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Prediction of Treatment Response in Chronic Pain Patients: The Relationship Between Illness Behavior and Self-Concept

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PREDICTION OF TREATMENT RESPONSE IN CHRONIC PAIN PATIENTS:
THE RELATIONSHIP BETWEEN ILLNESS BEHAVIOR AND SELF-CONCEPT

by

ANDREW ROSENBLUM

A dissertation submitted to the Graduate Faculty in
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Abstract

PREDICTION OF TREATMENT RESPONSE IN CHRONIC PAIN
PATIENTS: THE RELATIONSHIP BETWEEN ILLNESS BEHAVIOR AND
SELF-CONCEPT

by

Andrew Rosenblum

Adviser: Professor Howard Ehrlichman

This study investigated self-concepts held by
chronic pain patients. It was hypothesized that self
schemas of probable and ideal levels of control,
dependence on medical care, physical vulnerability,
affiliation and conflict with physicians would predict
response to treatment.

At intake into a three week in-patient program 72
pain patients were given a self perception scale which
measured these five dimensions across three "possible
selves" (now self, probable self and ideal self).
Patients were also given at intake, and at follow-up (5
weeks after discharge), a battery of psychological and
behavioral measures. Control, dependence on medical
care, and vulnerability (CDV) were identified as the
three most important constructs since patients rated
themselves lower and identified themselves more

frequently on these dimensions than they did on
affiliation or conflict with physicians. Three types
of analyses of outcome were conducted. 1) Follow-up
measures were regressed upon the three CDV scales, a
global measure of optimism and a measure of negative
affectivity. Negative affectivity was found to be the
measure most consistently related to changes in mood
and pain; and Probable Self was found to be the best
predictor of behavioral improvement. 2) Patients'
subjective estimates of improvement showed the
strongest pattern of correlations with Self and
Probable Self. 3) Differences in the intake scores of
patients identified at follow-up as active (N=23) and
inactive (N=33) were also examined. Probable Self and
Ideal Self discriminated between active and inactive
patients. Now Self was marginally related to active
status at follow-up. Negative affectivity, optimism,
mood, self-esteem, pain and physical activities at
intake were unrelated to active status at follow-up.
Implications for the importance of a domain specific
measure of a self-schema of future functioning are
discussed.

ACKNOWLEDGMENTS

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Introduction

This research was designed to assess the role of self-concept in the recovery of chronic pain patients. These patients typically show limitations in physical activity, reduced capacity or inability to work, sleep disturbances, depression, increased number of medical contacts and dependence on narcotics or other contraindicated medications. Although only a few studies have directly assessed the self-concept of chronic pain patients these patients are usually described as having low self-esteem, and viewing themselves as entitled to solicitous care and incapable of healthy functioning (e.g., Fordyce, 1985; Ng, 1981; Sternbach, 1974). Recent developments, such as a link between stressful cognitions and EMG disturbances in the lower back (Flor, Turk, & Birbaumer, 1985), the frequency of cognitive errors in depressed lower back pain patients (Lefebvre, 1981), and elevated self/ideal-self discrepancy as a predictor of favorable response to treatment (Large, 1985) have emphasized the role of cognitive factors among chronic pain patients.

The Chronic Pain Patient

Chronic pain is distinct from acute pain. Acute pain is self-limiting, and directly related to tissue damage. Chronic pain is typically defined as benign but intractable, of several or more months duration, for which pain behavior appears disproportionate to actual tissue damage, and which has remained unresponsive to conventional medical treatment (Blackwell, Galbraith, & Dahl, 1984). In the past two decades there has been a remarkable shift from the consideration of peripheral factors, such as tissue damage, to that of central, psychological, and social factors in chronic pain (Blumer & Heilbronn, 1982; Melzack, 1973). The current literature shows an appreciation of neurochemical activity (Hendler, 1982), social factors (Fordyce, 1976), and cognitive processes (Turk & Rudy, 1986a) in the maintenance of chronic pain.

Chronic pain has a significant impact on the quality of life. Bonica (1981) estimates that over one-third of the United States population has persistent or recurrent chronic pain. Among the yearly economic costs are 700 million lost work-days and an estimated $90 billion spent on medical care, insurance, and lost wages (Aronoff, 1985). Back pain is the most frequent

source of disability of people under 45, and as many as six to eight million persons are permanently disabled by it (Mooney, 1983). Although for 98% of back pain patients the condition does not persist for more than six months (cf. Nachemson, 1985), for those patients where the pain extends beyond this date only 50% will return to work (Vallfors, 1985). It is further reported that in instances where chronic painful conditions occur, it is not the underlying pathology but the pain that primarily impairs functioning. Chronic pain has become an area of increasing interest to social scientists due to the recognition of the cultural (e.g., Zbrowski, 1969) and social (e.g., Fordyce, 1976) factors which impact upon it, as well as disappointment over the efficacy of conservative and invasive medical treatments, such as bedrest and surgery.

Medical Treatment and Evaluation of Chronic Pain

Flor & Turk (1984) note that chronic pain is usually attributed to degenerative processes (e.g., osteoarthritis, herniated disc), and less frequently thought to be of inflammatory (e.g., ankylosing spondylitis, peripheral neuropathy), structural (e.g.,

congenital deformities), or traumatic origin (such as
injury to the spine from a motor vehicle accident).
However, no significant differences in disc
degeneration between low back pain patients and healthy
controls have been found in studies drawing upon
radiological findings. In fact, disc degeneration may
be ubiquitous, since it appears to be a natural process
of aging (Finneson, 1980). This difficulty of finding
organic pathology as the sole cause or even as one of
the contributing agents of chronic pain points to the
complexity of the chronic pain syndrome and limitations
with the medical model.

