive rehabilitation versus highlighting the maladaptive thinking associated with coping with back pain. Due to its relationship to the belief statements, the concept map also reflects this positive focus.

It is important to explain why a small number of dysfunctional belief statements were identified relative to the number of adaptive statements. This question was raised by some of the participants who were involved in the validation of the map. In particular, they were at odds with the fact that the cluster representing medications was void of the negative aspects of medication use or misuse. A number of explanations are possible. It has been reported in previous research that subjects tend to under report medication use by 50 - 60% (Ready, Sarkis, & Turner, 1982) and over report activity and social behavior (Kremer, Block, & Gaylor, 1981). More positive belief statements may have been derived because of a response bias in that the interviewees wanted to present in a positive light to one of their health care

providers. This positive focus may also be a function of the length of the interview. That is, more time may be needed to develop a degree of therapeutic relationship or rapport that is necessary for individuals to disclose negative aspects of their thinking. On the other hand, however, the seemingly over-representation of adaptive belief statements may, in fact, be an accurate reflection of the beliefs held by these individuals.

The disclosure of primarily positive statements may indicate that the interviewees held beliefs similar to those further along in the rehabilitation process, a notion suggested by the concept map. In this regard, the mean length of time since injury for the interviewees was 9.9 months. Throughout this time, many, if not all, of these individuals would have gone through extensive physiotherapy and would have had an opportunity to experience the adverse effects of medication use or overuse. Also, they would have had the opportunity to begin to learn about and accept the limitations associated with their injuries as a result of many flair-ups or actual re-injuries to their backs. Furthermore, it was interesting to note that in the survey (administered prior to the start of their programs), 25.8 of respondents reported feeling better even though there was no change in their pain levels.

Although the statements were labelled, the raters acknowledged the difficulty in ascribing a direction to them due to their context specific nature. A supposition of the author was that a functional/dysfunctional distinction would be an important element of interpreting the clinical utility of the data. However, it seems that data can still be interpreted without using this distinction to identify clinically useful information. For example, the results of the concept map yielded findings that are worthy of comment and further consideration.

The second research question was established to determine if these beliefs would fall into any themes or categories that help to define them and give meaning to the role they may play in the rehabilitation process. To this end, a group of 48 clinicians completed a sorting task that produced a seven cluster solution representing the themes of denial/regret, self-defeating/passive, medications/pain focus, cautious realism, accepting limitations, adaptive coping, and responsibility for rehabilitation. These themes were validated by ten clinicians who care for chronic low back pain sufferers.

Relationship to Previous Research

Some elements of the concept map themes and their corresponding belief statements are consistent with the existing chronic pain belief literature. For example, the belief statements contained in the self-defeating/passive cluster closely relate to the cognitive models of chronic pain beliefs that have focused on cognitive errors such as catastrophizing, and depressive cognitions (Beck, 1976). The medication use/pain focus concept, although loaded with adaptive beliefs about medications, highlights the importance of the role that medications play in treating chronic pain. Similarly, some of the scales being developed include items to assess attitudes towards the use of medications as a means of managing pain (Jensen, Karoly & Huger, 1987). The

adaptive coping theme is similar to the large body of literature that has studied types of coping techniques used by chronic pain sufferers. The belief statements found in this adaptive coping concept resemble items found in a number of scales used to assess coping strategies (e.g., Pain Cognitions Questionnaire, Boston, Pearce & Richardson, 1990; Coping Strategies Questionnaire, Rosenstiel & Keefe, 1983). The accepting limitations theme identified in the concept map seems also to be highlighting an area that has been deemed an important aspect of coping with chronic pain. Although indirectly inherent in a number of the scales developed that focus on self-efficacy, pain intrusion, and disability, it does not appear that these types of beliefs have been studied in isolation. This congruence represents a type of construct validity given the similarities between the concepts identified by the map and their relationship to the existing literature.

It is also clear however, that the beliefs of these chronic low back pain sufferers are not completely reducible to specific theoretical formulations. First, beliefs corresponding to the concept of denial and regret have not been directly addressed in the beliefs literature. The theme of cautious realism represents an interesting concept and to this point it does not appear that research related to beliefs and coping with chronic pain have examined the possibility that individuals hold beliefs that may represent a transitory phase in the rehabilitation process. The responsibility for rehabilitation theme seems to encompass many aspects of engaging in a rehabilitation program. The beliefs statements comprising this concept appear to be related to the Pain Beliefs Information Questionnaire (Shutty & DeGood, 1990) which assesses the individuals' agreement with a conservative treatment approach. Also, inherent in this theme are belief statements that represent a specific focus on the beliefs toward rehabilitation which have not been directly addressed in the research to this point. Examples of such beliefs include: "My rehabilitation program is helping," "I have to cooperate and communicate with my therapists for my rehabilitation to be successful," and "I think my rehabilitation is a full-time job."

Based on the location of the themes, the concept map can be interpreted to suggest that certain beliefs are held throughout the process of sustaining an injury and attempting rehabilitation. That is, individuals in an early phase of an injury or those dealing with pain may hold beliefs consistent with the themes of denial and regret. They may also, to a greater extent than those further along in the recovery process, hold beliefs that are more self-defeating and passive with respect to ways of coping. As well, individuals' beliefs may shift and become more cautious and realistic, in a sense representing the transition phase in a process toward successful rehabilitation. Once through the transition phase of the process, pain sufferers may begin to hold beliefs relative to accepting limitations and adaptive coping, and, move towards holding beliefs that represent taking responsibility for their own rehabilitation.

Survey Data

A back pain survey was developed to address the third research question that was to determine the prevalence of the beliefs held by this sample of chronic low

back pain sufferers. Upon examination of the frequency data, it was observed that this sample frequently endorsed a majority of the adaptive belief statements. None the less, these data also provided information that identified a number of issues that would require intervention. First, it can be inferred from the frequency data that many back pain sufferers struggle with the denial aspects of accepting the consequences of developing low back pain. Many did not want to acknowledge or were ambiguous about the adverse effects that they were experiencing that contributed to the severity of their conditions. In this regard many believed that they could prevent losing their jobs by working through excessive pain. As proposed by the concept map these items may reflect a degree of denial on the part of back pain sufferers that tends to lead to more severe injury in the long term. Also highlighted is the importance of educating individuals about preventative measures and the potential consequences of not caring for a back injury in the early stages of developing low back pain.

In terms of medication use, a large number of pain sufferers indicated the need to cease using drugs as a first step to improving their lives. In addition, a majority believed that at times pain medication was the only way to reduce pain. This finding supports the existing literature that notes the high rate of drug use in chronic pain populations and the potential for medication overuse. These findings also lend support for the need for interventions that involve education about medication use and assist with medication reduction.

Belief statements that reflected difficulty with social interactions were also frequently endorsed. A high percentage of respondents indicated that they believe it has been difficult being around healthy people because they didn't want to hurt themselves engaging in potentially harmful activities with them. As well, a large number of subjects endorsed beliefs that could lead to social isolation. For example, many pain sufferers believed or were ambiguous about the notion that others did not want to engage them for fear that they would hurt themselves. Similarly many respondents believed or were ambiguous about the thought that they would have to limit how close they stayed to friends to avoid there being pressure to ensure the pain sufferer was enjoying her/himself. Thus, assessment and interventions that identify and address the disruption in an individuals social functioning appear to be important for this sample.

Many beliefs were endorsed that are related to the respondents' lack of understanding of the diagnosis and dynamics of their injuries; and that understanding their injuries will contribute to more effective coping. In this regard interventions are needed that will help low back pain sufferers become more aware of their medical conditions; this awareness would relate to their ability to engage in functional activity. Interventions that would involve a collaboration employing the physician's medical knowledge, the occupational therapists understanding of job demands and the psychologist's ability to develop a therapeutic relationship and work with the beliefs related to a client's ability to engage in functional activities would be most useful with this population.

The results of this study raise questions about the chronic versus non-chronic

distinction with respect to the pain experience. As noted, when group comparisons were made, there appeared to be few differences in the way in which the groups responded to the pain related questions and belief statements. These results prompt questions regarding the homogeneity of the pain experience. Specifically, whether having pain involves similar qualities of experience regardless of the degree of chronicity. In this study, the six month time period was used as the criteria to determine whether pain sufferers were experiencing chronic pain. This period, although somewhat arbitrary, has been used in many chronic pain studies and is supported by Cailliet (1981). The American Pain Association's definition for chronic pain includes pain that persists beyond the normal time of healing - three months - and pain that has not responded to tradition medical interventions (cited in Wuitchik, 1993). The results of the survey data lend more support to the three month distinction.

Finally, a byproduct of this investigation was the development of a survey instrument that could be used by the clinician to identify the beliefs held by chronic low back pain sufferers and to identify how strongly they are held. All or part of the survey could be used in conjunction with other measures, such as a perceived disability scale and a depression or anxiety measure to develop a treatment plan and assess an individual's progress in therapy. The survey could be particularly useful in a large group setting where it is difficult to identify on an individual basis the beliefs of group members. The survey could also serve as an indicator of the efficacy of chronic pain programs that include the treatment of chronic low back pain. In fact, in work piloting the back pain survey changes in beliefs were noted for some clients in as little as two weeks on the program.

Conclusions

As a result of this study, a set of beliefs held by a sample of chronic low back pain sufferers that were predominantly functional or adaptive in nature has been identified. Categorization of the beliefs in the form of a concept map revealed that the concepts and representative belief statements were not completely reducible to theoretical formulations previously used to examine the beliefs associated with coping with chronic pain. Rather, the concepts developed in the study appear to be largely representative of beliefs associated more specifically with rehabilitation and suggest a model that individuals may hold different beliefs throughout the process of being rehabilitated.

The survey data highlighted the importance for counselling practitioners to address a number of themes. First, beliefs were endorsed that reflected a degree of denial on the part of back pain sufferers about the need to understand the potential consequences of ignoring symptoms that could lead to more severe injury in the long term. In this regard, there seems to be a need to educate individuals about preventative measures and the potential consequences of not caring for a back injury in the early stages of developing low back pain. Second, the need for interventions related to assisting individuals reduce medication use was also highlighted for this

population. Pain sufferers were clear about their need to better understand the diagnosis and dynamics of the injury to help them cope with pain and be more clear about functional limitations. Finally, the need for interventions assisting individuals, who are experiencing chronic low back pain, in becoming more clear and less restrictive about their options when making decisions about their social involvement was also identified.

Limitations of the Study

The findings of this study are preliminary and include some important limitations. It appears that the beliefs derived from the experience of suffering with chronic low back pain have been identified and well organized. However, the interviewees, sorters and raters were all involved with the WCB (Alberta). Due to the specific demands of this agency it is difficult to know if these results would apply to other populations elsewhere. As well, the interview sample was completely male, a fact which may have excluded some important belief statements relative to the experience of chronic low back pain for women. In addition, the sorting was done by clinicians producing a map that may be interpreted to reflect beliefs held throughout the process of going through rehabilitation.

Future Research

In terms of the concept mapping procedure further investigations could focus on extracting some of the negative aspects of the chronic pain experience to identify a greater number of maladaptive beliefs that may be held within the chronic low back pain population. As well it would be important to develop a concept map examining the beliefs of women who suffer with chronic low back pain to determine if any new themes would be identified from their perspective. Although attempted with difficulty in a pilot phase of this study, a map derived from chronic low back pain sufferers sorts would provide a contrast to the one generated in this study using the sorts of health care providers. Developing a map from the beliefs of a sample that does not include WCB clients or clinicians would be useful in determining the generalizability of the results from the present study. A second validation of the seven theme map identified in the present study with chronic low back pain sufferers would also be a worthwhile undertaking.

With respect to the results of the survey, it was decided when generating the belief statements that priority would be given to uncovering the uniqueness of the experience of these chronic low back pain sufferers in contrast to developing a scale and losing the breadth of that experience. A logical next step would be to refine the belief statements into a psychometrically sound instrument that could be used to assess beliefs so as to evaluate program or therapy outcomes. In addition, this instrument would have utility in examining the possibility that some beliefs are more prevalent in the various stages of the rehabilitation process, a hypothesis generated by the concept map developed in this study.

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APPENDIX A

WCB REHABILITATION CENTRE
AUDIO/VIDEO TAPE CONSENT FORM

I, _____, Claim # _____, consent and agree to the Workers' Compensation Board making and using my likeness on audio/video tape for Assessment and student education purposes.

I understand that information from analysis of the audio/video tape will form part of my Treatment Program, and that the findings will be discussed with me.

I understand that my identity will remain confidential during the use of audio/video tapes for educational purposes, and that the contents of the tape will be destroyed following its use.

Finally, I understand that I may discontinue participation at any time with no consequences to my staying on program or receiving WCB benefits.

_____	_____
WITNESS SIGNATURE	CLIENT'S SIGNATURE
_____	_____
PLEASE PRINT NAME	PLEASE PRINT NAME

APPENDIX B

LISTING OF MEANING UNITS IDENTIFIED FROM INTERVIEW DATA AND ANALYZED IN INTERRATER AGREEMENT PROCESS

#	Meaning Unit
1	When I can't walk then I would consider surgery.
2	The worst thing that could happen is that I would have to go in for a back operation.
3	I would rather change to some form of lighter work and live with what I have than have back surgery.
4	Sometimes you are having pain so severe that you have to take some pain killers.
5	Specialists just tried to ship me out as quickly as possible without providing a good explanation about my injury.
6	It's more difficult being around people because they can do activities and I might hurt myself.
7	People don't want to have much to do with me because they are scared that I will hurt myself.
8	The pain can hurt of effect my family as much as me sometimes.
9	It is important to let people know where I am at and what my limitations are.
10	You want to limit how close I stay to friends so I don't put pressure on them to make sure I am enjoying myself.
11	It's important to have friends to talk to when you're in a bad mood.
12	Its helpful to be with other injured people as a start to getting motivated again.
13	Taking pain and sleep medication can make it difficult to concentrate.
14	Using pain medication can result in damage to your stomach.
15	Pain medication only masks pain which can lead to more damage in the long run.
16	Taking too much pain medication can cause me to focus more on the pain.

#	Meaning Unit
17	I can get addicted to medications that have codeine in them.
18	If I didn't need the pain and sleep medications I wouldn't take them even though it appears that I am taking too many.
19	The medications are ruining my family life, health, and making me feel depressed.
20	The first step to improving my family life, health and feeling depressed is to get off the pain medication.
21	There is no prescription drug that can get rid of pain without causing some type of problem.
22	I have to get off the pain medications.
23	The TENS unit is a better way to cope with pain than any prescription drug.
24	I would have to have good odds before I would have surgery not 50/50.
25	I can relieve stress by keeping busy with activities.
26	I'll know what to do if it happens again, how to cope with it, there will be less thinking because I went through it already.
27	It is helpful to have someone teach you skills to manage your pain instead of keeping to yourself.
28	I can learn to control my pain to a certain degree if I have the proper training and I apply myself.
29	I think I have learned to manage my pain better in the last while.
30	Since I have come to the Rehabilitation Centre I have been able to get away from the negative aspects of the injury -- like thinking about the pain all the time -- and focus on more positive things.
31	It doesn't do any good to think about pain all the time.
32	Pain gets annoying but if you let it get to you it just makes it worse.
33	It helps me deal with my injury when I compare it to others and realize that it could be much more serious.
34	It could be worse I could be paralyzed.
35	I know it is going to take a while to heal and I have accepted that.

#	Meaning Unit
36	If I give the injury some time it just can't stay like this; I believe that time will heal the injury.
37	I shut everything out when I am in pain; I don't want to do anything.
38	I think that if you have a problem with drugs or alcohol it is important to get some kind of help.
39	I can't control my back condition with heat or other temporary kinds of relief because it will eventually get worse if I don't modify my activities.
40	I think there is no way to control the pain.
41	When I am having a pain flare-up I need it to stop immediately.
42	I would need counselling or some form of help to learn to live with big changes in my lifestyle.
43	I think that just sitting down and talking to people about my injury is helping.
44	I thought I could control the pain even though, it is getting worse, by I keep doing the same activities and work I was doing before the injury.
45	I can use pleasant thoughts to focus away from the pain and get some relief.
46	I am going to manage with my limitations with a better mental attitude.
47	It's hard to keep pain inside; sometimes you just have to let it out and tell someone.
48	I distract myself from the pain by watching a lot of television and it helps me cope with the pain.
49	People with back injuries have to cope with big changes in their lives.
50	If my injury does not get better over time I will have to learn to live with it.
51	You need to find your limits through trial and error.
52	Once I have found my limits I have to stick to them.
53	I know I can find some type of work even with my limitations.
54	Learning about my injury will help me deal with the injury better by helping me understand my limitations.

#	Meaning Unit
55	I don't think I will ever be 100%.
56	The most important thing to help cope is to accept the injury.
57	My limits are different for different situations and depend upon what I am doing.
58	I think I have worn my back out over the years. You can't have done the things that I have and not expect to suffer the consequences.
59	I won't be as good as I was at recreational activities but it doesn't matter because I only do them for fun.
60	I am still learning the things that I can and can't do.
61	I may not get rid of some of the pain but I am going to get the best physical function that I can with what I have left.
62	I can coach or instruct to stay involved in recreational activities I can't participate in.
63	I will have to give up high impact rigorous sports or recreational activities.
64	I think I can still participate in recreational activities to a lesser degree to stay involved.
65	I am sure I'll be able to get back to some form of sports or recreational activities.
66	I am learning that I can't do something one way I can do it another way.
67	I have to modify or adapt to suit the situation.
68	I have to accept that I need help to do some things.
69	I have to change my lifestyle to a degree to accommodate my limitations.
70	Doing activities with my family is an important part of dealing with my injury
71	I can still be involved with my children even though I can't participate in as much physical activities with them.
72	It doesn't help to focus on the possibility that employers will be biased against workers who have been on WCB.
73	WCB is an employer who is employing me to be rehabilitated.

#	Meaning Unit
74	I can use the resources available through WCB to help me find work.
75	Some good opportunity may still come out of this back injury.
76	I think my rehabilitation is a full-time job.
77	I have to go back to work and that's all there is to it.
78	I don't overexert myself.
79	Pacing is an important part of my rehabilitation.
80	I have to take it step by step and hope for the best.
81	I believe it is important to pace myself.
82	My pain is the same as it was five weeks ago but now I feel better.
83	My rehabilitation program is helping.
84	Every time I lift something I think the injury could start again.
85	My back injury can contribute to pain in other parts of my body.
86	I understand why I have back pain.
87	I am doing many things to compensate for stiffness and soreness.
88	I can become paralyzed because all you have to do is barely pinch your main cord.
89	Its hard to know when to stop activities because I am not sure if the pain is caused by a normal reaction to exercise or because I am doing further harm to my back.
90	I don't do things that I think will hurt me and this can keep me from doing things I might be able to do.
91	Sports are my life.
92	Being in poor physical condition (like being overweight) will increase my pain level.
93	The mood I am in can really bring on the pain more than what I am doing physically.
94	I blame myself for being in pain.
95	I thought that by working through excessive pain I could prevent losing my job.

#	Meaning Unit
96	I didn't want to think I had a serious back injury so I put it out of my mind.
97	I kept working after the original injury because I didn't think it was serious.
98	If I was more physically fit I would not be in this position.
99	There is going to be a time when it gets worse before it gets better.
100	By strengthening my back and abdominal muscles I can go over the hump and carry on.
101	Exercise and strengthening will improve my posture and stop some of the pain.
102	I know with strengthening the muscles will take up the slack where the pain is.
103	Exercise helps my back get a bit stronger to take some of the pressure off of it.
104	Improving my overall fitness has got me feeling better both physically and mentally.
105	I need more exercise because I have lost strength and muscle tone from being inactive.
106	Activity keeps your mind more sharp.
107	Being physically and mentally fit is the most important thing when you have constant back pain.
108	I think pain is depressing.
109	When you're in pain you're not able to experience humour.
110	When you understand the pain from your injury it helps you to deal with it better.
111	I have to cooperate and communicate with my therapists for my rehabilitation to be successful.
112	Holding things in that are bothering me can create pain in other areas of my body.
113	You have to think positively and not think you can't make it because you have a sore back.

#	Meaning Unit
114	It helps to sit down and talk to someone about your problems.
115	It is helpful to talk with other injured workers.
116	Pacing is important.
117	Exercise is an important part of the program.
118	Being overweight will put strain on your back
119	I will be able to find some type of work with my limitations.
120	You must work consistently on your exercises to recover and maintain your gains.
121	My rehabilitation is a full-time job.
122	It doesn't help to focus on your pain.
123	Back pain can cause pain in other areas of my body.
124	I limp because I am trying to save my back.

APPENDIX C

August 8, 1994

To Study Participants:

A study is being carried out at the University of Alberta to develop a better understanding of clients' experience of suffering from chronic low back pain. It is hoped that the results of this study will help in the development of better programs designed to aid workers in this situation.

Phase one of this study involved collecting statements from chronic low back pain sufferers about their experience. Each client's statements were then pooled. We are now starting phase two of the study. It involves sorting and rating the statements collected from clients into groups to develop themes about the experience of having chronic low back pain.