Schneider and Karoly (1983) identify three medically
oriented approaches to pain management:

1) Surgery, the most invasive form of medical
treatment for chronic pain, has come under increasing
criticism. Schneider and Karoly concluded that,
"...operations generally have failed to produce pain
relief, and have often left the patient in more severe
pain than before the surgery" (pp. 75-76). Critics
report that surgery for both chronic and non-chronic
back pain is over utilized. In the United States there
are approximately seven times more back surgeries
performed than in either Great Britain or Sweden
(Addison, 1981; Nachemson, 1983). This is in spite of

any dissimilarity in severity or incidence in low back pain between these countries (Wilkinson, 1983). Finneson (1979; cited by Flor & Turk, 1984) concluded that 80% of surgical patients should never have entered surgery. Elsewhere, Finneson (1980) writes that 20 to 40% of the operations for lumbar disc disease performed each year will be unsuccessful. The Swedish orthopedist Alf Nachemson has written about the excessive use of back surgery (Nachemson, 1984). His arguments are that in most cases of acute back pain the patients eventually get well and that disc surgery should only occur after two months of back pain.

Repeat surgery, which is not an uncommon condition among chronic pain patients (cf. Ng, 1981; Wilkinson, 1983), is generally far less effective than first time surgery. Burton (1981; cited by Flor & Turk, 1984) reports that success rate for repeated surgery rapidly decreases down to 5% after the fourth operation. Nachemson (1984) concluded that even among his own patients more patients were worse after repeat surgery than better. It has been estimated that 2/3 of all patients in chronic pain centers have had previous unsuccessful surgery for their pain (Wilkinson, 1983).

2) Physically disrupting sensory transmission to the brain, such as anesthetic blocking, and less frequently, electrical stimulation does produce short term results. However these blocking procedures often fail to provide sustained relief for back pain (Fields & Levine, 1985; Flor & Turk, 1984; Schneider & Karoly, 1983).

3) The use of narcotic and non-narcotic analgesics, though particularly effective in relieving acute pain are usually contraindicated in the treatment of benign chronic pain. Not only is there the risk of addiction or dependency but there is also an increasing body of evidence that certain medications, such as the benzodiazepines, because of their influence on neurotransmitters actually reduce tolerance to pain (cf. Hendler, 1981). Iatrogenic effects may also arise in other ways. Valium, for example, which may be prescribed as a muscle relaxant to pain patients, might also exacerbate depression (Physicians Desk Reference, 1986). The manner in which drugs are taken may also prove problematic. Medication taken on a PRN basis (in which dosage and frequency is typically pain contingent) is more likely to reinforce pain behaviors than medication taken on a fixed interval schedule

(Fordyce, 1976; Fordyce, Brockway, Bergman, & Spengler, 1985).

Chronic pain patients are also often prescribed anti-depressants. This is based not only on the belief that chronic pain is a consequent or an aggravating factor of depression (cf. Romano & Turner, 1985) but also on the theory that pain is an epiphenomenon of the same biochemical processes that produce depression (Hendler, 1981). Depletion of central serotonin activity can result in sleep disturbance, lowered pain tolerance, and depression. Tricyclic antidepressants enhance the activity of serotonin by blocking its reuptake (Hendler, 1984). Another indicant of the pain depression link is that a significant number of depressed patients have pain as a major symptom (Romano & Turner, 1985). Though the use of anti-depressant medication appears prevalent among chronic pain clinics its use has been questioned. Flor and Turk (1984) have argued that studies assessing the efficacy of anti-depressants in the treatment of chronic pain have failed to demonstrate more than a placebo effect. Romano and Turner (1985) concluded, in their review of chronic pain and depression, that there is not enough evidence to establish a clear relationship between use of anti-depressants and pain reduction.

The Psychosocial Components of Chronic Pain

Sternbach (1984) provides a summary of the effects of chronic pain. Physiological consequences are sleep disturbances, decreased pain tolerance, and changes in appetite. The persistent pain and lack of sleep may in turn be followed by fatigue, irritability, depression, social withdrawal, and decreased self-esteem. When patients are compared with others or themselves before the onset of their pain they are found to be less active, frequently bedridden, and to have diminished interpersonal interactions. Typically their relationship with others is mediated by the sick role. Patients may feel entitled to solicitous caretaking, financial compensation, and exempt from responsibilities. Patients will typically attribute their pain to physical disease (Pilowsky, 1978) and engage in an interminable search for a medical cure. They have increased number of medical contacts, solicit more surgery, and over use analgesics. The putative "benefits" of chronic pain are that the pain may serve as a "sink" for all interpersonal and intrapersonal problems. (Both the patient, through primary and secondary gain, and the patient's family, via tertiary gain, may become invested in the chronic pain). The

illness gains listed by Sternbach (1984) are that patients may become oblivious to sources of tension, dependency needs may be satisfied through invalidism, and depression may be masked by symptom preoccupation. The pain may also allow for a legitimate source of narcotics.

The traditional somatosensory model of pain does not adequately explain the chronic pain condition. In the 1950's and 1960's psychoanalytic explanations were advanced. In these cases (e.g., Engel, 1959; Mersky, 1968; Spear, 1967; Walters, 1961) chronic pain was explained in terms of a conversion neurosis or a hypochondriacal reaction (cf. Turk & Flor, 1984). Within this framework chronic pain tended to be attributed to a "pain prone" personality. Such individuals were thought to have a prominence of guilt and aggression, and to have a history of suffering, defeat and an intolerance of success (Engel, 1959). More recently Blumer and Heilbronn (1982) have described chronic pain as a depressive equivalent. According to these authors chronic pain patients are characterized by alexithymia, anhedonia, dependency needs, and a family history of depression, alcoholism, and chronic pain. For these patients psychological distress is expressed somatically. There is evidence

that many of these conditions are likely to be found within a chronic pain population. Recent studies have produced evidence of a relationship between chronic pain and depression (Romano & Turner, 1985), a family history of chronic pain (Edwards, Zeichner, Kuczmierczyk, & Boczkowski, 1984; Violon & Giurgea, 1984), and alexithymia (Blumer & Heilbronn, 1981; Ford, 1983). Also an association between psychological stress and EMG activity has recently been indicated (Flor, Turk, & Birbaumer, 1985). (In this study, which is discussed at greater length later in this paper, low back pain patients displayed EMG reactivity in their paravertebral musculature when subjected to personally-relevant stress.) However, despite this evidence, a psychogenic theory of chronic pain has lost favor. Research has failed to demonstrate whether the personality characteristics are premorbid (Turk & Flor, 1984). In fact some studies suggest that psychopathology, mood disturbances, and behavior problems are consequences rather than precursors of chronic pain (Rudy, Kerns, & Turk, 1985; Sternbach, 1974). Another problem is that less than half of chronic pain patients meet the DSM III criteria for psychiatric illness (Bouckoms, 1985).

The Multidimensional Model of Chronic Pain

Current research has suggested the appropriateness of a model in which chronic pain is multiply determined. Within this model reciprocal influence is found between biological, psychological, and social factors. The theoretical underpinnings of this model have been provided by the gate-control theory and, somewhat more broadly, by the biopsychosocial model popular in health psychology (Melzack, 1973; Turk, Meichenbaum, & Genest, 1983; Ng, 1981).

Biological factors have included the primary and secondary consequences of injury and disease, such as fatigue, low-stamina, drug dependence and stress induced muscle tension (Blackwell et al., 1984). Within the nervous system abnormal information processing such as pain responses to non-noxious stimuli, and memory-like mechanisms for pain have also been implicated as contributors to chronic pain (Melzack, 1973). In addition neurotransmitters, endogenous opiates, and pain-eliciting substances (e.g., bradykinin) play a role in the regulation of chronic pain (Hendler, 1981; Fine & Hare, 1985; Fields & Levine, 1984).

The psychological models of chronic pain have been enumerated by Turk and Flor (1984). Within the respondent model acute pain may lead to a pain-tension cycle wherein fear of repeated injury or fear of pain leads to greater pain, muscle tension, and muscle atrophy. The operant approach proposes that pain behavior, such as inactivity, drug dependence, and complaining may be reinforced by either the family or the medical practitioner (Fordyce, 1976). More systemic types of reinforcement, such as disability insurance and workman's compensation have also been reported (Cott, 1985; Edwards et al., 1985; Belkin, 1985).

Cognitive factors, whether acquired prior to or after the onset of chronic pain can play a significant role. Here cognitive processes are defined rather broadly as the way patients experience and assign meaning to events. My guiding premise is one entertained by many cognitive theorists (e.g., Kelly, 1955; Lazarus, 1981; Mischel, 1981) that perceptions and interpretations of events may be as critical or even more critical than the events themselves. Beecher's (1959) classic study was one of the first to provide evidence for this position within the context of the pain experience. He found that U.S. soldiers

wounded at Anzio complained less and requested less pain medication than civilian surgical patients with similar lesions. For the wounded combatants the injury meant a break from the danger of battle, while for the surgical patients the pain was associated with dependency and anxiety. Zbrowski's (1969) work described cultural differences in pain perception among a group of patients with herniated disks and spinal lesions. In this study "Old Americans" (mostly white, Anglo-Saxon Protestants) described their pain in sensory terms. They rarely complained and when in severe pain withdrew from others. First generation or immigrant Jews and Italians showed no inhibitions about complaining. An interesting difference appeared between these two ethnic groups. Italians would complain when in pain but would appear at ease once the pain ended. Jews, however, would still express discomfort even after the pain had ceased. For Jews it seemed the implications of the pain ("is it some disease?") were of concern, while for Italians it was just the pain itself that was troublesome.

More recent studies have produced evidence of a specific link between pain and cognitions. Lefebvre (1981) found that depressed low back pain patients were more likely to make cognitive errors that

distorted the impact of their pain than either non-depressed pain patients or depressed psychiatric patients. The implication of this study was that depression in these patients is a function of both low back pain and cognitive errors, such as catastrophizing, overgeneralization and selective abstraction. Rudy et al. (1985), using a structural equations model, suggested a more complex relationship between chronic pain and depression. In this study, although there was a correlation between pain and depression, no direct path between these two variables appeared when social reinforcement (as described by Lewinsohn, Sullivan & Grosscup, 1982) and self-control were entered into the equation. Rather, chronic pain was shown to interfere with family and social networks and to lower self-control. These two mediating variables, in turn, elevated depression. In a study by Flor et al. (1985) chronic back pain patients reacted with strong EMG increases in their lower back when exposed to personally relevant stressors. Summarizing these studies, there is a growing body of evidence that the distress and disability associated with chronic pain is significantly mediated by cognitive factors such as the meaning of the pain, cognitive errors and self control.