If you are willing to help with this project, please take a few minutes to do the enclosed task and return the material via interoffice mail in the return envelope. Your decision to become involved in this research is completely voluntary. And, please, do NOT sign your name. Your answers will be completely confidential and only the group results will be used.

Thank you for agreeing to take part in this study and for giving so generously of your time and effort. If you have any questions, please contact Steve Knish at Ext. 4087, or 454-7030.

Sincerely,

Steve Knish, Ph.D. (Candidate)
Psychologist
Rehabilitation Centre

Dr. Peter Calder, Ph.D. (Professor)
Department of Educational Psychology
University of Alberta

Enclosures

SORTING INSTRUCTIONS

Enclosed is a list of 83 statements clients with chronic low back pain attending the Rehabilitation Centre have been found to make.

We are asking for your help in sorting these statements into groups which contain a common theme. You can sort the statements into as many groups as you wish. Statements can be kept separate if you don't think they fit into any group. Please do not place all the items into one pile or leave all the items to form 83 separate groups. The following example shows several statements which have been grouped together along with the theme of the group.

Example

Statements:	Theme:
1. I am a good person	Positive view of self
2. I always do my best	
3. I do many things well	
4. Many people like me	

To sort the statements

A. Group the statements which you think go together.
B. Staple each group together.
C. Place all the groups, and any statements not sorted into a group, into the enclosed envelope.
D. Fill out the general information at the bottom of this page and place it in the envelope. **Please note that your name is not required.**
E. Return the envelope via interoffice mail, or call me at Ext. 4087 and I will pick it up.

Thanks!

_____

Steve Knish

GENERAL INFORMATION

Male ___ Female ___ Age ___
Occupation _____
Student: Yes ___ No ___ School _____
Highest grade completed ___

APPENDIX D

April, 1994

Thank you for agreeing to be part of the validation process involved in my Doctoral Dissertation "Concept Mapping the Beliefs of Chronic Low Back Pain Sufferers".

I am now at the stage where I am trying to validate my findings with people who are involved with caring for those who suffer with chronic pain. Thus, I am asking clinicians from the Rehabilitation Centre to give me feedback based on their experience with treating or assessing chronic pain. To do this I have enclosed a questionnaire incorporating a summary of the concept map developed in my study.

I would like your opinion about whether you have experienced these concepts or themes in your work with clients suffering with pain.

I would greatly appreciate if you could spend time filling out the questionnaire. The first part of the questionnaire will ask for information pertaining to your gender, occupation and work experience in the rehabilitation field.

In part two you will be asked to read a brief description of a concept or theme that made up the concept map in my study and indicate if you agree or disagree with the it. If you disagree you will be asked to explain why. Finally, you will be asked to report on any concept, themes or information that you found to be missing from the map.

Once completed the questionnaire can be returned to me through interoffice mail or at my mail slot outside room 270.

Results of the study, including the results of your feedback, will be presented in a Centre-wide Inservice. Thank you for your interest in this project.

Thanks,

Steve Knish

GENERAL INFORMATION

Gender _____
Occupation _____
Years of Experience in Rehabilitation _____

CONCEPT MAPPING VALIDATION QUESTIONNAIRE

Please read the brief description of a concept or theme that made up the concept map in my study and indicate if you agree or disagree with it. If you disagree, please explain why. Finally, you will be asked to report any concept, themes or information that you found to be missing from the map.

CLUSTER 1 - DENIAL/REGRET

Cluster one was determined to represent a concept which had a negative valence and included beliefs that featured denial and regret about the injury. Statements more representative of denying aspects of the injury included: " I don't want to think I have a serious back injury so I put it out of my mind" and " I kept working after the original injury because I didn't think it was serious". The other element of this cluster was represented by two items and seemed to reflect beliefs that were retrospective in nature focusing on regret as to how the injury had arisen (e.g. "If I was more physically fit I wouldn't be in this position" and "If you have done the things that I have done over the years you can expect to have a worn out back").

AGREE _____ DISAGREE _____

COMMENTS _____

CLUSTER 2 - SELF DEFEATING/PASSIVE

The second cluster, which is adjacent to the first, also suggests beliefs that have a negative valence and that are self-defeating in nature (e.g., "Its my fault that I am in pain"). In addition, this group of beliefs seems to reflect a passive approach in dealing with or perceiving the pain related condition. An element of magnification (e.g., "I think I can become paralysed because of the injury") seems to be present as well as one of isolation (e.g., "People don't want to have much to do with me because they are scared I might hurt myself" and "I have to limit how close I stay to friends so I don't put pressure on them to make sure that I am enjoying myself).

AGREE _____ DISAGREE _____

COMMENTS _____

CLUSTER 3 - MEDICATIONS/PAIN FOCUS

The third cluster is more central and at the top of the map. Although containing the fewest items, this cluster clearly represents a medication theme with two items reflecting a focus on pain. The most representative item appears to be the belief statement "Taking too much pain medication can cause me to focus more on the pain".

AGREE _____ DISAGREE _____

COMMENTS _____

CLUSTER 4 - CAUTIOUS REALISM

The most central cluster in terms of region is cluster four. There seems to be a more neutral valence or balance to the beliefs contained in this cluster such as "There is going to be a time when it gets worse before it gets better" and "having a bad pain flare-up makes the next one easier". Inherent in this cluster, there appears to be a cautious but realistic set of beliefs about experiencing pain such as "I don't think I will ever be 100%", "My mood can really bring on the pain more than what I am doing physically" and "My back injury can contribute to pain in other parts of my body".

AGREE _____ DISAGREE _____

COMMENTS _____

CLUSTER 5 - ACCEPTING LIMITATIONS

The item that seems most representative in this cluster is "I have to change my lifestyle to a degree in order to accommodate my limitations". This cluster also contains items that indicate beliefs about accepting limits related to general physical functioning (e.g., "I have to accept that I need help to do some things"), and not addressing psychological issues (e.g., "Holding things in that are bothering me can create pain in other areas of my body"). As well, a number of items highlight the limitations of medication use, such as "pain medication only masks the pain which can lead to more damage in the long run".

AGREE _____ DISAGREE _____

COMMENTS _____

CLUSTER 6 - ADAPTIVE COPING

Cluster six appears to contain belief statements that are adaptive, solution focused, and indicate ways of coping with the consequences of having an injury. As noted, some overlap is present with cluster five, more specifically, in that acknowledging limitations can aid in the process of coping with pain (e.g., " Learning about my injury will help me to deal with the injury better by helping me understand my limitations" and "I believe it is important to pace myself"). Within the context of this adaptive coping concept, also inherent in this cluster are the themes of understanding and accepting the injury. These two themes are represented by items such as "When you understand the pain from your injury it helps you to deal with it better" and "The most important thing to help cope is to accept the injury". Other more specific adaptive coping beliefs in this cluster include: "Doing activities with my family is an important part of dealing with my injury", "I can use positive thoughts to focus away from the pain and get some relief", and "It helps me deal with my injury when I compare it to others and realize that it could be much more serious".

AGREE _____ DISAGREE _____

COMMENTS _____

CLUSTER 7 - RESPONSIBILITY FOR REHABILITATION

The final cluster found in the lower left region of the map and slightly overlapping cluster six also reflects the notion of activities which support adaptive coping (e.g., "I can relieve stress by keeping busy with activities"). However, the items in this cluster suggest more of a focus on specific tasks and activities that are important to the rehabilitation process such as "Regular exercise and strengthening will improve my posture and stop some of the pain". As well as including beliefs about the role of activities, belief statements in this cluster also suggest optimism or positive expectations about being rehabilitated (e.g., "My rehabilitation program is helping" and "By strengthening my back and abdominal muscles I can go over the hump and carry on"). These items appear to represent beliefs that reflect an acceptance of a conservative (versus surgical) and active treatment approach and, more generally, indicate an attitude of self-responsibility for being rehabilitated.

AGREE _____ DISAGREE _____

COMMENTS _____

Please indicate any concepts, themes or other information that appears to be missing from the concept map described above. Use the back of the page if necessary.

APPENDIX E

To WCB Rehabilitation Centre Clients!

A study is being carried out through the University of Alberta which will attempt to develop a better understanding of workers' experience of suffering from back pain. It is hoped that the results of this study will help in the development of better programs designed to aid individuals in your situation, so your participation would be greatly appreciated.

Part one of this study involved asking workers to describe their experience of living with back pain. Each worker's statements were then put together. We are asking you to read through these statements and rate whether they represent thoughts that you have about your injury.

Also, we will ask you for some background information and questions about the pain you have been experiencing.

If you are willing to help with this project, please take the time to complete the enclosed survey and put it in the return envelope and leave it with your orientation presenter, or drop it off at Room 129.

Your participation in the study is appreciated. Keep in mind that participation is completely voluntary so if you do not wish to participate in the study it will have no effect on your admission to the Work Hardening Program or your WCB benefits.

Sincerely,

Steve Knish, Ph.D. (Candidate)
Psychologist
Rehabilitation Centre

Dr. Peter Calder, Ph.D. (Professor)
Department of Educational Psychology
University of Alberta

Enclosures

BACK PAIN SURVEY - PART 1

This part of the questionnaire is designed to provide general information. Please read each question carefully and mark an X beside the proper category or clearly print your answer.

1. Male _____ Female _____

2. Age _____

3. Years of Formal Education _____

4. How long have you been suffering with back pain?

   Months _____

5. How long have you been on your Work Hardening Program (not including Orientation)?

   Weeks _____

6. How long have you been receiving Workers' Compensation benefits for your back injury?

   Months _____

7. Have you ever been on program at the WCB Rehabilitation Centre before?

   Month _____ Year _____ Injury _____ No _____

8. What was your pre-accident employment? (Describe what you did).

   _____

9. Marital Status: Single _____ Married _____ Separated _____

   Common Law _____ Divorced _____

10. What is the diagnosis of your injury? (How do you understand what is causing your pain?)

    _____

11. Have you had back surgery? Yes ____ No ____

BACK PAIN SURVEY - PART 2

This section will ask information about the pain you are experiencing.

1. Please rate your level of pain

a) at present

0 1 2 3 4 5 6 7 8 9 10

no pain worst pain possible

b) most severe in last week

0 1 2 3 4 5 6 7 8 9 10

no pain worst pain possible

c) least severe in last week

0 1 2 3 4 5 6 7 8 9 10

no pain worst pain possible

2. How much control do you feel you have over your pain?

1 2 3 4 5 6 7

No control at all A great deal of control

3. How often are you able to do something that helps you reduce your pain?

1 2 3 4 5 6 7

Never Very Often

4. Do you still feel that you will be in pain in two years?

   Yes _____ No _____

5. Question 5 of Part 2 of the questionnaire consists of a series of statements which represent a thought or belief about experiencing back pain. In this survey, you are asked to rate your level of agreement where:

   1 - indicates that you strongly disagree with the statement
   2 - indicates that you slightly disagree with the statement
   3 - indicates that you slightly agree with the statement
   4 - indicates that you strongly agree with the statement

Statements	Strongly Disagree			Strongly Agree
1. No one has been able to tell me exactly why I am in pain.	1	2	3	4
2. I used to think my pain was curable but now I am not so sure.	1	2	3	4
3. There are times when I am pain free.	1	2	3	4
4. My pain is confusing to me.	1	2	3	4
5. My pain is here to stay	1	2	3	4
6. I am continuously in pain.	1	2	3	4
7. If I am in pain it is my own fault	1	2	3	4
8. I don't know enough about my pain.	1	2	3	4
9. My pain is a temporary problem in my life.	1	2	3	4
10. It seems like I wake up with pain and I go to sleep with pain.	1	2	3	4
11. I am the cause of my pain.	1	2	3	4
12. There is a cure for my pain.	1	2	3	4
13. I blame myself if I am in pain.	1	2	3	4
14. I can't figure out why I am in pain.	1	2	3	4
15. Someday I will be 100% pain free again.	1	2	3	4
16. My pain varies in intensity but is always with me.	1	2	3	4

BACK PAIN SURVEY - PART 3

Directions:

The following survey consists of a series of statements which represent a thought or belief about experiencing back pain. In this survey, you are asked to:

Please rate each of the following statements (by circling the appropriate number) as to how much you presently believe the statement. If a statement does not apply to you or you believe you do not have sufficient information to answer the question, circle "N/A".

1 - indicates that you strongly disbelieve the statement
2 - indicates that you slightly disbelieve the statement
3 - indicates that you neither believe or disbelieve
4 - indicates that you slightly believe the statement
5 - indicates that you strongly believe the statement
N/A - indicates a statement does not apply to you

EXAMPLE

Statement	Present Belief					
	Strongly Disbelieve				Strongly Believe	
1. Summer is my favourite season.	1	2	3	4	5	N/A

Statement	Present Belief					
	Strongly Disbelieve				Strongly Believe	
1. I kept working after the original injury because I didn't think it was serious.	1	2	3	4	5	N/A
2. Taking too much pain medication can cause me to focus more on the pain.	1	2	3	4	5	N/A
3. I have to accept that I need help to do some things.	1	2	3	4	5	N/A
4. There is no prescription drug that can get rid of pain without causing some type of problem.	1	2	3	4	5	N/A
5. Specialists just tried to ship me out as quickly as possible without providing a good explanation about my injury.	1	2	3	4	5	N/A

	Statement	Present Belief					
		Strongly Disbelieve				Strongly Believe	
6.	The TENS unit is a better way to cope with pain than any prescription drug.	1	2	3	4	5	N/A
7.	I would have to have good odds before I would have surgery.	1	2	3	4	5	N/A
8.	At times pain can hurt or effect my family as much as it does me.	1	2	3	4	5	N/A
9.	I can get addicted to medications that have codeine in them.	1	2	3	4	5	N/A
10.	The worst thing that could happen is that I would have to go in for a back operation.	1	2	3	4	5	N/A
11.	At times when I am having pain so severe I have to take some pain medications.	1	2	3	4	5	N/A
12.	It has been difficult being around healthy people because they can do activities I can't do because I might hurt myself.	1	2	3	4	5	N/A
13.	The first step to improving my life is to get off the pain medication.	1	2	3	4	5	N/A
14.	It is helpful to be with other injured people as a start to getting motivated again.	1	2	3	4	5	N/A
15.	I have to limit how close I stay to friends so I don't put pressure on them to make sure I am enjoying myself.	1	2	3	4	5	N/A
16.	When you understand the pain from your injury it helps you to deal with it better.	1	2	3	4	5	N/A
17.	Doing activities with my family is an important part of dealing with my injury.	1	2	3	4	5	N/A
18.	My rehabilitation program is helping.	1	2	3	4	5	N/A
19.	It doesn't help to focus on the possibility that employers will be biased against workers who have been on WCB.	1	2	3	4	5	N/A

Statement		Present Belief Strongly Disbelieve — Strongly Believe					
20.	I have to cooperate and communicate with my therapists for my rehabilitation to be successful.	1	2	3	4	5	N/A
21.	WCB is an employer who is employing me to be rehabilitated.	1	2	3	4	5	N/A
22.	Some good opportunity may still come out of this back injury.	1	2	3	4	5	N/A
23.	I think my rehabilitation is a full-time job.	1	2	3	4	5	N/A
24.	I have to take it step by step and hope for the best.	1	2	3	4	5	N/A
25.	I think I can become paralysed because of the injury.	1	2	3	4	5	N/A
26.	My pain is the same as it was but now I feel better.	1	2	3	4	5	N/A
27.	Holding things in that are bothering me can create pain in other areas of my body.	1	2	3	4	5	N/A
28.	I am doing many things to compensate for stiffness and soreness.	1	2	3	4	5	N/A
29.	I don't know when to stop activities because I am not sure if the pain is caused by a normal reaction to exercise or because I am doing further harm to my back.	1	2	3	4	5	N/A
30.	Sports are my life.	1	2	3	4	5	N/A
31.	I believe it is important to pace myself.	1	2	3	4	5	N/A
32.	Being in poor physical condition (like being overweight) will increase my pain level.	1	2	3	4	5	N/A
33.	If I was more physically fit I would not be in this position.	1	2	3	4	5	N/A
34.	I have to go back to work and that's all there is to it.	1	2	3	4	5	N/A
35.	There is going to be a time when it gets worse before it gets better.	1	2	3	4	5	N/A

Statement		Present Belief					
		Strongly Disbelieve				Strongly Believe	
36.	By strengthening my back and abdominal muscles I can go over the hump and carry on.	1	2	3	4	5	N/A
37.	At times my mood can really bring on the pain more than what I am doing physically.	1	2	3	4	5	N/A
38.	Regular exercise and strengthening will improve my posture and stop some of the pain.	1	2	3	4	5	N/A
39.	Being physically and mentally fit is the most important thing when you have constant back pain.	1	2	3	4	5	N/A
40.	I think pain is depressing.	1	2	3	4	5	N/A
41.	It is my fault that I am in pain.	1	2	3	4	5	N/A
42.	I think that by working through excessive pain I can prevent losing my job.	1	2	3	4	5	N/A
43.	I don't want to think I have a serious back injury so I put it out of my mind.	1	2	3	4	5	N/A
44.	I don't do things that I think will hurt me and this can keep me from doing things I might be able to do.	1	2	3	4	5	N/A
45.	Pain medication only masks pain which can lead to more damage in the long run.	1	2	3	4	5	N/A
46.	I think I can control the pain by doing the same activities and work I was doing before the injury.	1	2	3	4	5	N/A
47.	I can use the resources available through WCB to help me find work.	1	2	3	4	5	N/A
48.	At times I think there is no way to control the pain.	1	2	3	4	5	N/A
49.	I think that if you have a problem with drugs or alcohol it is important to get some kind of help.	1	2	3	4	5	N/A

Hang in there! You are over halfway through.

You may want to stand up and stretch.

Statement		Present Belief					
		Strongly Disbelieve				Strongly Believe	
50.	When I am having a pain flare-up I need it to stop immediately.	1	2	3	4	5	N/A
51.	I can't control my back condition with heat or other temporary kinds of relief because it will eventually get worse if I don't modify my activities.	1	2	3	4	5	N/A
52.	I would need counselling or some form of help to learn to live with big changes in my lifestyle.	1	2	3	4	5	N/A
53.	I need to find my limits through trial and error.	1	2	3	4	5	N/A
54.	I can use positive thoughts to focus away from the pain and get some relief.	1	2	3	4	5	N/A
55.	You have to think positively and not think you can't make it because you have a sore back.	1	2	3	4	5	N/A
56.	I can relieve stress by keeping busy with activities.	1	2	3	4	5	N/A
57.	Having had a bad pain flare-up makes the next one easier to deal with.	1	2	3	4	5	N/A
58.	It doesn't do any good to think about pain all the time.	1	2	3	4	5	N/A
59.	It helps me deal with my injury when I compare it to others and realize that it could be much more serious.	1	2	3	4	5	N/A
60.	The most important thing to help cope is to accept the injury.	1	2	3	4	5	N/A
61.	I know it is going to take a while to heal and I have accepted that.	1	2	3	4	5	N/A
62.	People with back injuries have to cope with big changes in their lives.	1	2	3	4	5	N/A
63.	If my injury does not get better over time I will have to learn to live with it.	1	2	3	4	5	N/A

Statement		Present Belief					
		Strongly Disbelieve				Strongly Believe	
64.	If you have done the things that I have over the years you can expect to have a worn out back.	1	2	3	4	5	N/A
65.	Once I have found my limits I have to stick to them.	1	2	3	4	5	N/A
66.	It is important to let people know where I am at and what my limitations are.	1	2	3	4	5	N/A
67.	I can coach or instruct to stay involved in recreational activities I can't participate in.	1	2	3	4	5	N/A
68.	I don't think I will ever be 100%.	1	2	3	4	5	N/A
69.	My limits are different for different situations and depend upon what I am doing.	1	2	3	4	5	N/A
70.	I am still learning the things that I can and can't do.	1	2	3	4	5	N/A
71.	I may not get rid of some of the pain but I am going to get the best physical function that I can with what I have left.	1	2	3	4	5	N/A
72.	I think I can still participate in recreational activities to a lesser degree to stay involved.	1	2	3	4	5	N/A
73.	I can learn to control my pain to a certain degree if I have the proper training and I apply myself.	1	2	3	4	5	N/A
74.	I would rather change to some form of lighter work and live with what I have than have back surgery.	1	2	3	4	5	N/A
75.	People don't want to have much to do with me because they are scared that I will hurt myself.	1	2	3	4	5	N/A
76.	I can still be involved with my children even though I can't participate in as much physical activities with them.	1	2	3	4	5	N/A
77.	I have to change my lifestyle to a degree to accommodate my limitations.	1	2	3	4	5	N/A

Statement		Present Belief					
		Strongly Disbelieve				Strongly Believe	
78.	My back injury can contribute to pain in other parts of my body.	1	2	3	4	5	N/A
79.	Learning about my injury will help me deal with the injury better by helping me understand my limitations.	1	2	3	4	5	N/A
80.	Improving my overall fitness has got me feeling better both physically and mentally.	1	2	3	4	5	N/A
81.	I think that talking to people about my injury and pain helps.	1	2	3	4	5	N/A
82.	I distract myself from the pain by watching a lot of television and it helps me cope with the pain.	1	2	3	4	5	N/A
83.	I know I can find some type of work even with my limitations.	1	2	3	4	5	N/A

BACK PAIN SURVEY - PART 3

Please rate each of the following statements (by circling the appropriate number) as to how much you presently believe the statement. If a statement does not apply to you or you believe you do not have sufficient information to answer the question, circle "N/A".

1 - indicates that you strongly disbelieve the statement
2 - indicates that you slightly disbelieve the statement
3 - indicates that you neither believe or disbelieve
4 - indicates that you slightly believe the statement
5 - indicates that you strongly believe the statement
N/A - indicates a statement does not apply to you

APPENDIX F

CLUSTER SOLUTIONS

The purpose of this appendix is to outline the stages in developing the seven cluster solution presented in the concept map. Apart from describing this process, the maps containing cluster solutions with their items and bridging values will also be presented.

The statistical analysis conducted to determine the final cluster solution was derived by using The Concept System (Trochim, 1987a), a computer program developed to create concept maps. In this analysis the sort data was subjected to the multidimensional scaling (MDS) and cluster analysis routines. The program then provided the MDS plots and by default provided a cluster solution that is equal to approximately one-fifth the number of statements. The initial map computed contained a 16 cluster solution.

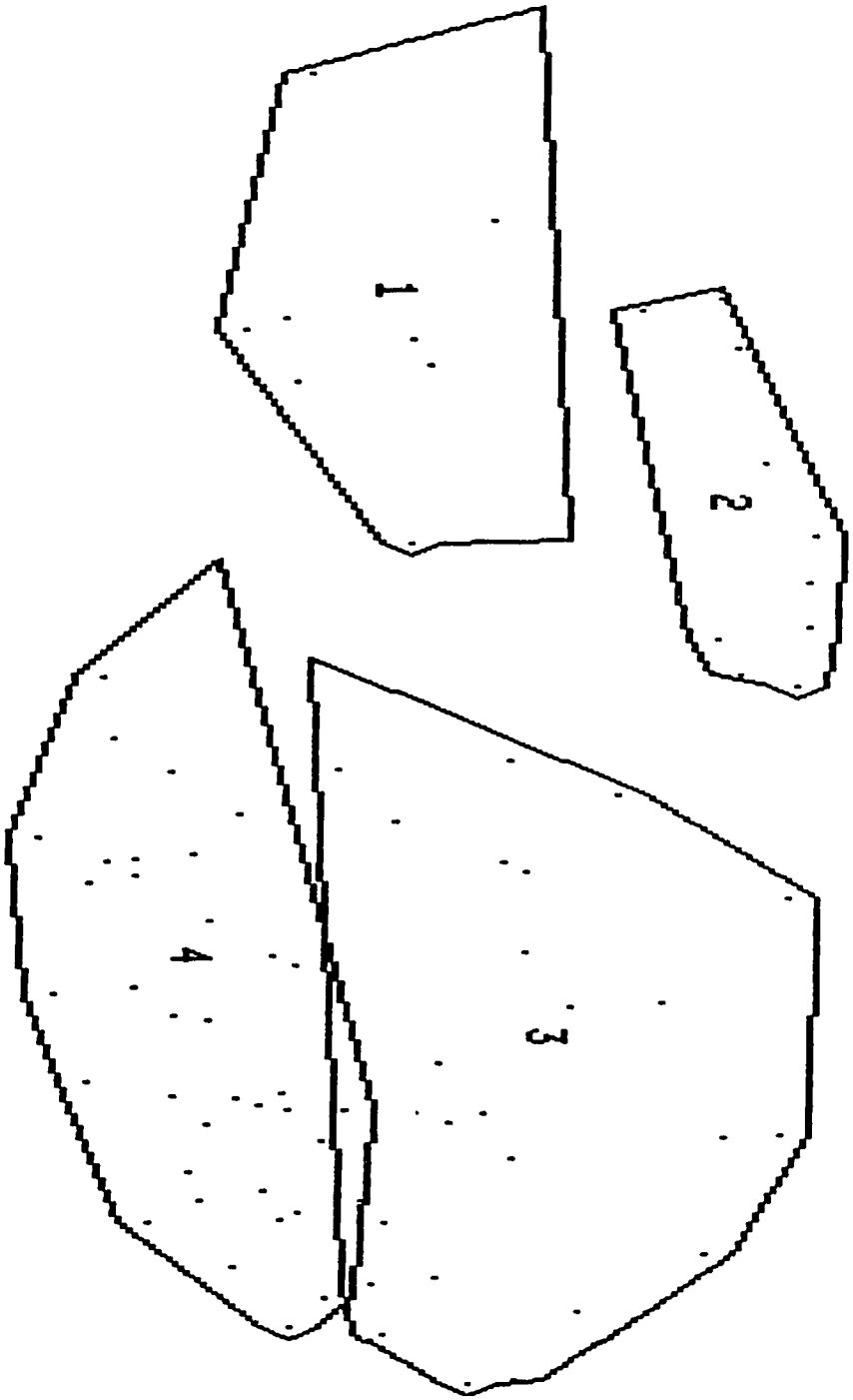
The 16 cluster solution included clusters that were deemed to be too fragmented. In many cases clusters contained few items and no clear themes were emerging. Next, solutions were examined by reducing the number of clusters by one. Moving from 16 to 15 clusters had a slight effect by only bringing clusters 1 and 2 together. Further reducing the number of clusters by one again produced little change at each individual step. However, the reduction from 15 to 10 clusters served to develop the lower right portion of the map and gave more interpretability to these positive clusters that appeared in the final solution. These clusters represented accepting limitations, adaptive coping and responsibility for rehabilitation.

Further reduction of the cluster solution was deemed appropriate with 10 clusters due to the difficulty encountered when interpreting the remaining 7 clusters. Decreasing the solution from 10 to 8 served to collapse the clusters in the central upper region of the map and was useful in improving their interpretability. Also, these two clusters appeared to be describing themes related to medication use and cautious realism towards the changes associated with the injury. These two clusters remained intact in the final solution. Although the reduction of the cluster solution from ten to eight was useful in interpreting the upper central region of the map, this step did little to give meaning to the three clusters in the extreme left portion of the map. Clarification of the portion of the map that was difficult to interpret was provided during the next step when the solution was set at seven. This step resulted in the collapse of clusters one and two, leaving two clusters in this region of the map. These clusters were interpreted to include items reflecting the themes of denial/regret and beliefs statements that were self-defeating in nature (refer to concept maps and cluster solutions in this appendix).

Once examined, further reduction of the seven cluster solution was deemed to be inappropriate. An analysis of six clusters was observed to combine the clusters three (medications/pain focus) and four (cautious realism). Although the cautious realistic theme appeared to be inherent to some extent in cluster three, the third cluster was judged to be distinct with its items reflecting a specific focus on the use of

medications. Reducing the solution to five clusters combined the concepts of accepting limitations, cautious realism and medications/pain focus. Upon examination of this solution, the items combined from the three clusters tended to reflect beliefs that indicate acceptance. However, this interpretation seemed to overgeneralize the contents in these three clusters and was not maintained. Any further reduction in the number of clusters analyzed (e.g., four, three or two) was judged to also produce an overgeneralization of the results.

4 CLUSTER MAP



4 CLUSTER SOLUTION

Cluster/Items	Bridging Index
Cluster #1	
I would have to have good odds before I would have surgery.	0.43
If you have done the things that I have over the years you can expect to have a worn out back.	0.46
I think I can control the pain by doing the same activities and work I was doing before the injury.	0.58
If I was more physically fit I would not be in this position.	0.60
I think that by working through excessive pain I can prevent losing my job.	0.61
I don't want to think I have a serious back injury so I put it out of my mind.	0.62
I have to go back to work and that's all there is to it.	0.64
I kept working after the original injury because I didn't think it was serious.	0.82
The worst thing that could happen is that I would have to go in for a back operation.	0.83
Sports are my life.	1.00
Cluster Average	**0.66**
Cluster #2	
At times I think there is no way to control the pain.	0.35
When I am having a pain flare-up I need it to stop immediately.	0.38
People don't want to have much to do with me because they are scared that I will hurt myself.	0.39
It has been difficult being around healthy people because they can do activities I can't do because I might hurt myself.	0.40
I have to limit how close I stay to friends so I don't put pressure on them to make sure I am enjoying myself.	0.41
I think pain is depressing.	0.41

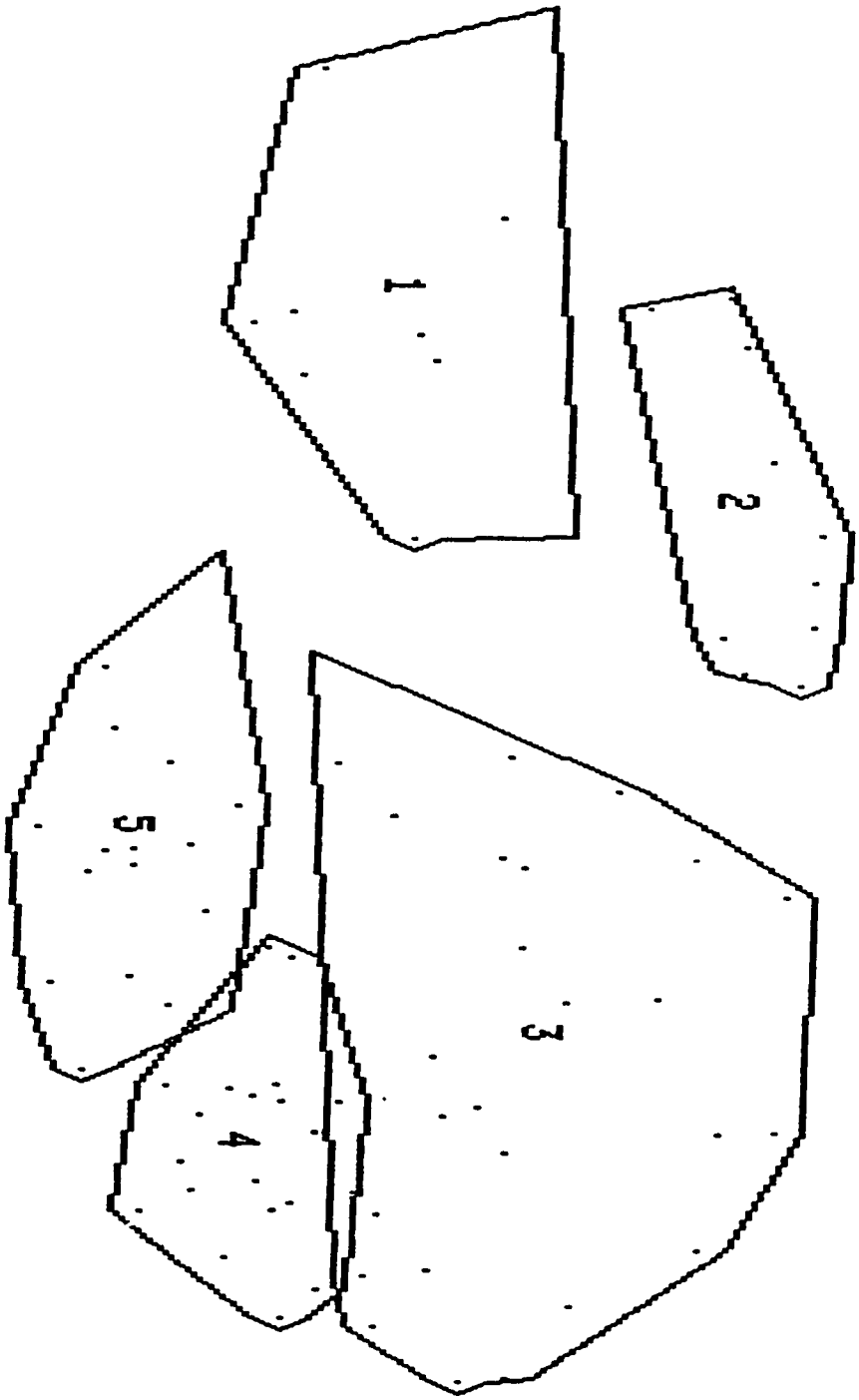
It is my fault that I am in pain.	0.43
I think I can become paralysed because of the injury.	0.47
I don't know when to stop activities because I am not sure if the pain is caused by a normal reaction to exercise or because I am doing further harm to my back.	0.60
Specialists just tried to ship me out as quickly as possible without providing a good explanation about my injury.	0.61
Cluster Average	**0.45**
Cluster #3	
I have to change my lifestyle to a degree to accommodate my limitations.	0.05
My limits are different for different situations and depend upon what I am doing.	0.08
I am still learning the things that I can and can't do.	0.11
Holding things in that are bothering me can create pain in other areas of my body.	0.13
People with back injuries have to cope with big changes in their lives.	0.16
Having had a bad pain flare-up makes the next one easier to deal with.	0.18
There is going to be a time when it gets worse before it gets better.	0.20
It is important to let people know where I am at and what my limitations are.	0.20
I have to accept that I need help to do some things.	0.20
The TENS unit is a better way to cope with pain than any prescription drug.	0.22
Once I have found my limits I have to stick to them.	0.23
My back injury can contribute to pain in other parts of my body.	0.24
I can't control my back condition with heat or other temporary kinds of relief because it will eventually get worse if I don't modify my activities.	0.25

I don't think I will ever be 100%.	0.27
I would rather change to some form of lighter work and live with what I have than have back surgery.	0.30
At times my mood can really bring on the pain more than what I am doing physically.	0.30
I distract myself from the pain by watching a lot of television and it helps me cope with the pain.	0.32
I don't do things that I think will hurt me and this can keep me from doing things I might be able to do.	0.36
I think that if you have a problem with drugs or alcohol it is important to get some kind of help.	0.38
The first step to improving my life is to get off the pain medication.	0.39
Pain medication only masks pain which can lead to more damage in the long run.	0.39
At times pain can hurt or effect my family as much as it does me.	0.40
I can get addicted to medications that have codeine in them.	0.41
Taking too much pain medication can cause me to focus more on the pain.	0.46
There is no prescription drug that can get rid of pain without causing some type of problem.	0.46
At times when I am having pain so severe I have to take some pain medications.	0.48
Cluster Average	**0.28**
Cluster #4	
When you understand the pain from your injury it helps you to deal with it better.	0.00
The most important thing to help cope is to accept the injury.	0.00
If my injury does not get better over time I will have to learn to live with it.	0.01
I can relieve stress by keeping busy with activities.	0.01
I know it is going to take a while to heal and I have accepted that.	0.02

It is helpful to be with other injured people as a start to getting motivated again.	0.02
Learning about my injury will help me deal with the injury better by helping me understand my limitations.	0.03
I believe it is important to pace myself.	0.03
I would need counselling or some form of help to learn to live with big changes in my lifestyle.	0.04
I can learn to control my pain to a certain degree if I have the proper training and I apply myself.	0.05
My pain is the same as it was but now I feel better.	0.05
I can still be involved with my children even though I can't participate in as much physical activities with them.	0.05
It doesn't do any good to think about pain all the time.	0.05
I think that talking to people about my injury and pain helps.	0.05
I am doing many things to compensate for stiffness and soreness.	0.06
Being physically and mentally fit is the most important thing when you have constant back pain.	0.06
Doing activities with my family is an important part of dealing with my injury.	0.06
I may not get rid of some of the pain but I am going to get the best physical function that I can with what I have left.	0.07
Regular exercise and strengthening will improve my posture and stop some of the pain.	0.07
I can use positive thoughts to focus away from the pain and get some relief.	0.07
Some good opportunity may still come out of this back injury.	0.08
You have to think positively and not think you can't make it because you have a sore back.	0.08
By strengthening my back and abdominal muscles I can go over the hump and carry on.	0.10
Improving my overall fitness has got me feeling better both physically and mentally.	0.11

I can coach or instruct to stay involved in recreational activities I can't participate in.	0.12
I think I can still participate in recreational activities to a lesser degree to stay involved.	0.12
It helps me deal with my injury when I compare it to others and realize that it could be much more serious.	0.12
I need to find my limits through trial and error.	0.13
I have to cooperate and communicate with my therapists for my rehabilitation to be successful.	0.16
My rehabilitation program is helping.	0.17
I have to take it step by step and hope for the best.	0.19
I know I can find some type of work even with my limitations.	0.19
I think my rehabilitation is a full-time job.	0.21
Being in poor physical condition (like being overweight) will increase my pain level.	0.22
I can use the resources available through WCB to help me find work.	0.31
WCB is an employer who is employing me to be rehabilitated.	0.34
It doesn't help to focus on the possibility that employers will be biased against workers who have been on WCB.	0.45
Cluster Average	**0.11**

5 CLUSTER MAP



5 CLUSTER SOLUTION

Cluster/Items	Bridging Index
Cluster #1	
I would have to have good odds before I would have surgery.	0.43
If you have done the things that I have over the years you can expect to have a worn out back.	0.46
I think I can control the pain by doing the same activities and work I was doing before the injury.	0.58
If I was more physically fit I would not be in this position.	0.60
I think that by working through excessive pain I can prevent losing my job.	0.61
I don't want to think I have a serious back injury so I put it out of my mind.	0.62
I have to go back to work and that's all there is to it.	0.64
I kept working after the original injury because I didn't think it was serious.	0.82
The worst thing that could happen is that I would have to go in for a back operation.	0.83
Sports are my life.	1.00
Cluster Average	**0.66**
Cluster #2	
At times I think there is no way to control the pain.	0.35
When I am having a pain flare-up I need it to stop immediately.	0.38
People don't want to have much to do with me because they are scared that I will hurt myself.	0.39
It has been difficult being around healthy people because they can do activities I can't do because I might hurt myself.	0.40
I have to limit how close I stay to friends so I don't put pressure on them to make sure I am enjoying myself.	0.41
I think pain is depressing.	0.41

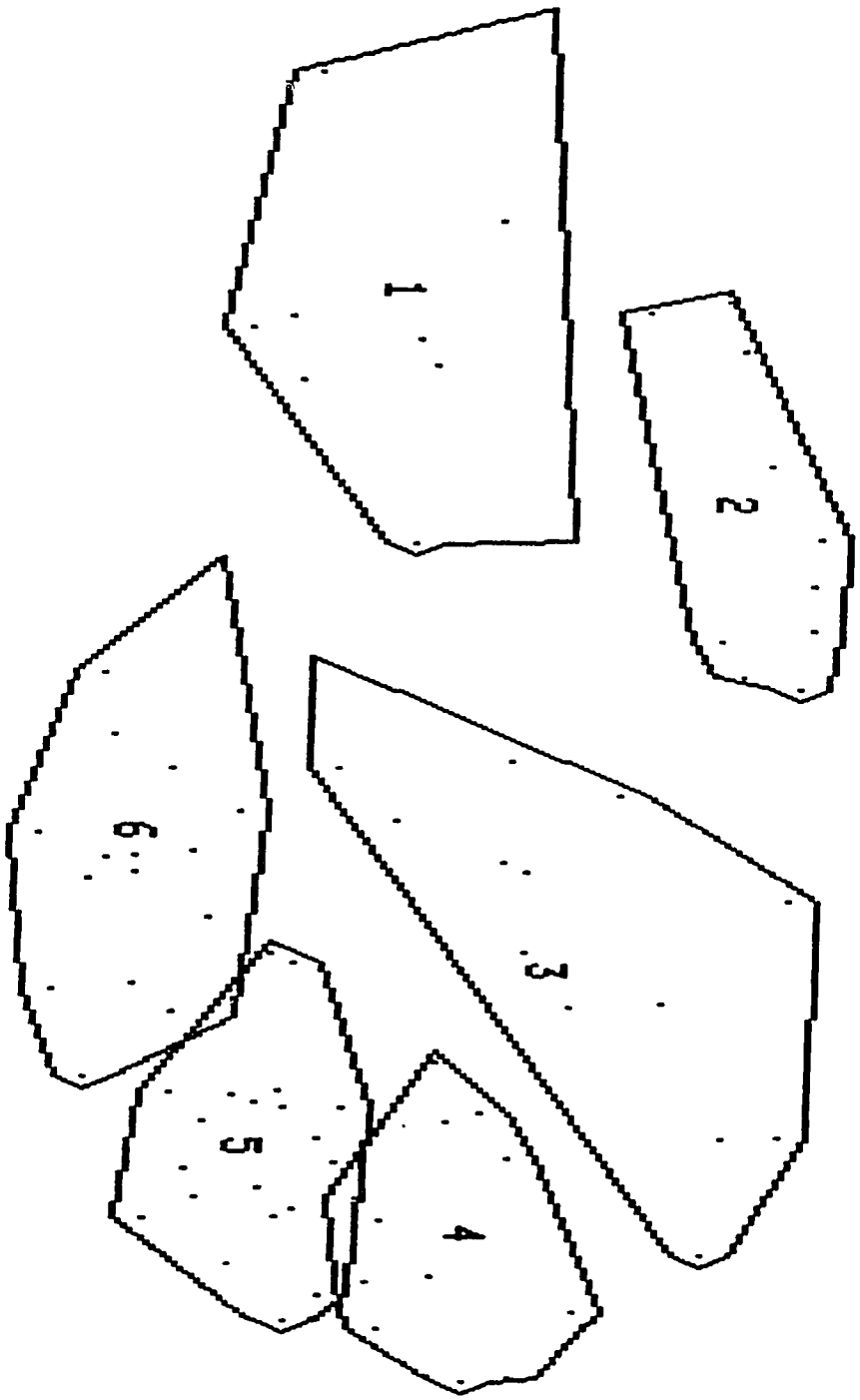
It is my fault that I am in pain.	0.43
I think I can become paralysed because of the injury.	0.47
I don't know when to stop activities because I am not sure if the pain is caused by a normal reaction to exercise or because I am doing further harm to my back.	0.60
Specialists just tried to ship me out as quickly as possible without providing a good explanation about my injury.	0.61
Cluster Average	**0.45**
Cluster #3	
I have to change my lifestyle to a degree to accommodate my limitations.	0.05
My limits are different for different situations and depend upon what I am doing.	0.08
I am still learning the things that I can and can't do.	0.11
Holding things in that are bothering me can create pain in other areas of my body.	0.13
People with back injuries have to cope with big changes in their lives.	0.16
Having had a bad pain flare-up makes the next one easier to deal with.	0.18
I have to accept that I need help to do some things.	0.20
There is going to be a time when it gets worse before it gets better.	0.20
It is important to let people know where I am at and what my limitations are.	0.20
The TENS unit is a better way to cope with pain than any prescription drug.	0.22
Once I have found my limits I have to stick to them.	0.23
My back injury can contribute to pain in other parts of my body.	0.24
I can't control my back condition with heat or other temporary kinds of relief because it will eventually get worse if I don't modify my activities.	0.25