Multidisciplinary Chronic Pain Units

With the increasing recognition of the multidimensional nature of chronic pain multidisciplinary chronic pain clinics have been established. In the past 10 years there has been a burgeoning growth of these clinics, from 20 in 1976 to 250 in 1979 (Blackwell, et al., 1984). Currently it is estimated that there are over 1,000 (Turk & Rudy, 1986b).

The growth and popularity of these clinics has been attributed to utilization of procedures derived from or inspired by the gate-control theory of pain (Aronoff, 1985; Wall & Melzack, 1984), improved communication among clinicians and researchers (Blackwell et al., 1984), and the growing popularity of the biopsychosocial model (Chapman & Brena, 1985). The establishment of the International Association for the Study of Pain, as well as the publication of the journal Pain are two events of particular importance in the development of cross fertilization among various health care professionals (Ng, 1981).

Within these clinics physical and medical interventions may include such treatments as trigger point injections, nerve blocks, nerve stimulation,

physical therapy, and antidepressant medication. Psychosocial treatments include occupational therapy, group therapy, hypnosis, behavior therapy, and cognitive-behavior therapy. As a result of Fordyce's influential 1976 book most clinics attempt to incorporate an operant model. The staff is trained to respond to well behaviors and not to respond to pain behaviors, such as grimaces and pain complaints. When pain medications are prescribed it is done on an interval schedule rather than on a PRN basis. For problems of drug addiction or dependency a "Pain Cocktail" is prescribed. A pain cocktail is a flavored liquid mixture of pain medications which is given at reduced amounts over regular intervals. In many cases patients are required to sign a contract in which they make goals. These include reduction in pain behaviors, and an increase in social, vocational, and occupational activities. Most clinics, including the Orthopedic Institute, emphasize behavioral changes rather than reduction of the pain.

Along with the prevailing behaviorist perspective there is an emphasis on self-control (which might be thought of as a cognitive element in the treatment). Patients are encouraged to take an active part in their treatments. They are asked to set goals for themselves

and to agree on the steps necessary to achieve these goals. In collaboration with various therapists patients choose the physical exercises, and vocational and occupational activities they will engage in.

A good part of the treatment efforts at pain clinics are attempts to reverse the process that brought the patient there in the first place. Patients' treatment prior to their arrival at a pain clinic can best be understood with the medical model. The medical model views others or factors outside of the self as responsible for the problem and the cure (Brickman, et al, 1982). During the early career of the chronic pain patient little work was done by the patient directly. Instead health professionals were expected to provide a diagnosis and prescribe treatment. Coping efforts were often limited to selecting the proper agents of diagnosis and treatment. While this model is usually appropriate for acute pain it becomes inappropriate for chronic pain (Ng, 1981). The usual regimen of medical treatments prior to the patients arrival at a pain clinic makes iatrogenesis a very likely possibility. Addison (1983), in his review of patient data from a chronic pain unit, attributes this to: entrenchment of psychosocial problems due to delayed identification and

treatment; counter productive interactions between patient and physician as a consequence of multiple medical procedures; and unnecessary treatments resulting from problematic interactions between the patient and physicians. As noted earlier, an additional problem with conventional medical treatment of pain is that this type of treatment is pain contingent. Medications are prescribed for as long as the patient is in pain and pain is used as a guide for length of bed rest and resumption of activities. A recent empirical study by Fordyce, et al. (1985), in which traditional management techniques were compared with behavioral methods, found that pain contingent treatments led to significant increases in claimed impairment.

In addition to the feelings of dependency, powerlessness, and vulnerability resulting from medical care, the patient may also confront difficulties at work and with friends and family members. The statistics on the impact of chronic pain on work are disquieting. As noted earlier, Bonica (1981) reviewing 1978 health data concluded that as a result of chronic pain well over 700 million work days were lost. In a study by Strang (1985) of 111 disabled workers with chronic low back pain 83% were rated as having

insufficient objective findings to warrant work
incapacity. However only 5.1% of these patients
returned to work. Patients described an adversarial
relationship with their employer, demanded financial
compensation, and displayed rigid and negative
attitudes about returning to work. Compared to other
non-life threatening chronic illnesses chronic pain
appears to be one of the most debilitating (Gaston-
Johansson, Johansson, Feldin, & Sanne, 1985; Kames,
Nabiloff, Heinrich, & Schag, 1984).

Antonovsky's (1982) theory of coherence may be
appropriate here. For the chronic pain patient the
sense of coherence is shattered. Coping resources are
diminished. Physical endurance is impaired, roles
contributing to self-esteem, such as provider and
worker may be lost. Income is often reduced (and in
instances were it is maintained or increased it is
usually linked to disability, such as workmen's
compensation). Contact with primary social resources
is either reduced or impaired and dependence upon
secondary social resources, such as physicians and
social service agencies, is increased. This shift from
primary to secondary social resources has been linked
to a further exacerbation of psychosocial distress (Ben-
Sira, 1984).

The Importance of Self-Concept among Chronic Pain
Patients

Given the array of long term stressors and the
reduced coping resources that the chronic pain patient
faces there is a good reason to believe that chronic
pain has a significant impact on self image. In fact,
this occurrence is entertained, if only covertly, by
most writers on the subject. Two writers who have paid
special attention to the impact of chronic illness on
self image are Charmaz (1983) and Kotarba (1983).