I don't think I will ever be 100%.	0.27
At times my mood can really bring on the pain more than what I am doing physically.	0.30
I would rather change to some form of lighter work and live with what I have than have back surgery.	0.30
I distract myself from the pain by watching a lot of television and it helps me cope with the pain.	0.32
I don't do things that I think will hurt me and this can keep me from doing things I might be able to do.	0.36
I think that if you have a problem with drugs or alcohol it is important to get some kind of help.	0.38
Pain medication only masks pain which can lead to more damage in the long run.	0.39
The first step to improving my life is to get off the pain medication.	0.39
At times pain can hurt or effect my family as much as it does me.	0.40
I can get addicted to medications that have codeine in them.	0.41
Taking too much pain medication can cause me to focus more on the pain.	0.46
There is no prescription drug that can get rid of pain without causing some type of problem.	0.46
At times when I am having pain so severe I have to take some pain medications.	0.48
Cluster Average	**0.28**
Cluster #4	
The most important thing to help cope is to accept the injury.	0.00
When you understand the pain from your injury it helps you to deal with it better.	0.00
If my injury does not get better over time I will have to learn to live with it.	0.01
I know it is going to take a while to heal and I have accepted that.	0.02

It is helpful to be with other injured people as a start to getting motivated again.	0.02
I believe it is important to pace myself.	0.03
Learning about my injury will help me deal with the injury better by helping me understand my limitations.	0.03
I would need counselling or some form of help to learn to live with big changes in my lifestyle.	0.04
My pain is the same as it was but now I feel better.	0.05
I can learn to control my pain to a certain degree if I have the proper training and I apply myself.	0.05
I can still be involved with my children even though I can't participate in as much physical activities with them.	0.05
It doesn't do any good to think about pain all the time.	0.05
I think that talking to people about my injury and pain helps.	0.05
Doing activities with my family is an important part of dealing with my injury.	0.06
I can use positive thoughts to focus away from the pain and get some relief.	0.07
You have to think positively and not think you can't make it because you have a sore back.	0.08
It helps me deal with my injury when I compare it to others and realize that it could be much more serious.	0.12
I need to find my limits through trial and error.	0.13
I know I can find some type of work even with my limitations.	0.19
I have to take it step by step and hope for the best.	0.19
Cluster Average	**0.06**
Cluster #5	
I can relieve stress by keeping busy with activities.	0.01
I am doing many things to compensate for stiffness and soreness.	0.06
Being physically and mentally fit is the most important thing when you have constant back pain.	0.06

Regular exercise and strengthening will improve my posture and stop some of the pain.	0.07
I may not get rid of some of the pain but I am going to get the best physical function that I can with what I have left.	0.07
Some good opportunity may still come out of this back injury.	0.08
By strengthening my back and abdominal muscles I can go over the hump and carry on.	0.10
Improving my overall fitness has got me feeling better both physically and mentally.	0.11
I can coach or instruct to stay involved in recreational activities I can't participate in.	0.12
I think I can still participate in recreational activities to a lesser degree to stay involved.	0.12
I have to cooperate and communicate with my therapists for my rehabilitation to be successful.	0.16
My rehabilitation program is helping.	0.17
I think my rehabilitation is a full-time job.	0.21
Being in poor physical condition (like being overweight) will increase my pain level.	0.22
I can use the resources available through WCB to help me find work.	0.31
WCB is an employer who is employing me to be rehabilitated.	0.34
It doesn't help to focus on the possibility that employers will be biased against workers who have been on WCB.	0.45
Cluster Average	**0.16**

6 CLUSTER MAP



6 CLUSTER SOLUTION

Cluster/Items	Bridging Index
Cluster #1	
I would have to have good odds before I would have surgery.	0.43
If you have done the things that I have over the years you can expect to have a worn out back.	0.46
I think I can control the pain by doing the same activities and work I was doing before the injury.	0.58
If I was more physically fit I would not be in this position.	0.60
I think that by working through excessive pain I can prevent losing my job.	0.61
I don't want to think I have a serious back injury so I put it out of my mind.	0.62
I have to go back to work and that's all there is to it.	0.64
I kept working after the original injury because I didn't think it was serious.	0.82
The worst thing that could happen is that I would have to go in for a back operation.	0.83
Sports are my life.	1.00
Cluster Average	**0.66**
Cluster #2	
At times I think there is no way to control the pain.	0.35
When I am having a pain flare-up I need it to stop immediately.	0.38
People don't want to have much to do with me because they are scared that I will hurt myself.	0.39
It has been difficult being around healthy people because they can do activities I can't do because I might hurt myself.	0.40
I have to limit how close I stay to friends so I don't put pressure on them to make sure I am enjoying myself.	0.41
I think pain is depressing.	0.41

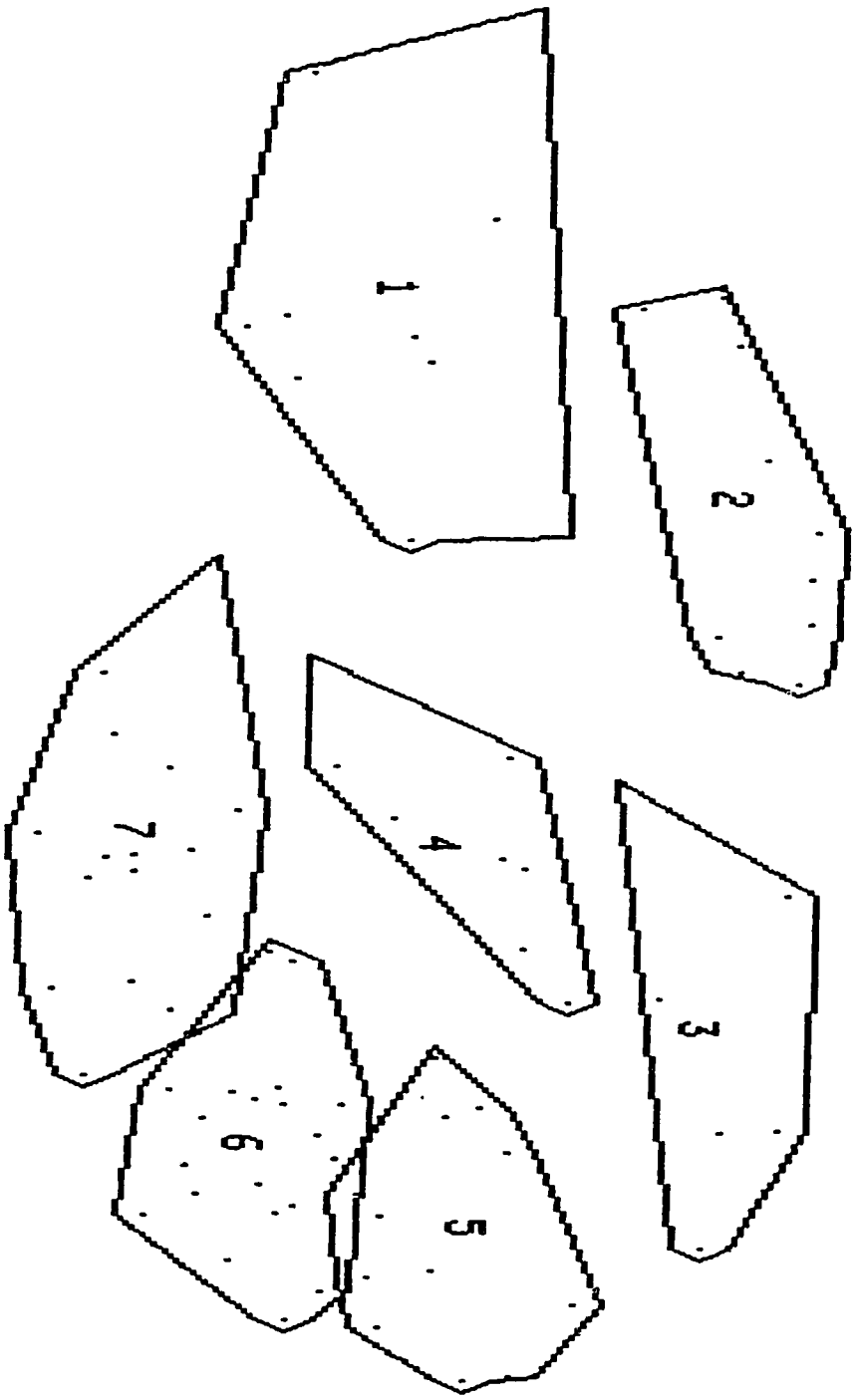
It is my fault that I am in pain.	0.43
I think I can become paralysed because of the injury.	0.47
I don't know when to stop activities because I am not sure if the pain is caused by a normal reaction to exercise or because I am doing further harm to my back.	0.60
Specialists just tried to ship me out as quickly as possible without providing a good explanation about my injury.	0.61
Cluster Average	**0.45**
Cluster #3	
Having had a bad pain flare-up makes the next one easier to deal with.	0.18
There is going to be a time when it gets worse before it gets better.	0.20
My back injury can contribute to pain in other parts of my body.	0.24
I can't control my back condition with heat or other temporary kinds of relief because it will eventually get worse if I don't modify my activities.	0.25
I don't think I will ever be 100%.	0.27
I would rather change to some form of lighter work and live with what I have than have back surgery.	0.30
At times my mood can really bring on the pain more than what I am doing physically.	0.30
I distract myself from the pain by watching a lot of television and it helps me cope with the pain.	0.32
I don't do things that I think will hurt me and this can keep me from doing things I might be able to do.	0.36
At times pain can hurt or effect my family as much as it does me.	0.40
I can get addicted to medications that have codeine in them.	0.41
Taking too much pain medication can cause me to focus more on the pain.	0.46
There is no prescription drug that can get rid of pain without causing some type of problem.	0.46

At times when I am having pain so severe I have to take some pain medications.	0.48
Cluster Average	**0.33**
Cluster #4	
I have to change my lifestyle to a degree to accommodate my limitations.	0.05
My limits are different for different situations and depend upon what I am doing.	0.08
I am still learning the things that I can and can't do.	0.11
Holding things in that are bothering me can create pain in other areas of my body.	0.13
People with back injuries have to cope with big changes in their lives.	0.16
I have to accept that I need help to do some things.	0.20
It is important to let people know where I am at and what my limitations are.	0.20
The TENS unit is a better way to cope with pain than any prescription drug.	0.22
Once I have found my limits I have to stick to them.	0.23
I think that if you have a problem with drugs or alcohol it is important to get some kind of help.	0.38
Pain medication only masks pain which can lead to more damage in the long run.	0.39
The first step to improving my life is to get off the pain medication.	0.39
Cluster Average	**0.21**
Cluster #5	
When you understand the pain from your injury it helps you to deal with it better.	0.00
The most important thing to help cope is to accept the injury.	0.00
If my injury does not get better over time I will have to learn to live with it.	0.01

I know it is going to take a while to heal and I have accepted that.	0.02
It is helpful to be with other injured people as a start to getting motivated again.	0.02
I believe it is important to pace myself.	0.03
Learning about my injury will help me deal with the injury better by helping me understand my limitations.	0.03
I would need counselling or some form of help to learn to live with big changes in my lifestyle.	0.04
I can learn to control my pain to a certain degree if I have the proper training and I apply myself.	0.05
My pain is the same as it was but now I feel better.	0.05
I can still be involved with my children even though I can't participate in as much physical activities with them.	0.05
It doesn't do any good to think about pain all the time.	0.05
I think that talking to people about my injury and pain helps.	0.05
Doing activities with my family is an important part of dealing with my injury.	0.06
I can use positive thoughts to focus away from the pain and get some relief.	0.07
You have to think positively and not think you can't make it because you have a sore back.	0.08
It helps me deal with my injury when I compare it to others and realize that it could be much more serious.	0.12
I need to find my limits through trial and error.	0.13
I know I can find some type of work even with my limitations.	0.19
I have to take it step by step and hope for the best.	0.19
Cluster Average	**0.06**
Cluster #6	
I can relieve stress by keeping busy with activities.	0.01
I am doing many things to compensate for stiffness and soreness.	0.06

Being physically and mentally fit is the most important thing when you have constant back pain.	0.06
I may not get rid of some of the pain but I am going to get the best physical function that I can with what I have left.	0.07
Regular exercise and strengthening will improve my posture and stop some of the pain.	0.07
Some good opportunity may still come out of this back injury.	0.08
By strengthening my back and abdominal muscles I can go over the hump and carry on.	0.10
Improving my overall fitness has got me feeling better both physically and mentally.	0.11
I think I can still participate in recreational activities to a lesser degree to stay involved.	0.12
I can coach or instruct to stay involved in recreational activities I can't participate in.	0.12
I have to cooperate and communicate with my therapists for my rehabilitation to be successful.	0.16
My rehabilitation program is helping.	0.17
I think my rehabilitation is a full-time job.	0.21
Being in poor physical condition (like being overweight) will increase my pain level.	0.22
I can use the resources available through WCB to help me find work.	0.31
WCB is an employer who is employing me to be rehabilitated.	0.34
It doesn't help to focus on the possibility that employers will be biased against workers who have been on WCB.	0.45
Cluster Average	**0.16**

7 CLUSTER MAP



7 CLUSTER SOLUTION

Cluster/Items	Bridging Index
Cluster #1	
I would have to have good odds before I would have surgery.	0.43
If you have done the things that I have over the years you can expect to have a worn out back.	0.46
I think I can control the pain by doing the same activities and work I was doing before the injury.	0.58
If I was more physically fit I would not be in this position.	0.60
I think that by working through excessive pain I can prevent losing my job.	0.61
I don't want to think I have a serious back injury so I put it out of my mind.	0.62
I have to go back to work and that's all there is to it.	0.64
I kept working after the original injury because I didn't think it was serious.	0.82
The worst thing that could happen is that I would have to go in for a back operation.	0.83
Sports are my life.	1.00
Cluster Average	**0.66**
Cluster #2	
At times I think there is no way to control the pain.	0.35
When I am having a pain flare-up I need it to stop immediately.	0.38
People don't want to have much to do with me because they are scared that I will hurt myself.	0.39
It has been difficult being around healthy people because they can do activities I can't do because I might hurt myself.	0.40
I have to limit how close I stay to friends so I don't put pressure on them to make sure I am enjoying myself.	0.41
I think pain is depressing.	0.41

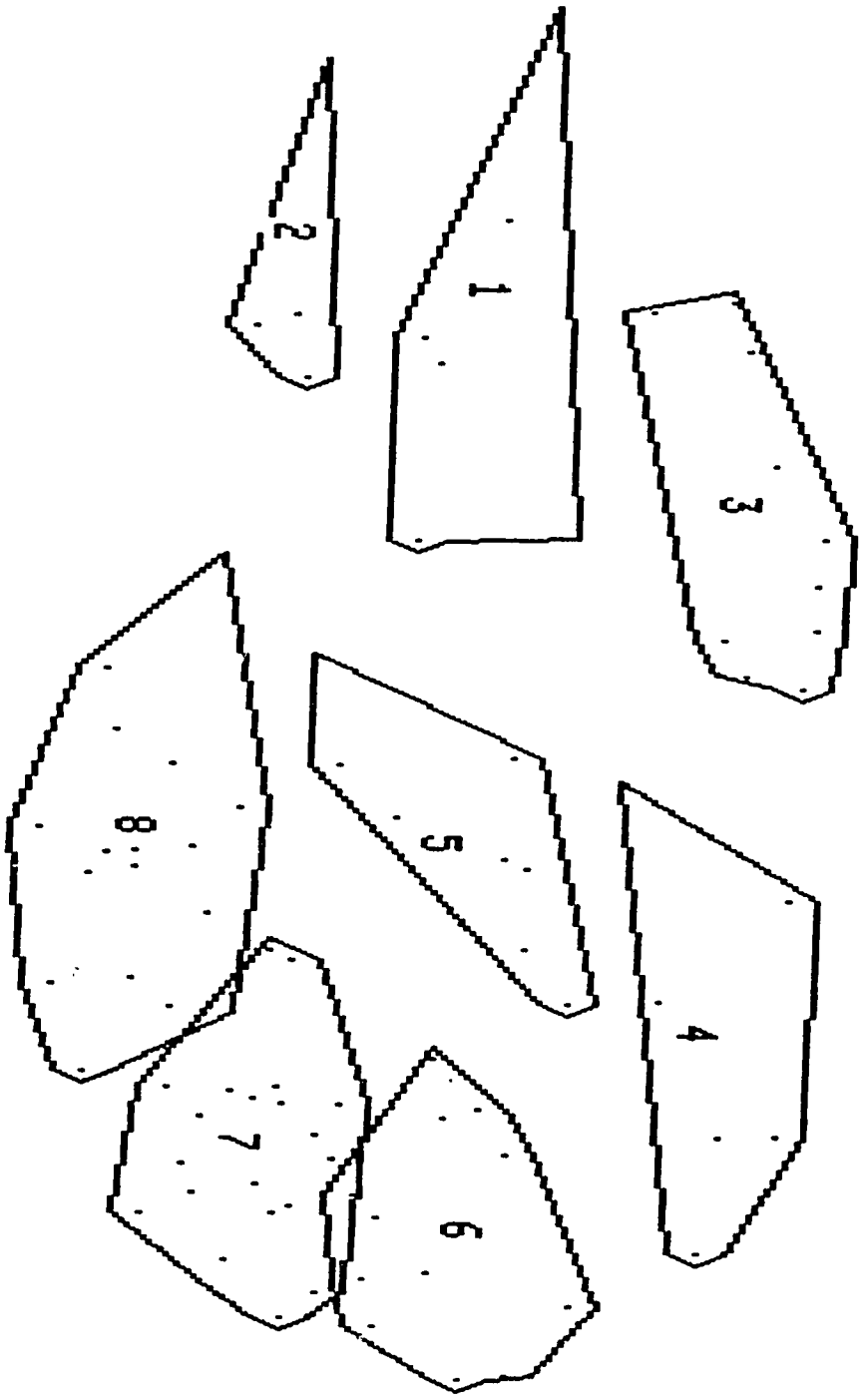
It is my fault that I am in pain.	0.43
I think I can become paralysed because of the injury.	0.47
I don't know when to stop activities because I am not sure if the pain is caused by a normal reaction to exercise or because I am doing further harm to my back.	0.60
Specialists just tried to ship me out as quickly as possible without providing a good explanation about my injury.	0.61
Cluster Average	**0.45**
Cluster #3	
I don't do things that I think will hurt me and this can keep me from doing things I might be able to do.	0.36
At times pain can hurt or effect my family as much as it does me.	0.40
I can get addicted to medications that have codeine in them.	0.41
Taking too much pain medication can cause me to focus more on the pain.	0.46
There is no prescription drug that can get rid of pain without causing some type of problem.	0.46
At times when I am having pain so severe I have to take some pain medications.	0.48
Cluster Average	**0.43**
Cluster #4	
Having had a bad pain flare-up makes the next one easier to deal with.	0.18
There is going to be a time when it gets worse before it gets better.	0.20
My back injury can contribute to pain in other parts of my body.	0.24
I can't control my back condition with heat or other temporary kinds of relief because it will eventually get worse if I don't modify my activities.	0.25
I don't think I will ever be 100%.	0.27
I would rather change to some form of lighter work and live with what I have than have back surgery.	0.30

At times my mood can really bring on the pain more than what I am doing physically.	0.30
I distract myself from the pain by watching a lot of television and it helps me cope with the pain.	0.32
Cluster Average	**0.26**
Cluster #5	
I have to change my lifestyle to a degree to accommodate my limitations.	0.05
My limits are different for different situations and depend upon what I am doing.	0.08
I am still learning the things that I can and can't do.	0.11
Holding things in that are bothering me can create pain in other areas of my body.	0.13
People with back injuries have to cope with big changes in their lives.	0.16
It is important to let people know where I am at and what my limitations are.	0.20
I have to accept that I need help to do some things.	0.20
The TENS unit is a better way to cope with pain than any prescription drug.	0.22
Once I have found my limits I have to stick to them.	0.23
I think that if you have a problem with drugs or alcohol it is important to get some kind of help.	0.38
Pain medication only masks pain which can lead to more damage in the long run.	0.39
The first step to improving my life is to get off the pain medication.	0.39
Cluster Average	**0.21**
Cluster #6	
When you understand the pain from your injury it helps you to deal with it better.	0.00
The most important thing to help cope is to accept the injury.	0.00

If my injury does not get better over time I will have to learn to live with it.	0.01
I know it is going to take a while to heal and I have accepted that.	0.02
It is helpful to be with other injured people as a start to getting motivated again.	0.02
I believe it is important to pace myself.	0.03
Learning about my injury will help me deal with the injury better by helping me understand my limitations.	0.03
I would need counselling or some form of help to learn to live with big changes in my lifestyle.	0.04
I can learn to control my pain to a certain degree if I have the proper training and I apply myself.	0.05
My pain is the same as it was but now I feel better.	0.05
I can still be involved with my children even though I can't participate in as much physical activities with them.	0.05
It doesn't do any good to think about pain all the time.	0.05
I think that talking to people about my injury and pain helps.	0.05
Doing activities with my family is an important part of dealing with my injury.	0.06
I can use positive thoughts to focus away from the pain and get some relief.	0.07
You have to think positively and not think you can't make it because you have a sore back.	0.08
It helps me deal with my injury when I compare it to others and realize that it could be much more serious.	0.12
I need to find my limits through trial and error.	0.13
I know I can find some type of work even with my limitations.	0.19
I have to take it step by step and hope for the best.	0.19
Cluster Average	**0.06**

Cluster #7	
I can relieve stress by keeping busy with activities.	0.01
I am doing many things to compensate for stiffness and soreness.	0.06
Being physically and mentally fit is the most important thing when you have constant back pain.	0.06
I may not get rid of some of the pain but I am going to get the best physical function that I can with what I have left.	0.07
Regular exercise and strengthening will improve my posture and stop some of the pain.	0.07
Some good opportunity may still come out of this back injury.	0.08
By strengthening my back and abdominal muscles I can go over the hump and carry on.	0.10
Improving my overall fitness has got me feeling better both physically and mentally.	0.11
I think I can still participate in recreational activities to a lesser degree to stay involved.	0.12
I can coach or instruct to stay involved in recreational activities I can't participate in.	0.12
I have to cooperate and communicate with my therapists for my rehabilitation to be successful.	0.16
My rehabilitation program is helping.	0.17
I think my rehabilitation is a full-time job.	0.21
Being in poor physical condition (like being overweight) will increase my pain level.	0.22
I can use the resources available through WCB to help me find work.	0.31
WCB is an employer who is employing me to be rehabilitated.	0.34
It doesn't help to focus on the possibility that employers will be biased against workers who have been on WCB.	0.45
Cluster Average	**0.16**

8 CLUSTER MAP



8 CLUSTER SOLUTION

Cluster/Items	Bridging Index
Cluster #1	
I would have to have good odds before I would have surgery.	0.43
If you have done the things that I have over the years you can expect to have a worn out back.	0.46
I think I can control the pain by doing the same activities and work I was doing before the injury.	0.58
I don't want to think I have a serious back injury so I put it out of my mind.	0.62
I kept working after the original injury because I didn't think it was serious.	0.82
The worst thing that could happen is that I would have to go in for a back operation.	0.83
Cluster Average	**0.63**
Cluster #2	
If I was more physically fit I would not be in this position.	0.60
I think that by working through excessive pain I can prevent losing my job.	0.61
I have to go back to work and that's all there is to it.	0.64
Sports are my life.	1.00
Cluster Average	**0.71**
Cluster #3	
At times I think there is no way to control the pain.	0.35
When I am having a pain flare-up I need it to stop immediately.	0.38
People don't want to have much to do with me because they are scared that I will hurt myself.	0.39
It has been difficult being around healthy people because they can do activities I can't do because I might hurt myself.	0.40

I have to limit how close I stay to friends so I don't put pressure on them to make sure I am enjoying myself.	0.41
I think pain is depressing.	0.41
It is my fault that I am in pain.	0.43
I think I can become paralysed because of the injury.	0.47
I don't know when to stop activities because I am not sure if the pain is caused by a normal reaction to exercise or because I am doing further harm to my back.	0.60
Specialists just tried to ship me out as quickly as possible without providing a good explanation about my injury.	0.61
Cluster Average	**0.45**
Cluster #4	
I don't do things that I think will hurt me and this can keep me from doing things I might be able to do.	0.36
At times pain can hurt or effect my family as much as it does me.	0.40
I can get addicted to medications that have codeine in them.	0.41
Taking too much pain medication can cause me to focus more on the pain.	0.46
There is no prescription drug that can get rid of pain without causing some type of problem.	0.46
At times when I am having pain so severe I have to take some pain medications.	0.48
Cluster Average	**0.43**
Cluster #5	
Having had a bad pain flare-up makes the next one easier to deal with.	0.18
There is going to be a time when it gets worse before it gets better.	0.20
My back injury can contribute to pain in other parts of my body.	0.24
I can't control my back condition with heat or other temporary kinds of relief because it will eventually get worse if I don't modify my activities.	0.25

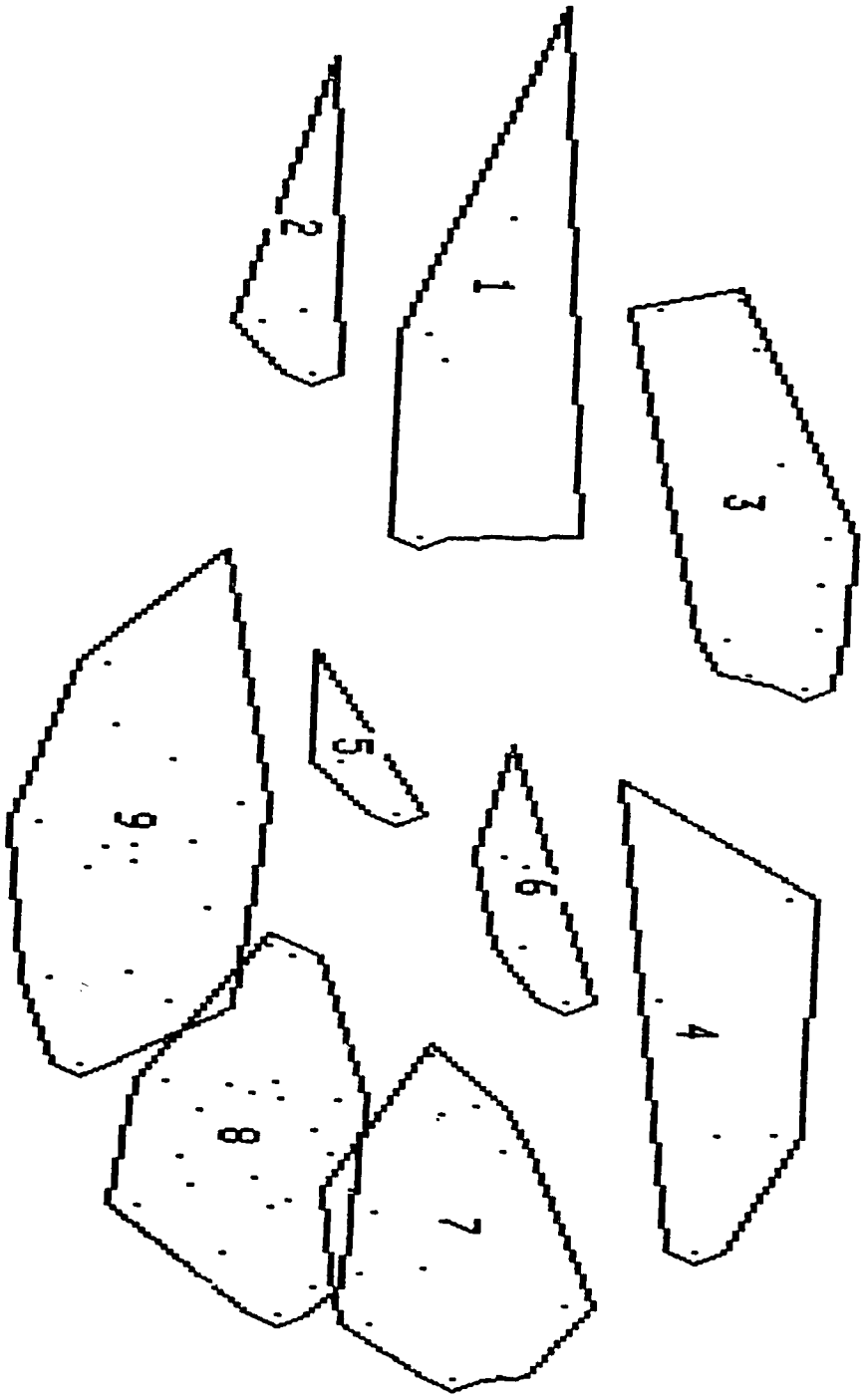
I don't think I will ever be 100%.	0.27
At times my mood can really bring on the pain more than what I am doing physically.	0.30
I would rather change to some form of lighter work and live with what I have than have back surgery.	0.30
I distract myself from the pain by watching a lot of television and it helps me cope with the pain.	0.32
Cluster Average	**0.26**
Cluster #6	
I have to change my lifestyle to a degree to accommodate my limitations.	0.05
My limits are different for different situations and depend upon what I am doing.	0.08
I am still learning the things that I can and can't do.	0.11
Holding things in that are bothering me can create pain in other areas of my body.	0.13
People with back injuries have to cope with big changes in their lives.	0.16
It is important to let people know where I am at and what my limitations are.	0.20
I have to accept that I need help to do some things.	0.20
The TENS unit is a better way to cope with pain than any prescription drug.	0.22
Once I have found my limits I have to stick to them.	0.23
I think that if you have a problem with drugs or alcohol it is important to get some kind of help.	0.38
Pain medication only masks pain which can lead to more damage in the long run.	0.39
The first step to improving my life is to get off the pain medication.	0.39
Cluster Average	**0.21**

Cluster #7	
When you understand the pain from your injury it helps you to deal with it better.	0.00
The most important thing to help cope is to accept the injury.	0.00
If my injury does not get better over time I will have to learn to live with it.	0.01
I know it is going to take a while to heal and I have accepted that.	0.02
It is helpful to be with other injured people as a start to getting motivated again.	0.02
Learning about my injury will help me deal with the injury better by helping me understand my limitations.	0.03
I believe it is important to pace myself.	0.03
I would need counselling or some form of help to learn to live with big changes in my lifestyle.	0.04
It doesn't do any good to think about pain all the time.	0.05
My pain is the same as it was but now I feel better.	0.05
I can learn to control my pain to a certain degree if I have the proper training and I apply myself.	0.05
I can still be involved with my children even though I can't participate in as much physical activities with them.	0.05
I think that talking to people about my injury and pain helps.	0.05
Doing activities with my family is an important part of dealing with my injury.	0.06
I can use positive thoughts to focus away from the pain and get some relief.	0.07
You have to think positively and not think you can't make it because you have a sore back.	0.08
It helps me deal with my injury when I compare it to others and realize that it could be much more serious.	0.12
I need to find my limits through trial and error.	0.13
I have to take it step by step and hope for the best.	0.19

I know I can find some type of work even with my limitations.	0.19
Cluster Average	**0.06**
Cluster #8	
I can relieve stress by keeping busy with activities.	0.01
I am doing many things to compensate for stiffness and soreness.	0.06
Being physically and mentally fit is the most important thing when you have constant back pain.	0.06
I may not get rid of some of the pain but I am going to get the best physical function that I can [illegible] I have left.	0.07
Regular exercise and stren[illegible] improve my posture and stop some of the pain.	0.07
Some good opportunit[illegible]e out of this back injury.	0.08
By strengthening my back and abdominal muscles I can go over the hump and carry on.	0.10
Improving my overall fitness has got me feeling better both physically and mentally.	0.11
I think I can still participate in recreational activities to a lesser degree to stay involved.	0.12
I can coach or instruct to stay involved in recreational activities I can't participate in.	0.12
I have to cooperate and communicate with my therapists for my rehabilitation to be successful.	0.16
My rehabilitation program is helping.	0.17
I think my rehabilitation is a full-time job.	0.21
Being in poor physical condition (like being overweight) will increase my pain level.	0.22
I can use the resources available through WCB to help me find work.	0.31
WCB is an employer who is employing me to be rehabilitated.	0.34
It doesn't help to focus on the possibility that employers will be biased against workers who have been on WCB.	0.45

Cluster Average	**0.16**

9 CLUSTER MAP



9 CLUSTER SOLUTION

Cluster/Items	Bridging Index
Cluster #1	
I would have to have good odds before I would have surgery.	0.43
If you have done the things that I have over the years you can expect to have a worn out back.	0.46
I think I can control the pain by doing the same activities and work I was doing before the injury.	0.58
I don't want to think I have a serious back injury so I put it out of my mind.	0.62
I kept working after the original injury because I didn't think it was serious.	0.82
The worst thing that could happen is that I would have to go in for a back operation.	0.83
Cluster Average	**0.63**
Cluster #2	
If I was more physically fit I would not be in this position.	0.60
I think that by working through excessive pain I can prevent losing my job.	0.61
I have to go back to work and that's all there is to it.	0.64
Sports are my life.	1.00
Cluster Average	**0.71**
Cluster #3	
At times I think there is no way to control the pain.	0.35
When I am having a pain flare-up I need it to stop immediately.	0.38
People don't want to have much to do with me because they are scared that I will hurt myself.	0.39
It has been difficult being around healthy people because they can do activities I can't do because I might hurt myself.	0.40

I have to limit how close I stay to friends so I don't put pressure on them to make sure I am enjoying myself.	0.41
I think pain is depressing.	0.41
It is my fault that I am in pain.	0.43
I think I can become paralysed because of the injury.	0.47
I don't know when to stop activities because I am not sure if the pain is caused by a normal reaction to exercise or because I am doing further harm to my back.	0.60
Specialists just tried to ship me out as quickly as possible without providing a good explanation about my injury.	0.61
Cluster Average	**0.45**
Cluster #4	
I don't do things that I think will hurt me and this can keep me from doing things I might be able to do.	0.36
At times pain can hurt or effect my family as much as it does me.	0.40
I can get addicted to medications that have codeine in them.	0.41
Taking too much pain medication can cause me to focus more on the pain.	0.46
There is no prescription drug that can get rid of pain without causing some type of problem.	0.46
At times when I am having pain so severe I have to take some pain medications.	0.48
Cluster Average	**0.43**
Cluster #5	
Having had a bad pain flare-up makes the next one easier to deal with.	0.18
There is going to be a time when it gets worse before it gets better.	0.20
I would rather change to some form of lighter work and live with what I have than have back surgery.	0.30
Cluster Average	**0.23**

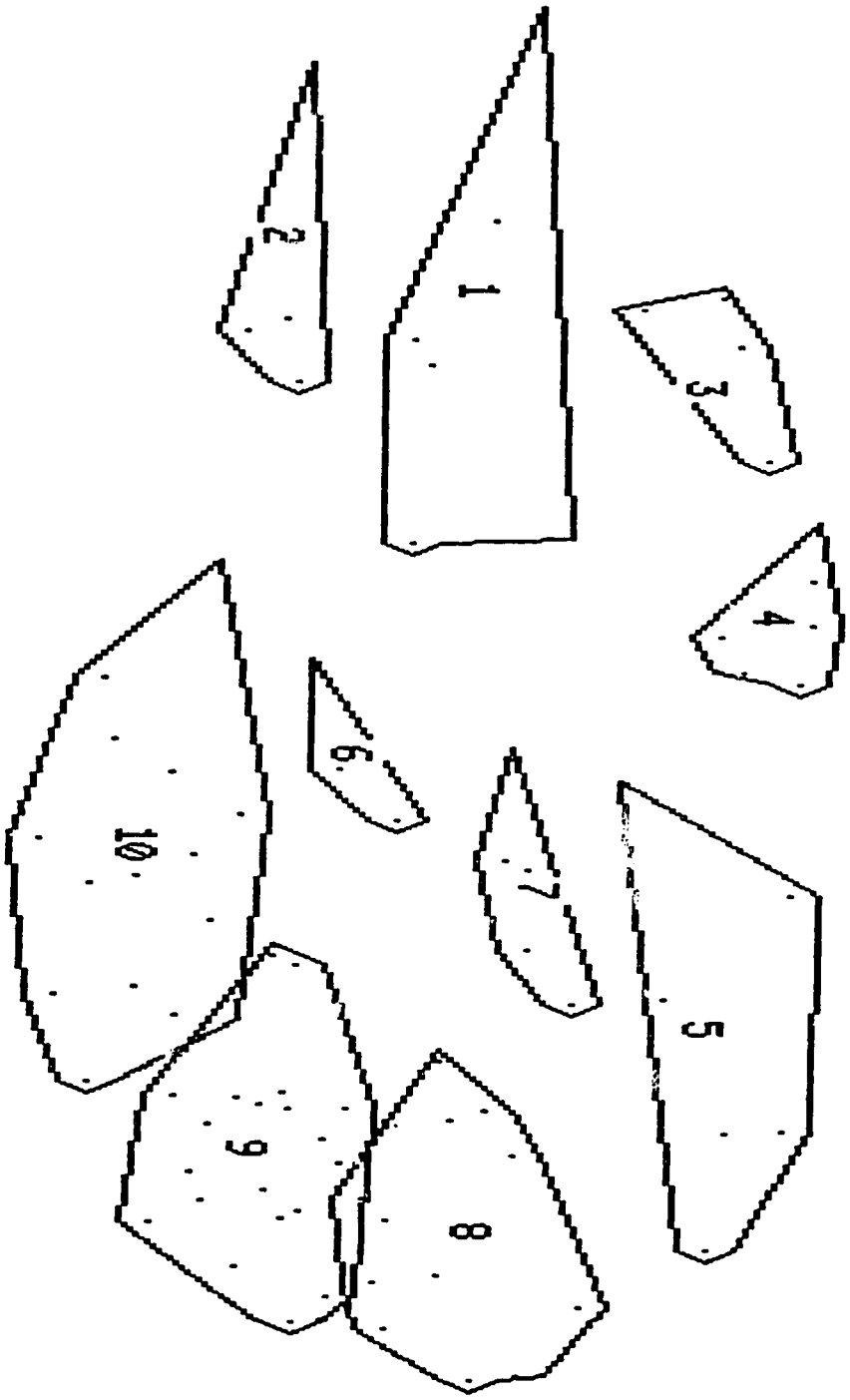
Cluster #6	
My back injury can contribute to pain in other parts of my body.	0.24
I can't control my back condition with heat or other temporary kinds of relief because it will eventually get worse if I don't modify my activities.	0.25
I don't think I will ever be 100%.	0.27
At times my mood can really bring on the pain more than what I am doing physically.	0.30
I distract myself from the pain by watching a lot of television and it helps me cope with the pain.	0.32
Cluster Average	**0.28**
Cluster #7	
I have to change my lifestyle to a degree to accommodate my limitations.	0.05
My limits are different for different situations and depend upon what I am doing.	0.08
I am still learning the things that I can and can't do.	0.11
Holding things in that are bothering me can create pain in other areas of my body.	0.13
People with back injuries have to cope with big changes in their lives.	0.16
It is important to let people know where I am at and what my limitations are.	0.20
I have to accept that I need help to do some things.	0.20
The TENS unit is a better way to cope with pain than any prescription drug.	0.22
Once I have found my limits I have to stick to them.	0.23
I think that if you have a problem with drugs or alcohol it is important to get some kind of help.	0.38
Pain medication only masks pain which can lead to more damage in the long run.	0.39

The first step to improving my life is to get off the pain medication.	0.39
Cluster Average	**0.21**
Cluster #8	
When you understand the pain from your injury it helps you to deal with it better.	0.00
The most important thing to help cope is to accept the injury.	0.00
If my injury does not get better over time I will have to learn to live with it.	0.01
I know it is going to take a while to heal and I have accepted that.	0.02
It is helpful to be with other injured people as a start to getting motivated again.	0.02
Learning about my injury will help me deal with the injury better by helping me understand my limitations.	0.03
I believe it is important to pace myself.	0.03
I would need counselling or some form of help to learn to live with big changes in my lifestyle.	0.04
It doesn't do any good to think about pain all the time.	0.05
My pain is the same as it was but now I feel better.	0.05
I can learn to control my pain to a certain degree if I have the proper training and I apply myself.	0.05
I can still be involved with my children even though I can't participate in as much physical activities with them.	0.05
I think that talking to people about my injury and pain helps.	0.05
Doing activities with my family is an important part of dealing with my injury.	0.06
I can use positive thoughts to focus away from the pain and get some relief.	0.07
You have to think positively and not think you can't make it because you have a sore back.	0.08
It helps me deal with my injury when I compare it to others and realize that it could be much more serious.	0.12