Charmaz (1983) conducted in-depth interviews with
chronically ill patients, family members and
practitioners. Though her subject population consisted
of patients with various types of debilitating chronic
illnesses (such as cardiovascular disease, diabetes,
cancer and multiple sclerosis) her findings do appear
to contribute to a better understanding of the chronic
pain condition. Chronic pain patients, like the
patients suffering from the severe forms of the
illnesses she describes, are disabled by their
illness. Her theoretical perspective is symbolic
interactionism; her major finding is that loss of self
is a fundamental form of suffering in the chronically
ill. This loss is accumulating: positive self-images

fall and new valued ones do not develop. Four sources
of this suffering are identified: leading a restricted
life; social isolation; being discredited, and becoming
a burden.

Kotarba (1983) identifies three major stages of
chronic pain: 1) onset of pain; 2) failure of
conservative treatments and attempts at radical
interventions; 3) and awareness of failure of all
medical interventions, designation of chronicity, and
search for alternative forms of help. During this
process people in pain are thought to almost never
resign themselves to a blind and passive acceptance of
their suffering. Chronic pain imposes a two-fold
meaning upon the patient: there is no cure - but you
must learn to live with it. One example of learning to
live with the pain is the control the pain afflicted
person exercises over the intrusion of pain into
certain social interactions. However for patients seen
in chronic pain clinics mastery over the pain may be
lacking. And this loss of control over their pain
(actually their pain behavior) may demean them in the
eyes of others and themselves. Patients, according to
Kotarba interpret the label chronic pain patient
(imposed upon them when medical treatments have failed

to treat their pain) as a negative evaluation of the self.

There are at least three reports in the literature of the relationship between self-concept scores and chronic pain. Armentrout (1979) using Fitts' (1965) Tennessee Self-Concept Scales (TSCS) found that chronic pain patients had significantly lower self-concept scores than other medical patients. He concluded that the experience of protracted pain contributed to changes in physical activities, family patterns, occupation, and abilities, and that these social and personal changes initiated a downward trend in the individual's self-perception. In a study conducted in Holland (Schmidt, 1985) with 39 chronic low back pain patients and an equal number of controls matched for age and sex, pain patients were found to have lower self-esteem scores, and were more critical and distrustful of others. Beekman, Axtell, Noland, and West (1982) assessed changes in self-concept in 50 chronic back pain patients who underwent a four week multidisciplinary inpatient program and 12 rheumatoid arthritis patients whose treatment was restricted to outpatient medical care. For the pain patients treated within a multidisciplinary framework, eight self-concept scores, as measured by the TSCS, improved at

discharge. However, a closer look at the data reveal that there was a steady decline in the self concept scores so that by six months after discharge only one of the self-concept scores (Physical Self) remained significantly higher than the pretrial scores. This suggests that self-concept may be less responsive to short term inpatient treatment than the authors had concluded.

Recently there has been a growing body of work on the importance of the self in psychology and a recognition of the impact of self-knowledge on behavior (e.g., Bandura, 1977; Markus, 1983; Kihlstrom & Cantor, 1984). As Markus (1983) notes, theories of the self have had a long history in psychology. The recent attention paid to the self seems to be a recognition and expansion of the insights made by earlier writers such as James (1890) and Kelly (1955).

Some of the problems involved in the treatment of chronic pain may be clarified by investigating self-perceptions of chronic pain patients. Patients who judge themselves as having coping resources and whose goal is to engage in a more vigorous life style should be more likely to respond to behavioral treatments than patients who lack goals and who are pessimistic about developing coping skills. This would appear to be an important issue in chronic pain research.

In other domains of behavioral medicine the study of self perceptions has met with some success. Bandura and his colleagues (e.g., Bandura, 1986; Condiotte & Lichtenstein, 1981) have produced evidence on the importance of perceived self-efficacy in postcoronary rehabilitation and consumptive behavior. Shelley Taylor's (1983) work on cognitive adaptation has provided evidence that self-generated feelings of mastery and self-esteem restoration play a critical role in the adjustment to breast cancer. And learned helplessness theory has apparently been strengthened once it paid closer attention to self-perceptions by employing an attributional framework (Abramson, Seligman, & Teasdale, 1978). The learned helplessness model has been applied to pateints with rheumatoid arthritis (Anderson, Bradley, Young, McDaniel, Wise, 1985). However, assessment of self-perceptions as predictors of treatment outcome has not occurred in chronic pain research.

Since the late 1970's dozens of follow-up studies have been conducted on chronic pain patients. The majority of these studies have been criticized for poor methodology (Aronoff, Evans, & Enders, 1985; Nigl, 1984). Among the problems cited are that the criteria for improvement have not been clearly presented, there has been a failure to use standardized instruments, and

there has been inconsistency between pre-and post treatment measures. Rates for general improvement among chronic pain patients have ranged from 37% (Malec, Cayner, Harvey, & Timming, 1981) to 87% (Rosomoff, Green, Silbert, & Steel, 1981). Similar ranges have been reported for pain relief, increase in physical activities, and reduction in use of pain medication (e.g., Crue & Pinsky, 1981; Malec et al, 1981; Wang, Ilstrup, Nauss, Nelson & Wilson, 1980). Rates for return to employment have tended to be lower (Newman, Seares, Yospe, & Garlington, 1978; Painter, Sears, & Newman, 1980). These findings suggest that pain programs do have a significant impact on pain behavior. However, there still appears to be a sizable number of pain patients who remain unresponsive to treatment. An important question is why some patients respond to treatment and others do not.