I need to find my limits through trial and error.	0.13
I have to take it step by step and hope for the best.	0.19
I know I can find some type of work even with my limitations.	0.19
Cluster Average	**0.06**
Cluster #9	
I can relieve stress by keeping busy with activities.	0.01
I am doing many things to compensate for stiffness and soreness.	0.06
Being physically and mentally fit is the most important thing when you have constant back pain.	0.06
I may not get rid of some of the pain but I am going to get the best physical function that I can with what I have left.	0.07
Regular exercise and strengthening will improve my posture and stop some of the pain.	0.07
Some good opportunity may still come out of this back injury.	0.08
By strengthening my back and abdominal muscles I can go over the hump and carry on.	0.10
Improving my overall fitness has got me feeling better both physically and mentally.	0.11
I think I can still participate in recreational activities to a lesser degree to stay involved.	0.12
I can coach or instruct to stay involved in recreational activities I can't participate in.	0.12
I have to cooperate and communicate with my therapists for my rehabilitation to be successful.	0.16
My rehabilitation program is helping.	0.17
I think my rehabilitation is a full-time job.	0.21
Being in poor physical condition (like being overweight) will increase my pain level.	0.22
I can use the resources available through WCB to help me find work.	0.31
WCB is an employer who is employing me to be rehabilitated.	0.34

It doesn't help to focus on the possibility that employers will be biased against workers who have been on WCB.	0.45
Cluster Average	**0.16**

10 CLUSTER MAP



10 CLUSTER SOLUTION

Cluster/Items	Bridging Index
Cluster #1	
I would have to have good odds before I would have surgery.	0.43
If you have done the things that I have over the years you can expect to have a worn out back.	0.46
I think I can control the pain by doing the same activities and work I was doing before the injury.	0.58
I don't want to think I have a serious back injury so I put it out of my mind.	0.62
I kept working after the original injury because I didn't think it was serious.	0.82
The worst thing that could happen is that I would have to go in for a back operation.	0.83
Cluster Average	**0.63**
Cluster #2	
If I was more physically fit I would not be in this position.	0.60
I think that by working through excessive pain I can prevent losing my job.	0.61
I have to go back to work and that's all there is to it.	0.64
Sports are my life.	1.00
Cluster Average	**0.71**
Cluster #3	
It is my fault that I am in pain.	0.43
I think I can become paralysed because of the injury.	0.47
I don't know when to stop activities because I am not sure if the pain is caused by a normal reaction to exercise or because I am doing further harm to my back.	0.60
Specialists just tried to ship me out as quickly as possible without providing a good explanation about my injury.	0.61

Cluster Average	**0.53**
Cluster #4	
At times I think there is no way to control the pain.	0.35
When I am having a pain flare-up I need it to stop immediately.	0.38
People don't want to have much to do with me because they are scared that I will hurt myself.	0.39
It has been difficult being around healthy people because they can do activities ' can't do because I might hurt myself.	0.40
I have to limit how close I stay to friends so I don't put pressure on them to make sure I am enjoying myself.	0.41
I think pain is depressing.	0.41
Cluster Average	**0.39**
Cluster #5	
I don't do things that I think will hurt me and this can keep me from doing things I might be able to do.	0.36
At times pain can hurt or effect my family as much as it does me.	0.40
I can get addicted to medications that have codeine in them.	0.41
There is no prescription drug that can get rid of pain without causing some type of problem.	0.46
Taking too much pain medication can cause me to focus more on the pain.	0.46
At times when I am having pain so severe I have to take some pain medications.	0.48
Cluster Average	**0.43**
Cluster #6	
Having had a bad pain flare-up makes the next one easier to deal with.	0.18
There is going to be a time when it gets worse before it gets better.	0.20
I would rather change to some form of lighter work and live with what I have than have back surgery.	0.30

Cluster Average	**0.23**
Cluster #7	
My back injury can contribute to pain in other parts of my body.	0.24
I can't control my back condition with heat or other temporary kinds of relief because it will eventually get worse if I don't modify my activities.	0.25
I don't think I will ever be 100%.	0.27
At times my mood can really bring on the pain more than what I am doing physically.	0.30
I distract myself from the pain by watching a lot of television and it helps me cope with the pain.	0.32
Cluster Average	**0.28**
Cluster #8	
I have to change my lifestyle to a degree to accommodate my limitations.	0.05
My limits are different for different situations and depend upon what I am doing.	0.08
I am still learning the things that I can and can't do.	0.11
Holding things in that are bothering me can create pain in other areas of my body.	0.13
People with back injuries have to cope with big changes in their lives.	0.16
It is important to let people know where I am at and what my limitations are.	0.20
I have to accept that I need help to do some things.	0.20
The TENS unit is a better way to cope with pain than any prescription drug.	0.22
Once I have found my limits I have to stick to them.	0.23
I think that if you have a problem with drugs or alcohol it is important to get some kind of help.	0.38
Pain medication only masks pain which can lead to more damage in the long run.	0.39

The first step to improving my life is to get off the pain medication.	0.39
Cluster Average	**0.21**
Cluster #9	
The most important thing to help cope is to accept the injury.	0.00
When you understand the pain from your injury it helps you to deal with it better.	0.00
If my injury does not get better over time I will have to learn to live with it.	0.01
I know it is going to take a while to heal and I have accepted that.	0.02
It is helpful to be with other injured people as a start to getting motivated again.	0.02
Learning about my injury will help me deal with the injury better by helping me understand my limitations.	0.03
I believe it is important to pace myself.	0.03
I would need counselling or some form of help to learn to live with big changes in my lifestyle.	0.04
It doesn't do any good to think about pain all the time.	0.05
My pain is the same as it was but now I feel better.	0.05
I can learn to control my pain to a certain degree if I have the proper training and I apply myself.	0.05
I think that talking to people about my injury and pain helps.	0.05
I can still be involved with my children even though I can't participate in as much physical activities with them.	0.05
Doing activities with my family is an important part of dealing with my injury.	0.06
I can use positive thoughts to focus away from the pain and get some relief.	0.07
You have to think positively and not think you can't make it because you have a sore back.	0.08
It helps me deal with my injury when I compare it to others and realize that it could be much more serious.	0.12

I need to find my limits through trial and error.	0.13
I know I can find some type of work even with my limitations.	0.19
I have to take it step by step and hope for the best.	0.19
Cluster Average	**0.06**
Cluster #10	
I can relieve stress by keeping busy with activities.	0.01
Being physically and mentally fit is the most important thing when you have constant back pain.	0.06
I am doing many things to compensate for stiffness and soreness.	0.06
Regular exercise and strengthening will improve my posture and stop some of the pain.	0.07
I may not get rid of some of the pain but I am going to get the best physical function that I can with what I have left.	0.07
Some good opportunity may still come out of this back injury.	0.08
By strengthening my back and abdominal muscles I can go over the hump and carry on.	0.10
Improving my overall fitness has got me feeling better both physically and mentally.	0.11
I think I can still participate in recreational activities to a lesser degree to stay involved.	0.12
I can coach or instruct to stay involved in recreational activities I can't participate in.	0.12
I have to cooperate and communicate with my therapists for my rehabilitation to be successful.	0.16
My rehabilitation program is helping.	0.17
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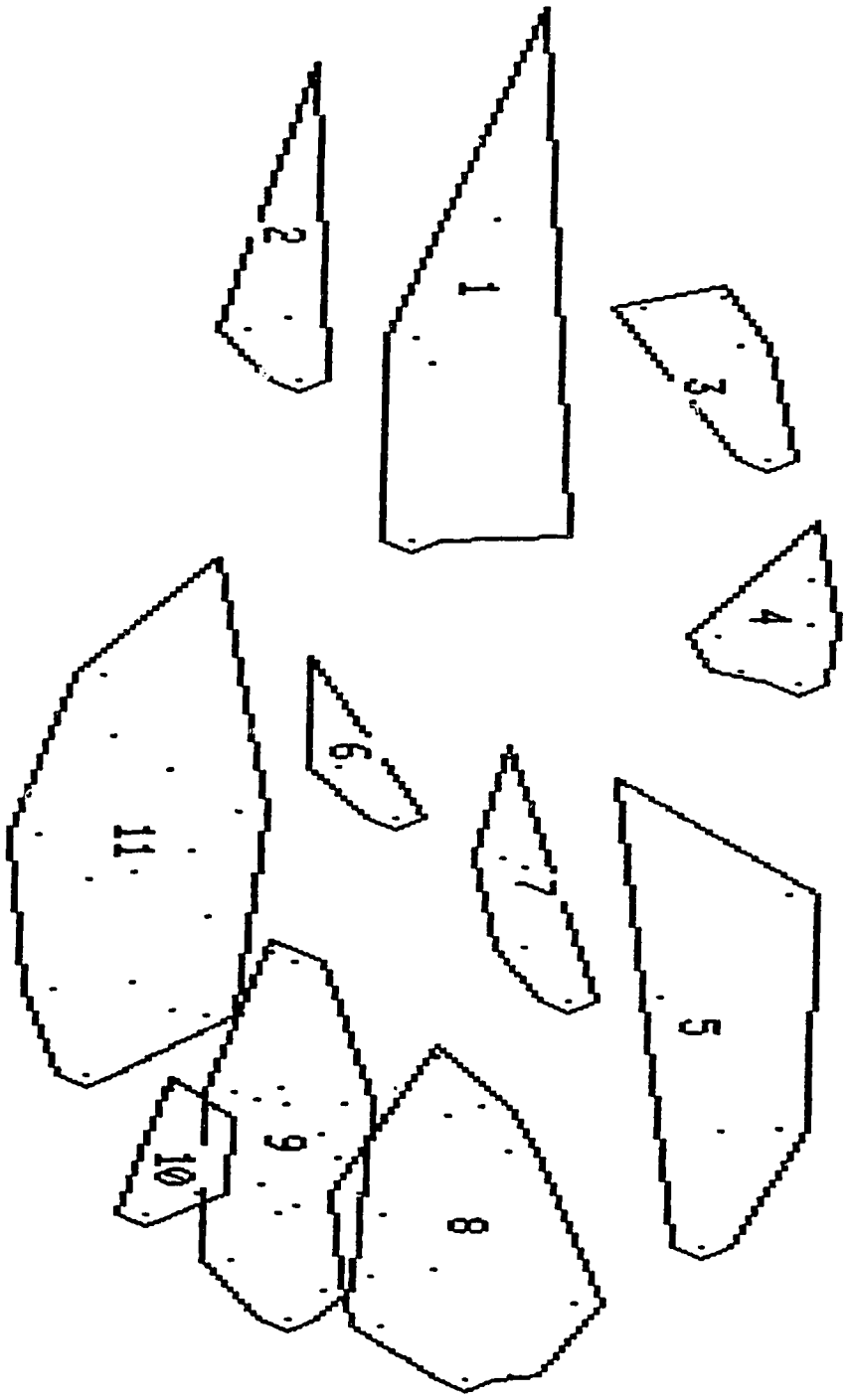
I can use the resources available through WCB to help me find work.	0.31
WCB is an employer who is employing me to be rehabilitated.	0.34

It doesn't help to focus on the possibility that employers will be biased against workers who have been on WCB.	0.45
Cluster Average	**0.16**

11 CLUSTER MAP



11 CLUSTER SOLUTION

Cluster/Items	Bridging Index
Cluster #1	
I would have to have good odds before I would have surgery.	0.43
If you have done the things that I have over the years you can expect to have a worn out back.	0.46
I think I can control the pain by doing the same activities and work I was doing before the injury.	0.58
I don't want to think I have a serious back injury so I put it out of my mind.	0.62
I kept working after the original injury because I didn't think it was serious.	0.82
The worst thing that could happen is that I would have to go in for a back operation.	0.83
Cluster Average	**0.63**
Cluster #2	
If I was more physically fit I would not be in this position.	0.60
I think that by working through excessive pain I can prevent losing my job.	0.61
I have to go back to work and that's all there is to it.	0.64
Sports are my life.	1.00
Cluster Average	**0.71**
Cluster #3	
It is my fault that I am in pain.	0.43
I think I can become paralysed because of the injury.	0.47
I don't know when to stop activities because I am not sure if the pain is caused by a normal reaction to exercise or because I am doing further harm to my back.	0.60
Specialists just tried to ship me out as quickly as possible without providing a good explanation about my injury.	0.61

Cluster Average	**0.53**
Cluster #4	
At times I think there is no way to control the pain.	0.35
When I am having a pain flare-up I need it to stop immediately.	0.38
People don't want to have much to do with me because they are scared that I will hurt myself.	0.39
It has been difficult being around healthy people because they can do activities I can't do because I might hurt myself.	0.40
I have to limit how close I stay to friends so I don't put pressure on them to make sure I am enjoying myself.	0.41
I think pain is depressing.	0.41
Cluster Average	**0.39**
Cluster #5	
I don't do things that I think will hurt me and this can keep me from doing things I might be able to do.	0.36
At times pain can hurt or effect my family as much as it does me.	0.40
I can get addicted to medications that have codeine in them.	0.41
There is no prescription drug that can get rid of pain without causing some type of problem.	0.4[illegible]
Taking too much pain medication can cause me to focus more on the pain.	0.46
At times when I am having pain so severe I have to take some pain medications.	0.48
Cluster Average	**0.43**
Cluster #6	
Having had a bad pain flare-up makes the next one easier to deal with.	0.18
There is going to be a time when it gets worse before it gets better.	0.20
I would rather change to some form of lighter work and live with what I have than have back surgery.	0.30

Cluster Average	**0.23**
ster #7	
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I don't think I will ever be 100%.	0.27
At times my mood can affect, bring on the pain more than what I am doing physically.	0.30
I distract myself from the pain by watching a lot of television and it helps me cope with the pain.	0.32
Cluster Average	**0.28**
Cluster #8	
I have to change my lifestyle to a degree to accommodate my limitations.	0.05
My limits are different for different situations and depend upon what I am doing.	0.08
I am still learning the things that I can and can't do.	0.11
Holding things in that are bothering me can create pain in other areas of my body.	0.13
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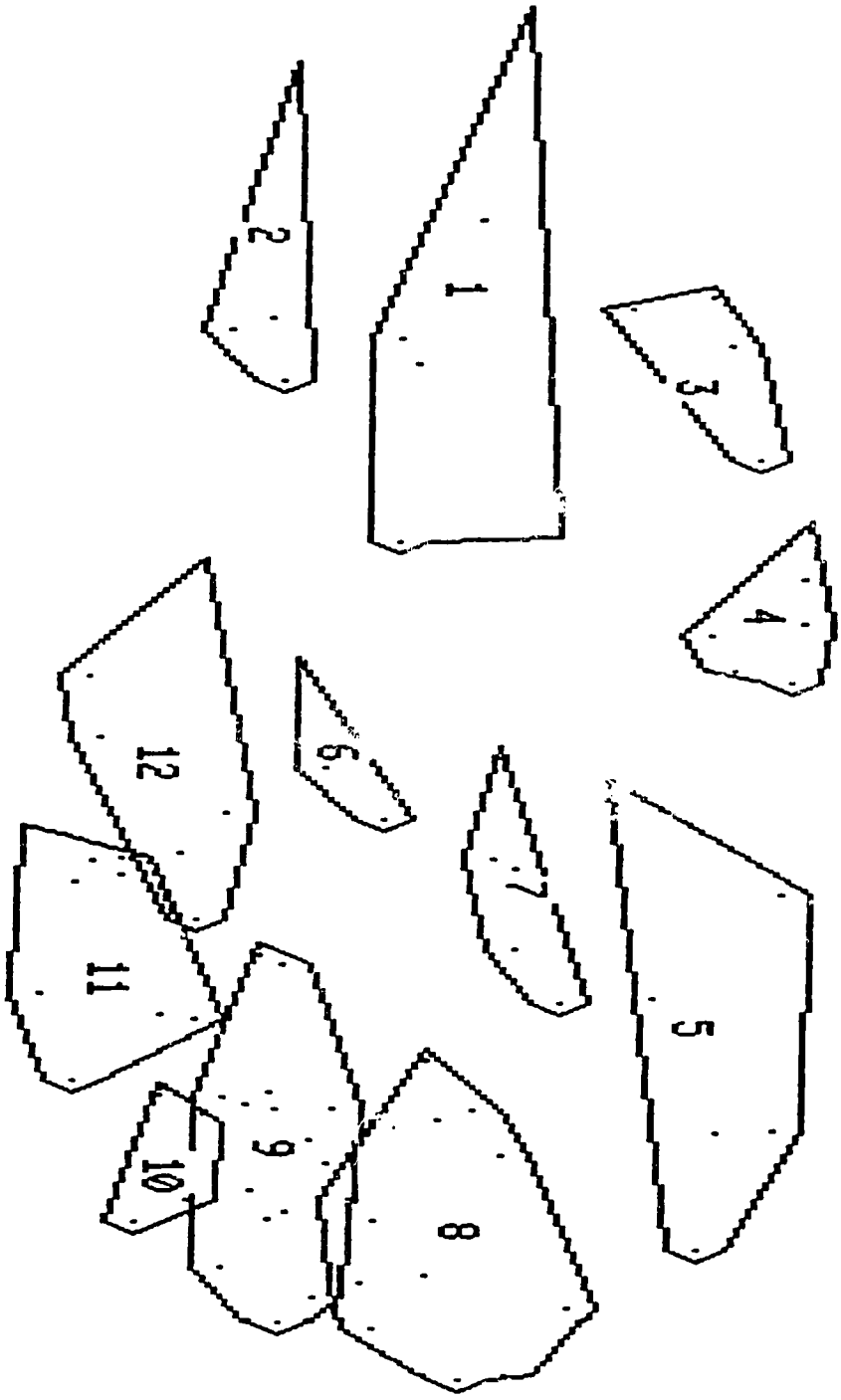
It is important to let people know where I am at and what my limitations are.	0.20
I have to accept that I need help to do some things.	0.20
The TENS unit is a better way to cope with pain than any prescription drug.	0.22
Once I have found my limits I have to stick to them.	0.23
I think that if you have a problem with drugs or alcohol it is important to get some kind of help.	0.38
Pain medication only masks pain which can lead to more damage in the long run.	0.39

The first step to improving my life is to get off the pain medication.	0.39
Cluster Average	**0.21**
Cluster #9	
When you understand the pain from your injury it helps you to deal with it better.	0.00
The most important thing to help cope is to accept the injury.	0.00
If my injury does not get better over time I will have to learn to live with it.	0.01
I know it is going to take a while to heal and I have accepted that.	0.02
It is helpful to be with other injured people as a start to getting motivated again.	0.02
Learning about my injury will help me deal with the injury better by helping me understand my limitations.	0.03
I believe it is important to pace myself.	0.03
I would need counselling or some form of help to learn to live with big changes in my lifestyle.	0.04
It doesn't do any good to think about pain all the time.	0.05
I think that talking to people about my injury and pain helps.	0.05
I can still be involved with my children even though I can't participate in as much physical activities with them.	0.05
Doing activities with my family is an important part of dealing with my injury.	0.06
It helps me deal with my injury when I compare it to others and realize that it could be much more serious.	0.12
I need to find my limits through trial and error.	0.13
I have to take it step by step and hope for the best.	0.19
Cluster Average	**0.05**
Cluster #10	
I can learn to control my pain to a certain degree if I have the proper training and I apply myself.	0.05

My pain is the same as it was but now I feel better.	0.05
I can use positive thoughts to focus away from the pain and get some relief.	0.07
You have to think positively and not think you can't make it because you have a sore back.	0.08
I know I can find some type of work even with my limitations.	0.19
Cluster Average	**0.09**
Cluster #11	
I can relieve stress by keeping busy with activities.	0.01
Being physically and mentally fit is the most important thing when you have constant back pain.	0.06
I am doing many things to compensate for stiffness and soreness.	0.06
Regular exercise and strengthening will improve my posture and stop some of the pain.	0.07
I may not get rid of some of the pain but I am going to get the best physical function that I can with what I have left.	0.07
Some good opportunity may still come out of this back injury.	0.08
By strengthening my back and abdominal muscles I can go over the bump and carry on.	0.10
Improving my overall fitness has got me feeling better both physically and mentally.	0.11
I think I can still participate in recreational activities to a lesser degree to stay involved.	0.12
I can coach or instruct to stay involved in recreational activities I can't participate in.	0.12
I have to cooperate and communicate with my therapists for my rehabilitation to be successful.	0.16
My rehabilitation program is helping.	0.17
I think my rehabilitation is a full-time job.	0.21
Being in poor physical condition (like being overweight) will increase my pain level.	0.22

I can use the resources available through WCB to help me find work.	0.31
WCB is an employer who is employing me to be rehabilitated.	0.34
It doesn't help to focus on the possibility that employers will be biased against workers who have been on WCB.	0.45
Cluster Average	**0.16**

12 CLUSTER MAP



12 CLUSTER SOLUTION

Cluster/Items	Bridging Index
Cluster #1	
I would have to have good odds before I would have surgery.	0.43
If you have done the things that I have over the years you can expect to have a worn out back.	0.46
I think I can control the pain by doing the same activities and work I was doing before the injury.	0.58
I don't wa[illegible] to think I have a serious back injury so I put it out of my mind.	0.62
I kept working after the original injury because I didn't think it was serious.	0.82
The worst thing that could happen is that I would have to go in for a back operation.	0.83
ver[illegible]ge	**0.63**
[illegible] #2	
If I was more physicaliy fit I would not be in this position.	0.60
I think that by working through excessive pain I can prevent losing my job.	0.61
I have to go back to work and that's all there is to it.	0.64
Sports are my life.	1.00
Cluster Average	**0.71**
Cluster #3	
It is my fault [illegible]hat I am in pain.	0.43
I think I can become paralysed because of the injury.	0.47
I don't know when to stop activities because I am not sure if the pain is caused by a normal reaction to exercise or because I am doing further harm to my back.	0.60
Specialists just tried to ship me out as quickly as possible without providing a good explanation about my injury.	0.61

Cluster Average	**0.53**
Cluster #4	
At times I think there is no way to control the pain.	0.35
When I am having a pain flare-up I need it to stop immediately.	0.38
People don't want to have much to do with me because they are scared that I will hurt myself.	0.39
It has been difficult being around healthy people because they can do activities I can't do because I might hurt myself.	0.40
I think pain is depressing.	0.41
I have to limit how close I stay to friends so I don't put pressure on them to make sure I am enjoying myself.	0.41
Cluster Average	**0.39**
Cluster #5	
I don't do things that I think will hurt me and this can keep me from doing things I might be able to do.	0.36
At times pain can hurt or effect my family as much as it does me.	0.40
I can get addicted to medications that have codeine in them.	0.41
Taking too much pain medication can cause me to focus more on the pain.	0.46
There is no prescription drug that can get rid of pain without causing some type of problem.	0.46
At times when I am having pain so severe I have to take some pain medications.	0.48
Cluster Average	**0.43**
Cluster #6	
Having had a bad pain flare-up makes the next one easier to deal with.	0.18
There is going to be a time when it gets worse before it gets better.	0.20
I would rather change to some form of lighter work and live with what I have than have back surgery.	0.30

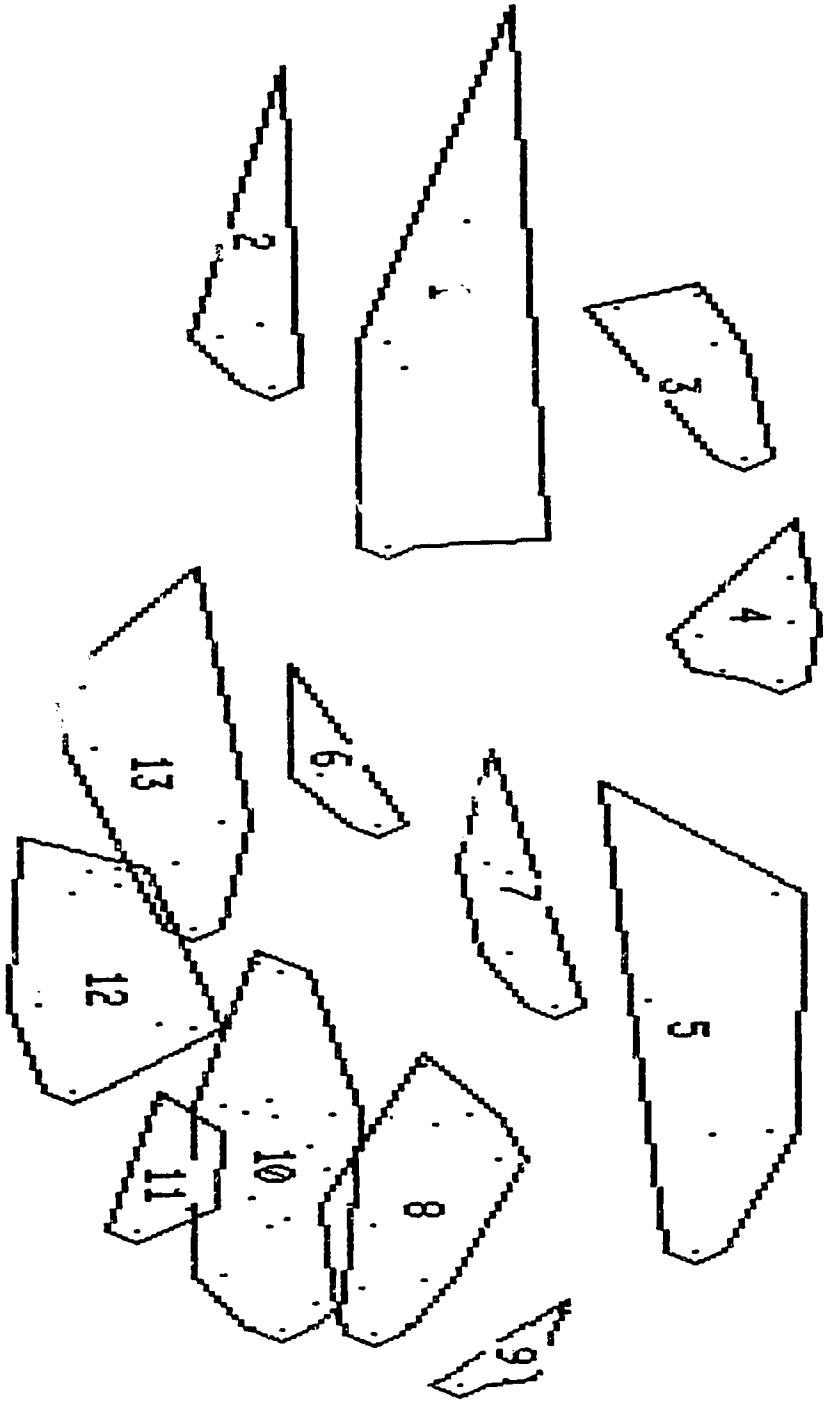
Cluster Average	**0.23**
Cluster #7	
My back injury can contribute to pain in other parts of my body.	0.24
I can't control my back condition with heat or other temporary kinds of relief because it will eventually get worse if I don't modify my activities.	0.25
I don't think I will ever be 100%.	0.27
At times my mood can really bring on the pain more than what I am doing physically.	0.30
I distract myself from the pain by watching a lot of television and it helps me cope with the pain.	0.32
Cluster Average	**0.28**
Cluster #8	
I have to change my lifestyle to a degree to accommodate my limitations.	0.05
My limits are different for different situations and depend upon what I am doing.	0.08
I am still learning the things that I can and can't do.	0.11
Holding things in that are bothering me can create pain in other areas of my body.	0.13
People with back injuries have to cope with big changes in their lives.	0.16
It is important to let people know where I am at and what my limitations are.	0.20
I have to accept that I need help to do some things.	0.20
The TENS unit is a better way to cope with pain than any prescription drug.	0.22
Once I have found my limits I have to stick to them.	0.23
I think that if you have a problem with drugs or alcohol it is important to get some kind of help.	0.38
Pain medication only masks pain which can lead to more damage in the long run.	0.39

The first step to improving my life is to get off the pain medication.	0.39
Cluster Average	**0.21**
Cluster #9	
The most important thing to help cope is to accept the injury.	0.00
When you understand the pain from your injury it helps you to deal with it better.	0.00
If my injury does not get better over time I will have to learn to live with it.	0.01
It is helpful to be with other injured people as a start to getting motivated again.	0.02
I know it is going to take a while to heal and I have accepted that.	0.02
Learning about my injury will help me deal with the injury better by helping me understand my limitations.	0.03
I believe it is important to pace myself.	0.03
I would need counselling or some form of help to learn to live with big changes in my lifestyle.	0.04
I think that talking to people about my injury and pain helps.	0.05
It doesn't do any good to think about pain all the time.	0.05
I can still be involved with my children even though I can't participate in as much physical activities with them.	0.05
Doing activities with my family is an important part of dealing with my injury.	0.06
It helps me deal with my injury when I compare it to others and realize that it could be much more serious.	0.12
I need to find my limits through trial and error.	0.13
I have to take it step by step and hope for the best.	0.19
Cluster Average	**0.05**
Cluster #10	
I can learn to control my pain to a certain degree if I have the proper training and I apply myself.	0.05

My pain is the same as it was but now I feel better.	0.05
I can use positive thoughts to focus away from the pain and get some relief.	0.07
You have to think positively and not think you can't make it because you have a sore back.	0.08
I know I can find some type of work even with my limitations.	0.19
Cluster Average	**0.11**
Cluster #11	
I can relieve stress by keeping busy with activities.	0.01
Being physically and mentally fit is the most important thing when you have constant back pain.	0.06
Regular exercise and strengthening will improve my posture and stop some of the pain.	0.07
I may not get rid of some of the pain but I am going to get the best physical function that I can with what I have left.	0.07
Some good opportunity may still come out of this back injury.	0.08
By strengthening my back and abdominal muscles I can go over the hump and carry on.	0.10
Improving my overall fitness has got me feeling better both physically and mentally.	0.11
I have to cooperate and communicate with my therapists for my rehabilitation to be successful.	0.16
My rehabilitation program is helping.	0.17
I can use the resources available through WCB to help me find work.	0.31
Cluster Average	**0.11**
Cluster #12	
I am doing many things to compensate for stiffness and soreness.	0.06
I can coach or instruct to stay involved in recreational activities I can't participate in.	0.12

I think I can still participate in recreational activities to a lesser degree to stay involved.	0.12
I think my rehabilitation is a full-time job.	0.21
Being in poor physical condition (like being overweight) will increase my pain level.	0.22
WCB is an employer who is employing me to be rehabilitated.	0.34
It doesn't help to focus on the possibility that employers will be biased against workers who have been on WCB.	0.45
Cluster Average	**0.22**

13 CLUSTER MAP



13 CLUSTER SOLUTION

Cluster/Items	Bridging Index
Cluster #1	
I would have to have good odds before I would have surgery.	0.43
If you have done the things that I have over the years you can expect to have a worn out back.	0.46
I think I can control the pain by doing the same activities and work I was doing before the injury.	0.58
I don't want to think I have a serious back injury so I put it out of my mind.	0.62
I kept working after the original injury because I didn't think it was serious.	0.82
The worst thing that could happen is that I would have to go in for a back operation.	0.83
Cluster Average	**0.63**
Cluster #2	
If I was more physically fit I would not be in this position.	0.60
I think that by working through excessive pain I can prevent losing my job.	0.61
I have to go back to work and that's all there is to it.	0.64
Sports are my life.	1.00
Cluster Average	**0.71**
Cluster #3	
It is my fault that I am in pain.	0.43
I think I can become paralysed because of the injury.	0.47
I don't know when to stop activities because I am not sure if the pain is caused by a normal reaction to exercise or because I am doing further harm to my back.	0.60
Specialists just tried to ship me out as quickly as possible without providing a good explanation about my injury.	0.61

Cluster Average	**0.53**
Cluster #4	
At times I think there is no way to control the pain.	0.35
When I am having a pain flare-up I need it to stop immediately.	0.38
People don't want to have much to do with me because they are scared that I will hurt myself.	0.39
It has been difficult being around healthy people because they can do activities I can't do because I might hurt myself.	0.40
I think pain is depressing.	0.41
I have to limit how close I stay to friends so I don't put pressure on them to make sure I am enjoying myself.	0.41
Cluster Average	**0.39**
Cluster #5	
I don't do things that I think will hurt me and this can keep me from doing things I might be able to do.	0.36
At times pain can hurt or effect my family as much as it does me.	0.40
I can get addicted to medications that have codeine in them.	0.41
Taking too much pain medication can cause me to focus more on the pain.	0.46
There is no prescription drug that can get rid of pain without causing some type of problem.	0.46
At times when I am having pain so severe I have to take some pain medications.	0.48
Cluster Average	**0.43**
Cluster #6	
Having had a bad pain flare-up makes the next one easier to deal with.	0.18
There is going to be a time when it gets worse before it gets better.	0.20
I would rather change to some form of lighter work and live with what I have than have back surgery.	0.30

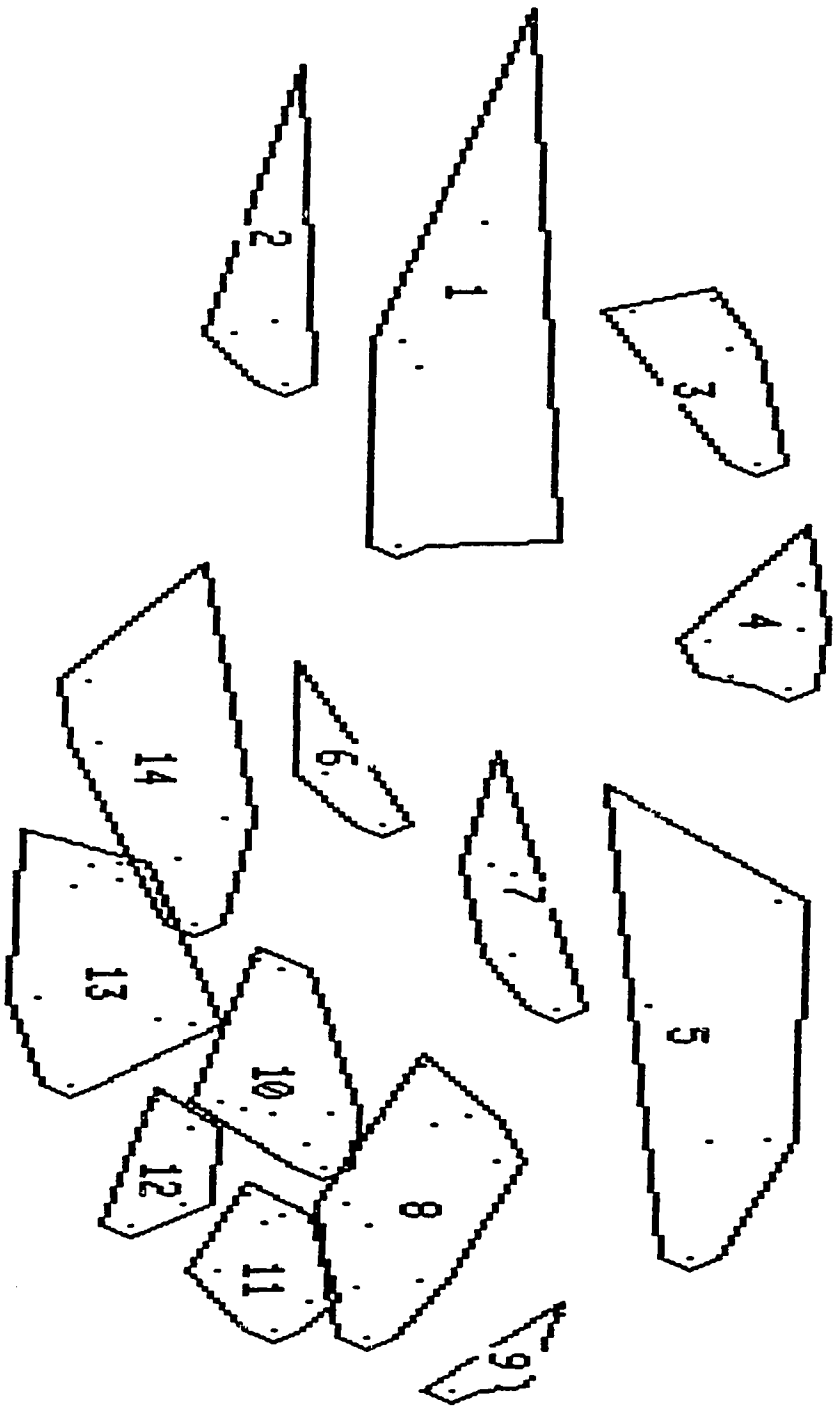
Cluster Average	**0.23**
Cluster #7	
My back injury can contribute to pain in other parts of my body.	0.24
I can't control my back condition with heat or other temporary kinds of relief because it will eventually get worse if I don't modify my activities.	0.25
I don't think I will ever be 100%.	0.27
At times my mood can really bring on the pain more than what I am doing physically.	0.30
I distract myself from the pain by watching a lot of television and it helps me cope with the pain.	0.32
Cluster Average	**0.28**
Cluster #8	
I have to change my lifestyle to a degree to accommodate my limitations.	0.05
My limits are different for different situations and depend upon what I am doing.	0.08
I am still learning the things that I can and can't do.	0.11
Holding things in that are bothering me can create pain in other areas of my body.	0.13
People with back injuries have to cope with big changes in their lives.	0.16
It is important to let people know where I am at and what my limitations are.	0.20
I have to accept that I need help to do some things.	0.20
The TENS unit is a better way to cope with pain than any prescription drug.	0.22
Once I have found my limits I have to stick to them.	0.23
Cluster Average	**0.15**

Cluster #9	
I think that if you have a problem with drugs or alcohol it is important to get some kind of help.	0.38
Pain medication only masks pain which can lead to more damage in the long run.	0.39
The first step to improving my life is to get off the pain medication.	0.39
Cluster Average	**0.39**
Cluster #10	
The most important thing to help cope is to accept the injury.	0.00
When you understand the pain from your injury it helps you to deal with it better.	0.00
If my injury does not get better over time I will have to learn to live with it.	0.01
It is helpful to be with other injured people as a start to getting motivated again.	0.02
I know it is going to take a while to heal and I have accepted that.	0.02
Learning about my injury will help me deal with the injury better by helping me understand my limitations.	0.03
I believe it is important to pace myself.	0.03
I would need counselling or some form of help to learn to live with big changes in my lifestyle.	0.04
I think that talking to people about my injury and pain helps.	0.05
It doesn't do any good to think about pain all the time.	0.05
I can still be involved with my children even though I can't participate in as much physical activities with them.	0.05
Doing activities with my family is an important part of dealing with my injury.	0.06
It helps me deal with my injury when I compare it to others and realize that it could be much more serious.	0.12
I need to find my limits through trial and error.	0.13

I have to take it step by step and hope for the best.	0.19
Cluster Average	**0.05**
Cluster #11	
I can learn to control my pain to a certain degree if I have the proper training and I apply myself.	0.05
My pain is the same as it was but now I feel better.	0.05
I can use positive thoughts to focus away from the pain and get some relief.	0.07
You have to think positively and not think you can't make it because you have a sore back.	0.08
I know I can find some type of work even with my limitations.	0.19
Cluster Average	**0.09**
Cluster #12	
I can relieve stress by keeping busy with activities.	0.01
Being physically and mentally fit is the most important thing when you have constant back pain.	0.06
Regular exercise and strengthening will improve my posture and stop some of the pain.	0.07
I may not get rid of some of the pain but I am going to get the best physical function that I can with what I have left.	0.07
Some good opportunity may still come out of this back injury.	0.08
By strengthening my back and abdominal muscles I can go over the hump and carry on.	0.10
Improving my overall fitness has got me feeling better both physically and mentally.	0.11
I have to cooperate and communicate with my therapists for my rehabilitation to be successful.	0.16
My rehabilitation program is helping.	0.17
I can use the resources available through WCB to help me find work.	0.31
Cluster Average	**0.11**

Cluster #13	
I am doing many things to compensate for stiffness and soreness.	0.06
I can coach or instruct to stay involved in recreational activities I can't participate in.	0.12
I think I can still participate in recreational activities to a lesser degree to stay involved.	0.12
I think my rehabilitation is a full-time job.	0.21
Being in poor physical condition (like being overweight) will increase my pain level.	0.22
WCB is an employer who is employing me to be rehabilitated.	0.34
It doesn't help to focus on the possibility that employers will be biased against workers who have been on WCB.	0.45
Cluster Average	**0.22**

14 CLUSTER MAP



14 CLUSTER SOLUTION

Cluster/Items	Bridging Index
Cluster #1	
I would have to have good odds before I would have surgery.	0.43
If you have done the things that I have over the years you can expect to have a worn out back.	0.46
I think I can control the pain by doing the same activities and work I was doing before the injury.	0.58
I don't want to think I have a serious back injury so I put it out of my mind.	0.62
I kept working after the original injury because I didn't think it was serious.	0.82
The worst thing that could happen is that I would have to go in for a back operation.	0.83
Cluster Average	**0.63**
Cluster #2	
If I was more physically fit I would not be in this position.	0.60
I think that by working through excessive pain I can prevent losing my job.	0.61
I have to go back to work and that's all there is to it.	0.64
Sports are my life.	1.00
Cluster Average	**0.71**
Cluster #3	
It is my fault that I am in pain.	0.43
I think I can become paralysed because of the injury.	0.47
I don't know when to stop activities because I am not sure if the pain is caused by a normal reaction to exercise or because I am doing further harm to my back.	0.60
Specialists just tried to ship me out as quickly as possible without providing a good explanation about my injury.	0.61

Cluster Average	**0.53**
Cluster #4	
At times I think there is no way to control the pain.	0.35
When I am having a pain flare-up I need it to stop immediately.	0.38
People don't want to have much to do with me because they are scared that I will hurt myself.	0.39
It has been difficult being around healthy people because they can do activities I can't do because I might hurt myself.	0.40
I have to limit how close I stay to friends so I don't put pressure on them to make sure I am enjoying myself.	0.41
I think pain is depressing.	0.41
Cluster Average	**0.39**
Cluster #5	
I don't do things that I think will hurt me and this can keep me from doing things I might be able to do.	0.36
At times pain can hurt or effect my family as much as it does me.	0.40
I can get addicted to medications that have codeine in them.	0.41
Taking too much pain medication can cause me to focus more on the pain.	0.46
There is no prescription drug that can get rid of pain without causing some type of problem.	0.46
At times when I am having pain so severe I have to take some pain medications.	0.48
Cluster Average	**0.43**
Cluster #6	
Having had a bad pain flare-up makes the next one easier to deal with.	0.18
There is going to be a time when it gets worse before it gets better.	0.20
I would rather change to some form of lighter work and live with what I have than have back surgery.	0.30