The attempts to predict treatment outcome have generally focused on either the history of the illness, such as duration of pain and the number of surgical procedures, or psychopathology, such as the Hy and Hs scales of the MMPI. A representative study is that of Maruta, Swanson, and Swenson (1979). In this study seven items were related to treatment efficacy: shorter duration of pain, less time lost from work, fewer

surgical procedures, lower levels of pain intensity, less drug use, and lower Hy and Hs scales. However, subsequent studies (e.g., Heaton et al, 1982; Hamburgen, Jennings, Maruta, and Swanson, 1985; Trieff & Yuan, 1983) have failed to identify the Hs and Hy scales as predictors of treatment response. Reliance upon variables related to the history of the illness has also proved problematic. For example in a recent study by Sweet, Breuer, Hazelwood, Toye, and Pawl (1985) no significant correlations were found between outcome and number of surgeries for pain, number of hospitalizations for pain, number of pain medications, or duration of pain condition. One of the reasons for conflicting findings in this area may be that self-perceptions of pain patients have not been assessed. Since chronic pain is a medically unsurpressable condition, the patient's attitudes and behavior plays a vital role in the treatment of this disorder.

Nerenz and Leventhal (1983) have argued that the central issue in chronic illness is how illness representations are related to the self-system. Some patients with chronic illness have a "total" view of their disease. Such patients fail to encapsulate the disease. For such patients all interactions are mediated by their illness. "The uniqueness of life's

varied episodes disintegrates and all life is a life of cancer, a life of heart disease, [... a life of pain]" (Nerenz & Leventhal, 1983, p. 28).

I will argue that chronic pain patients are especially susceptible to a total disease self-schema. I begin with the assumption that the patient's perceptions have been altered by the chronic pain experience. I have already reviewed a body of literature, e.g. Sternbach (1984), which shows that chronic pain patients face dramatic life adjustments and that the normal modes of gaining pleasure and satisfaction are reduced or inaccessible. Considering the findings of Charmaz (1983), Kotarba (1983), and to some degree those of Armentrout (1979) and Schmidt (1985) I argue that impairment extends to self identity. That is, an individual's self-perceptions on dimensions such as personal efficacy, affiliation, trust of physicians, harm avoidance, and dependence upon medical care may have been significantly impaired by the chronic pain experience. These life changes may lead to changes in perceptions of actual self, goals, and personal strivings. Some patients may become resigned to their condition. These patients, while still desiring an end to their pain, may be resistant to making personal changes such as increasing social

activities and returning to work. Another group may be more dissatisfied with their condition and, despite their pain, may be more responsive to opportunities to reduce their pain behavior. Both types of patients would probably rate themselves high along such dimensions as powerlessness, social isolation, dependence on medical care, and physical vulnerability. Resigned patients may also hold these self-concepts for the way they believe they may become (probable self) and for the way they would like to be (ideal self). However, patients who are less resigned to the chronic pain situation - though they may currently appear as distressed as the more resigned patients - may hold self schemas of their probable self and their ideal self that are less closely linked to disability and dysfunction than the probable and ideal self-concepts of the more resigned patients. My hypothesis is that patients who rate their probable and ideal selves high along the dimensions characteristic of the chronic pain experience (such as helplessness, dependency on medical care and physical vulnerability) will be more likely, after treatment, to report distress, pain and inactivity than patients who rate their probable and ideal selves lower on these dimensions.

Support for the hypothesis that future projections of the self can influence behavioral changes comes from recent work by Hazel Markus (Markus, 1983; Markus & Sentis, 1982; Markus & Nurius, 1986) and from some of the studies on self ideal-self discrepancy (e.g., Large, 1985; Phillips & Zigler, 1980; Rogers & Dymond, 1954). Markus (1983) has called for a new look at the self-concept. With the exception of self-discrepancy theory the conventional view of the self-concept has been that of a static entity. Markus argues that the self-concept actually represents a dynamic self. This expanded view of the self-concept includes past, current, and future selves. Particularly important are possible selves which represent "[...] cognitive structures within the self-concept that function as carriers of a person's aspirations, motives, and goals" (Markus, 1983, p. 545). Life changes influence possible selves. Failure and frustration may activate feared or dreaded possible selves. Under conditions in which negative self-knowledge is highly accessible the future will be viewed as bringing continued difficulties and problems. Anticipated future selves primed under these conditions will severely constrain one's present behavioral alternatives.

In one study by Markus and Nurius (1986) healthy subjects were given a list of 150 possibilities for the self. These items were derived from six categories: general descriptors of the self; physical descriptors; life-style possibilities; general abilities; various occupations; and possibilities tied to the opinions of others. These possibilities were selected so that a third were judged as positive, a third as negative, and a third as neutral. For each item respondents were asked whether: 1) the items described them as they were now; 2) whether the item was ever considered as a possible self; 3) how probable the possible self was, and 4) how much they would like the item to be true for them. Affective and motivational states were then assessed with the Affect Balance Scale (Derogatis, 1975), the Rotter Locus of Control Scale (Rotter, 1966), the Rosenberg Self-Esteem Scale (Rosenberg, 1965) and the Hopelessness Scale (Beck, Weissman, Lester, & Trexler, 1974). Partialing out the "now" self and then entering the remaining possible selves in a step-wise regression equation it was found that each of the possible selves (especially the "probable" and the "like to be" selves) contributed significant variance to the measures of self-esteem, negative affect, and hopelessness. In another experiment Markus

and Nurius (1986) presented the possible selves

questionnaire to 30 subjects who had recently

experienced a life crisis (death of a loved one, loss

of a long-standing relationship). Subjects were

divided between those who indicated that they had

recovered from the crisis and those who reported they

had not recovered. An additional 30 subjects who

indicated that they had not experienced a life crisis

were also assessed. It was found that the now selves

of the non-crisis subjects were rated more positively

than the now selves of the recovered and unrecovered

crisis subjects. The now selves of the two crisis

groups did not significantly differ from each other.