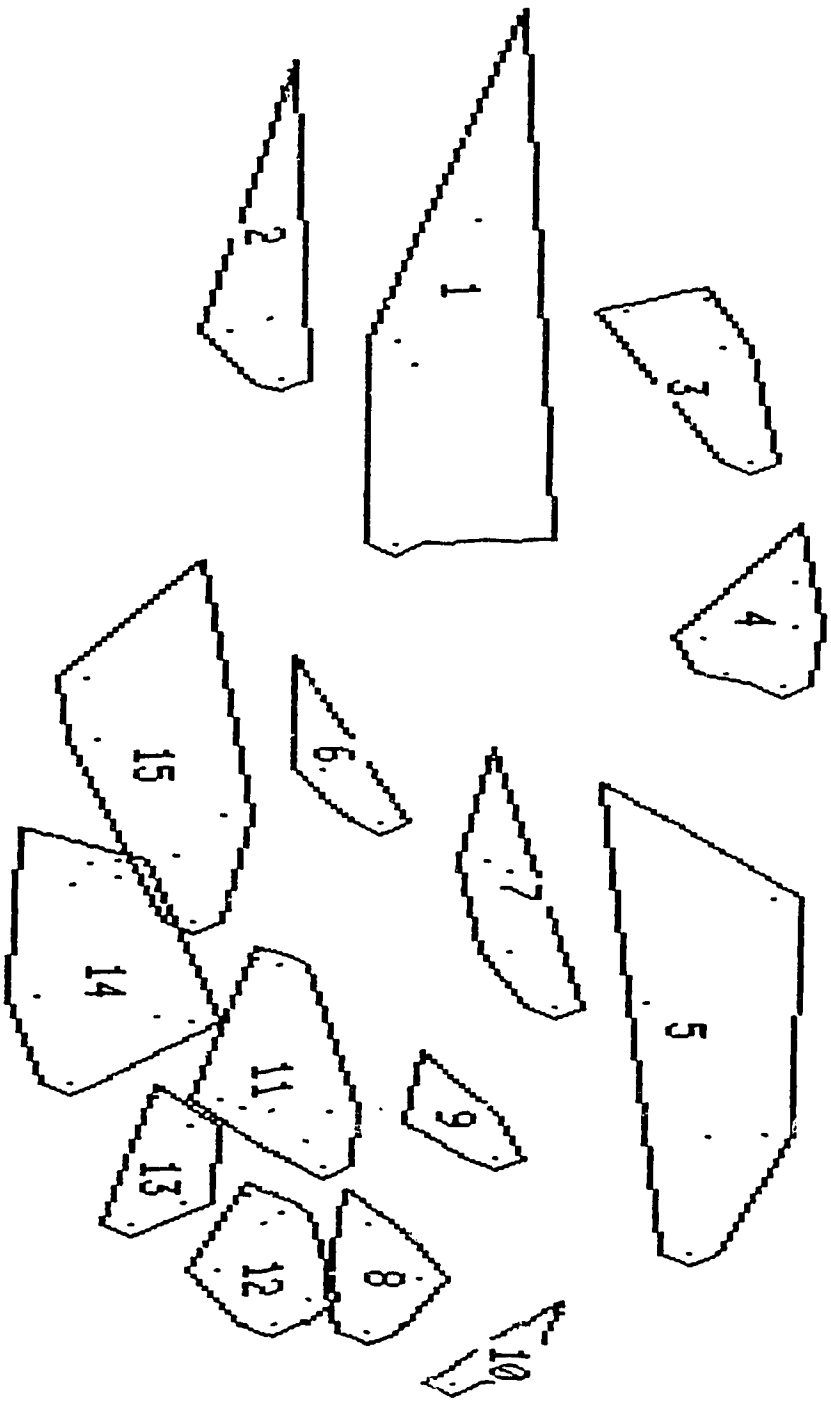
Cluster Average	**0.23**
Cluster #7	
My back injury can contribute to pain in other parts of my body.	0.24
I can't control my back condition with heat or other temporary kinds of relief because it will eventually get worse if I don't modify my activities.	0.25
I don't think I will ever be 100%.	0.27
At times my mood can really bring on the pain more than what I am doing physically.	0.30
I distract myself from the pain by watching a lot of television and it helps me cope with the pain.	0.32
Cluster Average	**0.28**
Cluster #8	
I have to change my lifestyle to a degree to accommodate my limitations.	0.05
My limits are different for different situations and depend upon what I am doing.	0.08
I am still learning the things that I can and can't do.	0.11
Holding things in that are bothering me can create pain in other areas of my body.	0.13
People with back injuries have to cope with big changes in their lives.	0.16
I have to accept that I need help to do some things.	0.20
It is important to let people know where I am at and what my limitations are.	0.20
The TENS unit is a better way to cope with pain than any prescription drug.	0.22
Once I have found my limits I have to stick to them.	0.23
Cluster Average	**0.15**

Cluster #9	
I think that if you have a problem with drugs or alcohol it is important to get some kind of help.	0.38
The first step to improving my life is to get off the pain medication.	0.39
Pain medication only masks pain which can lead to more damage in the long run.	0.39
Cluster Average	**0.39**
Cluster #10	
When you understand the pain from your injury it helps you to deal with it better.	0.00
If my injury does not get better over time I will have to learn to live with it.	0.01
It is helpful to be with other injured people as a start to getting motivated again.	0.02
I believe it is important to pace myself.	0.03
I would need counselling or some form of help to learn to live with big changes in my lifestyle.	0.04
I think that talking to people about my injury and pain helps.	0.05
I can still be involved with my children even though I can't participate in as much physical activities with them.	0.05
It doesn't do any good to think about pain all the time.	0.05
Doing activities with my family is an important part of dealing with my injury.	0.06
Cluster Average	**0.03**
Cluster #11	
The most important thing to help cope is to accept the injury.	0.00
I know it is going to take a while to heal and I have accepted that.	0.02
Learning about my injury will help me deal with the injury better by helping me understand my limitations.	0.03

It helps me deal with my injury when I compare it to others and realize that it could be much more serious.	0.12
I need to find my limits through trial and error.	0.13
I have to take it step by step and hope for the best.	0.19
Cluster Average	**0.08**
Cluster #12	
I can learn to control my pain to a certain degree if I have the proper training and I apply myself.	0.05
My pain is the same as it was but now I feel better.	0.05
I can use positive thoughts to focus away from the pain and get some relief.	0.07
You have to think positively and not think you can't make it because you have a sore back.	0.08
I know I can find some type of work even with my limitations.	0.19
Cluster Average	**0.09**
Cluster #13	
I can relieve stress by keeping busy with activities.	0.01
Being physically and mentally fit is the most important thing when you have constant back pain.	0.06
I may not get rid of some of the pain but I am going to get the best physical function that I can with what I have left.	0.07
Regular exercise and strengthening will improve my posture and stop some of the pain.	0.07
Some good opportunity may still come out of this back injury.	0.08
By strengthening my back and abdominal muscles I can go over the hump and carry on.	0.10
Improving my overall fitness has got me feeling better both physically and mentally.	0.11
I have to cooperate and communicate with my therapists for my rehabilitation to be successful.	0.16
My rehabilitation program is helping.	0.17

I can use the resources available through WCB to help me find work.	0.31
Cluster Average	**0.11**
Cluster #14	
I am doing many things to compensate for stiffness and soreness.	0.06
I think I can still participate in recreational activities to a lesser degree to stay involved.	0.12
I can coach or instruct to stay involved in recreational activities I can't participate in.	0.12
I think my rehabilitation is a full-time job.	0.21
Being in poor physical condition (like being overweight) will increase my pain level.	0.22
WCB is an employer who is employing me to be rehabilitated.	0.34
It doesn't help to focus on the possibility that employers will be biased against workers who have been on WCB.	0.45
Cluster Average	**0.22**

15 CLUSTER MAP



15 CLUSTER SOLUTION

Cluster/Items	Bridging Index
Cluster #1	
I would have to have good odds before I would have surgery.	0.43
If you have done the things that I have over the years you can expect to have a worn out back.	0.46
I think I can control the pain by doing the same activities and work I was doing before the injury.	0.58
I don't want to think I have a serious back injury so I put it out of my mind.	0.62
I kept working after the original injury because I didn't think it was serious.	0.82
The worst thing that could happen is that I would have to go in for a back operation.	0.83
Cluster Average	**0.63**
Cluster #2	
If I was more physically fit I would not be in this position.	0.60
I think that by working through excessive pain I can prevent losing my job.	0.61
I have to go back to work and that's all there is to it.	0.64
Sports are my life.	1.00
Cluster Average	**0.71**
Cluster #3	
It is my fault that I am in pain.	0.43
I think I can become paralysed because of the injury.	0.47
I don't know when to stop activities because I am not sure if the pain is caused by a normal reaction to exercise or because I am doing further harm to my back.	0.60
Specialists just tried to ship me out as quickly as possible without providing a good explanation about my injury.	0.61

Cluster Average	**0.53**
Cluster #4	
At times I think there is no way to control the pain.	0.35
When I am having a pain flare-up I need it to stop immediately.	0.38
People don't want to have much to do with me because they are scared that I will hurt myself.	0.39
It has been difficult being around healthy people because they can do activities I can't do because I might hurt myself.	0.40
I have to limit how close I stay to friends so I don't put pressure on them to make sure I am enjoying myself.	0.41
I think pain is depressing.	0.41
Cluster Average	**0.39**
Cluster #5	
I don't do things that I think will hurt me and this can keep me from doing things I might be able to do.	0.36
At times pain can hurt or effect my family as much as it does me.	0.40
I can get addicted to medications that have codeine in them.	0.41
Taking too much pain medication can cause me to focus more on the pain.	0.46
There is no prescription drug that can get rid of pain without causing some type of problem.	0.46
At times when I am having pain so severe I have to take some pain medications.	0.48
Cluster Average	**0.43**
Cluster #6	
Having had a bad pain flare-up makes the next one easier to deal with.	0.18
There is going to be a time when it gets worse before it gets better.	0.20
I would rather change to some form of lighter work and live with what I have than have back surgery.	0.30

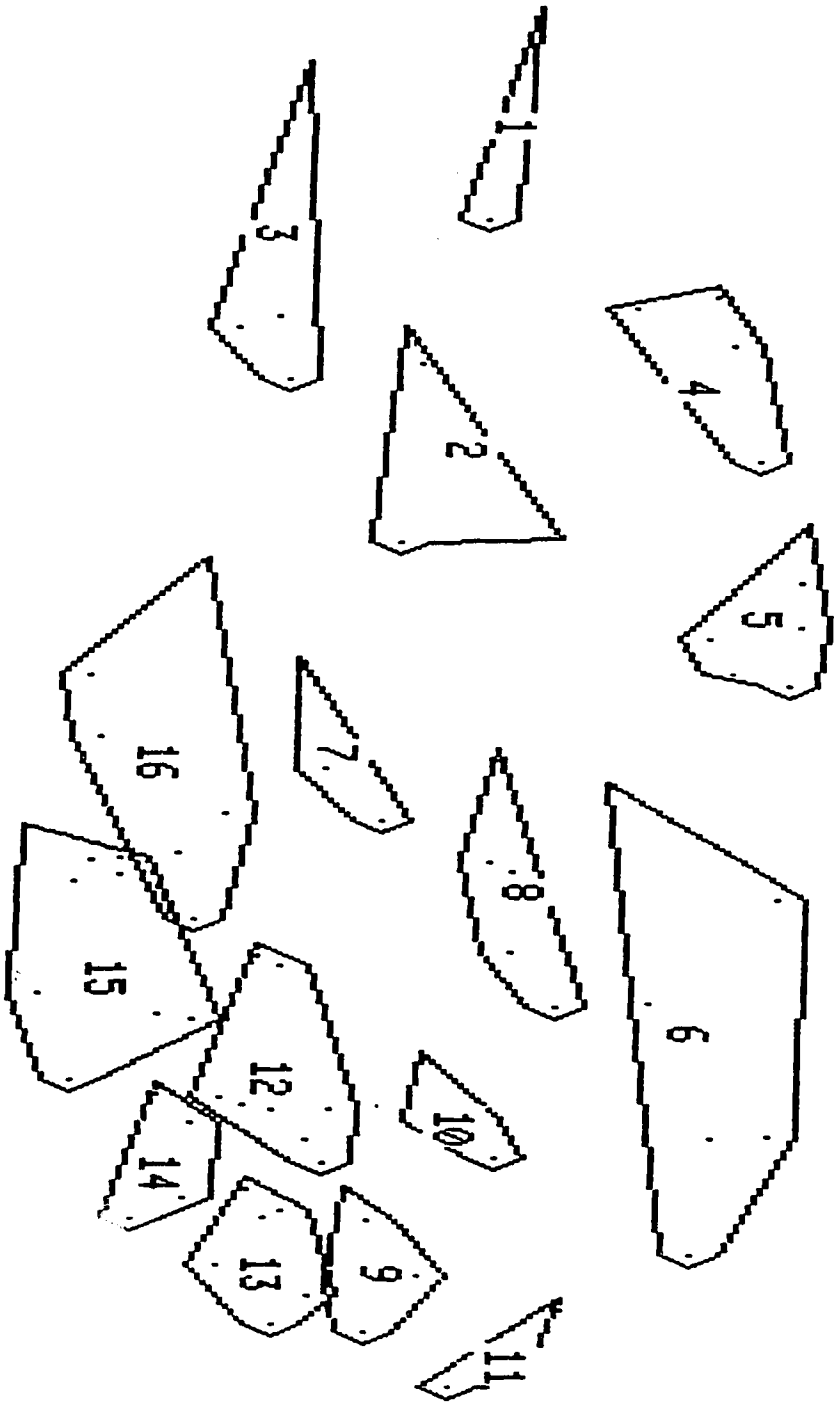
Cluster Average	**0.23**
Cluster #7	
My back injury can contribute to pain in other parts of my body.	0.24
I can't control my back condition with heat or other temporary kinds of relief because it will eventually get worse if I don't modify my activities.	0.25
I don't think I will ever be 100%.	0.27
At times my mood can really bring on the pain more than what I am doing physically.	0.30
I distract myself from the pain by watching a lot of television and it helps me cope with the pain.	0.32
Cluster Average	**0.28**
Cluster #8	
I have to change my lifestyle to a degree to accommodate my limitations.	0.05
My limits are different for different situations and depend upon what I am doing.	0.08
I am still learning the things that I can and can't do.	0.11
It is important to let people know where I am at and what my limitations are.	0.20
I have to accept that I need help to do some things.	0.20
Cluster Average	**0.13**
Cluster #9	
Holding things in that are bothering me can create pain in other areas of my body.	0.13
People with back injuries have to cope with big changes in their lives.	0.16
The TENS unit is a better way to cope with pain than any prescription drug.	0.22
Once I have found my limits I have to stick to them.	0.23
Cluster Average	**0.19**

Cluster #10	
I think that if you have a problem with drugs or alcohol it is important to get some kind of help.	0.38
Pain medication only masks pain which can lead to more damage in the long run.	0.39
The first step to improving my life is to get off the pain medication.	0.39
Cluster Average	**0.39**
Cluster #11	
When you understand the pain from your injury it helps you to deal with it better.	0.00
If my injury does not get better over time I will have to learn to live with it.	0.01
It is helpful to be with other injured people as a start to getting motivated again.	0.02
I believe it is important to pace myself.	0.03
I would need counselling or some form of help to learn to live with big changes in my lifestyle.	0.04
I can still be involved with my children even though I can't participate in as much physical activities with them.	0.05
I think that talking to people about my injury and pain helps.	0.05
It doesn't do any good to think about pain all the time.	0.05
Doing activities with my family is an important part of dealing with my injury.	0.06
Cluster Average	**0.03**
Cluster #12	
The most important thing to help cope is to accept the injury.	0.00
I know it is going to take a while to heal and I have accepted that.	0.02
Learning about my injury will help me deal with the injury better by helping me understand my limitations.	0.03

It helps me deal with my injury when I compare it to others and realize that it could be much more serious.	0.12
I need to find my limits through trial and error.	0.13
I have to take it step by step and hope for the best.	0.19
Cluster Average	**0.08**
Cluster #13	
I can learn to control my pain to a certain degree if I have the proper training and I apply myself.	0.05
My pain is the same as it was but now I feel better.	0.05
I can use positive thoughts to focus away from the pain and get some relief.	0.07
You have to think positively and not think you can't make it because you have a sore back.	0.08
I know I can find some type of work even with my limitations.	0.19
Cluster Average	**0.09**
Cluster #14	
I can relieve stress by keeping busy with activities.	0.01
Being physically and mentally fit is the most important thing when you have constant back pain.	0.06
I may not get rid of some of the pain but I am going to get the best physical function that I can with what I have left.	0.07
Regular exercise and strengthening will improve my posture and stop some of the pain.	0.07
Some good opportunity may still come out of this back injury.	0.08
By strengthening my back and abdominal muscles I can go over the hump and carry on.	0.10
Improving my overall fitness has got me feeling better both physically and mentally.	0.11
I have to cooperate and communicate with my therapists for my rehabilitation to be successful.	0.16
My rehabilitation program is helping.	0.17

I can use the resources available through WCB to help me find work.	0.31
Cluster Average	**0.11**
Cluster #15	
I am doing many things to compensate for stiffness and soreness.	0.06
I think I can still participate in recreational activities to a lesser degree to stay involved.	0.12
I can coach or instruct to stay involved in recreational activities I can't participate in.	0.12
I think my rehabilitation is a full-time job.	0.21
Being in poor physical condition (like being overweight) will increase my pain level.	0.22
WCB is an employer who is employing me to be rehabilitated.	0.34
It doesn't help to focus on the possibility that employers will be biased against workers who have been on WCB.	0.45
Cluster Average	**0.22**

16 CLUSTER MAP



16 CLUSTER SOLUTION

Cluster/Items	Bridging Index
Cluster #1	
I kept working after the original injury because I didn't think it was serious.	0.82
The worst thing that could happen is that I would have to go in for a back operation.	0.83
Cluster Average	**0.83**
Cluster #2	
I would have to have good odds before I would have surgery.	0.43
If you have done the things that I have over the years you can expect to have a worn out back.	0.46
I think I can control the pain by doing the same activities and work I was doing before the injury.	0.58
I don't want to think I have a serious back injury so I put it out of my mind.	0.62
Cluster Average	**0.53**
Cluster #3	
If I was more physically fit I would not be in this position.	0.60
I think that by working through excessive pain I can prevent losing my job.	0.61
I have to go back to work and that's all there is to it.	0.64
Sports are my life.	1.00
Cluster Average	**0.71**
Cluster #4	
It is my fault that I am in pain.	0.43
I think I can become paralysed because of the injury.	0.47

I don't know when to stop activities because I am not sure if the pain is caused by a normal reaction to exercise or because I am doing further harm to my back.	0.60
Specialists just tried to ship me out as quickly as possible without providing a good explanation about my injury.	0.61
Cluster Average	**0.53**
Cluster #5	
At times I think there is no way to control the pain.	0.35
When I am having a pain flare-up I need it to stop immediately.	0.38
People don't want to have much to do with me because they are scared that I will hurt myself.	0.39
It has been difficult being around healthy people because they can do activities I can't do because I might hurt myself.	0.40
I think pain is depressing.	0.41
I have to limit how close I stay to friends so I don't put pressure on them to make sure I am enjoying myself.	0.41
Cluster Average	**0.39**
Cluster #6	
I don't do things that I think will hurt me and this can keep me from doing things I might be able to do.	0.36
At times pain can hurt or effect my family as much as it does me.	0.40
I can get addicted to medications that have codeine in them.	0.41
Taking too much pain medication can cause me to focus more on the pain.	0.46
There is no prescription drug that can get rid of pain without causing some type of problem.	0.46
At times when I am having pain so severe I have to take some pain medications.	0.48
Cluster Average	**0.43**
Cluster #7	

Having had a bad pain flare-up makes the next one easier to deal with.	0.18
There is going to be a time when it gets worse before it gets better.	0.20
I would rather change to some form of lighter work and live with what I have than have back surgery.	0.30
Cluster Average	**0.23**
Cluster #8	
My back injury can contribute to pain in other parts of my body.	0.24
I can't control my back condition with heat or other temporary kinds of relief because it will eventually get worse if I don't modify my activities.	0.25
I don't think I will ever be 100%.	0.27
At times my mood can really bring on the pain more than what I am doing physically.	0.30
I distract myself from the pain by watching a lot of television and it helps me cope with the pain.	0.32
Cluster Average	**0.28**
Cluster #9	
I have to change my lifestyle to a degree to accommodate my limitations.	0.05
My limits are different for different situations and depend upon what I am doing.	0.08
I am still learning the things that I can and can't do.	0.11
I have to accept that I need help to do some things.	0.20
It is important to let people know where I am at and what my limitations are.	0.20
Cluster Average	**0.13**
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