However when the possible selves of the two crisis

groups were compared differences were found.

Respondents who reported that they had not recovered

from the crisis rated their possible selves more

negatively than recovered crisis subjects. In other

words, "[...] those who say they are recovered from

the crisis, even though they are not doing well

currently, think it is possible for them to be

motivated, independent, attractive and to win high

honors. Most importantly, they find these possible

selves to be significantly more likely than do the non-

crisis controls" (Markus & Nurius, 1986, p. 25). The

authors argue that these possible selves represent
incentives and cognitions of mastery and have
facilitated the crisis subjects' recovery.

Although Markus notes that self-concept
discrepancy generates affective and motivational states
she does not discuss the role played by this
discrepancy in her theory of possible selves. However,
her theory appears to, at least partially, fall under
its domain. What links her theory to self discrepancy
theory are her findings that recovered crises subjects
hold a negative view of the current self and a highly
positive view of the future self (higher even than the
non-crisis controls), as well as her argument that this
positive cognitive representation facilitates
recovery.   There are however three important
differences: (1) In her theory ideal self is one of
many possible selves; (2) It is the cognitive
representation of the ideal self (and not its
discrepancy with the current self) which provides
incentives; and (3) Markus's construct of the ideal
self (which she calls the "like to be self") appears to
be measured in the context of a possible self, while
the ideal self in the discrepancy literature is not
measured under this constraint. Despite these
differences there appears to be considerable congruence

between these two research areas. Below I discuss some of the work that has come out of self-discrepancy theory, work that may prove helpful in understanding the chronic pain patient.

Large (1985) in a study of preparedness for change, gave 18 patients with chronic musculoskeletal pain a repertory grid which consisted of six self-concepts (elements) and eight constructs. Constructs were drawn from the Illness Behaviour Questionnaire (IBQ) (Pilowsky & Spence, 1976). The IBQ was developed in order to identify syndromes in pain clinic patients (Pilowsky, 1978). The eight constructs were: (1) Worried about illness; (2) Seriousness of illness; (3) Importance of emotional factors; (4) Free in expressing positive and negative feelings to others; (5) Depression; (6) Anxiety; (7) Importance of problems apart from illness; and (8) Irritability. The six elements that Large used were: (1) As I am; (2) As I would like to be; (3) As others see me; (4) As my doctor sees me; (5) Like a hypochondriac; and (6) Like a physically ill person. Patients rated each element on each construct with a visual analogue scale (VAS). Grids were analyzed by means of Slater's (1972, cited by Large, 1985) principle component analysis which provided linear distance between elements. In this

study the linear distance between the self (As I am) and the ideal-self (As I would like to be) elements was used as the independent variable. This self ideal-self discrepancy was defined as a measure of dissatisfaction. Initial evaluation also included VAS for pain, the McGill-Melzack Pain Questionnaire, and a base line measure of EMG activity. An experimental within-subject control design was used. This consisted of a waiting list period, control period, and bio-feedback training. Posttrial evaluation included the same measures used in the pretrial evaluation. In addition, posttrial evaluation included patients' subjective reports of improvement (Large does not mention how this was measured). The main finding was that there was a significant rank correlation between the linear distance of self and ideal-self elements (self-concept discrepancy) and the outcome as measured by pain score change. Reductions in pain were associated with greater distance between self and ideal-self elements. Self/ideal-self discrepancy also predicted subjective improvement.

Further support for the use of self-concept discrepancy as a measure of dissatisfaction comes from the work of Rogers and his colleagues (see Rogers & Dymond, 1954). Patients entering psychotherapy had

higher discrepancy scores, i.e., lower correlations between self and ideal self Q-sorts, than subjects in an equivalent non-clinic control group (Butler & Haigh, 1954). Furthermore, discrepancy scores at the beginning and at the end of a 60 day pre-therapy wait period were able to discriminate between a "continuers" group (subjects who followed through with their initial decision to receive treatment) and an "attrition" group (Subjects who chose not to follow through with their initial decision to receive treatment). Discrepancy scores of the attrition group and the continuers group, at the beginning of the wait period did not significantly differ. However, at the end of this period the attrition group's discrepancy scores were significantly lower, while the discrepancy scores of the continuers group remained high. Grummon (1954a) understood this as reflecting spontaneous recovery in the attrition group. These subjects made some personal adjustment during the period while they were waiting to receive treatment, and therefore, became less motivated for psychotherapy. According to this view, increases in personal adjustment and decreases in motivation for therapy are reflected in greater congruence between self and ideal self ratings. These findings provide some support for the model I am constructing here. In

line with the results of Rogers and his colleagues self-concept discrepancy is understood as an indicant of self dissatisfaction and a motivation to change. However, while self ideal-self congruence for Large (1985), indicates resignation, for Rogers' group this congruence is aligned with psychological health.

The theory that self/ideal-self congruence indicates self-acceptance and personal adjustment has been the traditional view held in self-concept research (Wylie,1974; Robinson & Shaver, 1969). However, there is some evidence that the association between self-image congruence and psychological health may be more complex. Research on children by Zigler has linked increased self-image disparity with aspirations, age, and intelligence (Katz & Zigler, 1967; Phillips & Zigler, 1980) and research with adult psychiatric and non-psychiatric patients found a positive relationship between self-image disparity and social competence (Achenbach & Zigler, 1963). According to this cognitive developmental theory of self-image disparity, persons with high disparity are thought to have incorporated societal demands, mores, and values, and to make greater self-demands and to experience guilt from having been unable to fulfil them. A second factor contributing to self-image disparity is

cognitive differentiation. These factors provide some support for the study proposed here. The first factor, "social guilt", suggests that pain patients uncomfortable with their illness behavior will have a greater amount of self-image disparity and may be more motivated to change than their more self-accepting cohorts. Their motivation may come from a need to meet social values and mores that they have incorporated but which they are not currently realizing. "Cognitive differentiation", which is thought to represent a higher level of development as articulated by Piaget (Achenbach & Zigler, 1963), suggests that pain patients who are able to make increasingly subtle distinctions about their own behavior may be able to discriminate between "pain behaviors" and "well behaviors".

For example, low social guilt may help to maintain passive resignation to a pain bound life style in which beliefs, such as, one "deserves" to be taken care of, and that one is "exempt" from responsibilities are held. Employment of cognitive differentiation may be observed in patients who are able to reflect upon their own activities. These patients may increasingly be able to identify aspects of their own behavior and the behavior of others which reinforce their

disability, e.g., staying in bed because one is too tired or in too much pain, or eliciting the sympathy of others by grimaces and moans. Cognitive differentiation may also facilitate the articulation of patients' expectations and goals and, as a result, set the conditions for a larger disparity between self and ideal self to emerge.

Gough, Lazzari, and Fioravanti (1978) have remarked that a very high congruence between self and ideal-self statements could reflect insensitivity to personal problems, defensiveness, and other undesirable attributes. Preston and Viney (1984) assessed self and ideal-self perceptions of drug addicts in residential treatment centers. They found that respondents rated their ideal-self high on failure and powerlessness. Preston and Viney interpreted this finding as reflecting an ambivalence about goals and a fear of taking control of their own lives with out the protection and security of the drug treatment centers.

It should also be noted that chronic pain patients are quite different from the patients Rogers' had treated. Rogers' psychotherapy patients were described as experiencing anxiety, failure, guilt, and as making reasonably successful adjustments in their life situation (Grummon, 1954b). Chronic pain patients,

while often experiencing emotional disturbance, usually are not making successful life adjustments. It is argued, therefore, that the chronic course of this disability, along with the social reinforcement of pain behaviors, contributes to shifts in self, ideal self and probable self perceptions. Initially we might expect a downward shift in current self perceptions. However, for patients who become so overwhelmed by the chronic pain condition that they have become resigned to it we might observe that probable self and ideal-self ratings would also show a downward trend. This model is also implied by Markus's self-schema theory (Markus, 1983). Repeated encounters with failure would likely prime negative cognitive representations of the self. These cognitive representations would in turn influence subsequent behavior.

The purpose of this study was to determine whether self-images of the possible self would predict whether or not pain patients would respond to treatment. Patients rated their self, their probable self, and their ideal self along the following five dimensions: 1) easily hurt and exploited by physicians; 2) social isolation; 3) control; 4) dependence on medical care; and 5) physical vulnerability (harm avoidance).

Interviews with chronic pain patients and observation of a chronic pain self-help group pointed to the importance of these constructs. 1) Themes of victimization emerged in the stories patients told about how they felt they had been hurt and misled by physicians. Recurring issues were multiple diagnoses, surgery which either did not improve or worsened their condition, and other treatments and diagnostic tests which proved more painful and problematic than they had been led to expect. 2) Stories of isolation, of not being understood by others, of feeling that no one else had pain like theirs, along with the relief of finding (at the hospital or in the self-help group) other people who shared their condition, pointed to social isolation as a significant factor in their lives. 3) The relevance of the constructs of control and powerlessness emerged during patients' discussion of how they often felt helpless about finding a definitive diagnosis for their condition and effective treatment. For many patients the pain and its management had taken control over their lives. Many had stopped working and, for all, social activities had been drastically reduced. Incidents of control appeared to be valuable for these patients. One woman who had been nearly house bound for years attributed her ability to drive

to Buffalo with her husband to her insistence that hourly stops be made so that she could stretch and walk. Another women reported that by consistently taking an hourly lunch break each day she was able to manage her pain during work. 4) Dependence on medical care was evident in just about all patients. Despite repeated disappointments with health professionals discussions in the self-help group repeatedly revolved around treatments for chronic pain. 5) Harm avoidance was also a concern of many patients. A former flamenco dancer who now suffered from muscle atrophy told stories of how, whenever she was recovering, she'd overexert herself and wind up hurt again. Another woman considered delaying a trip to California out of fear it would interfere with the treatments she was receiving in New York. "After all", she said, "the most important thing in my life is my back".

I expected that the majority of the patients would rate their current selves high along the dimensions of powerlessness, dependency on medical care, physical vulnerability, social isolation and conflict with physicians. My hypothesis is that patients who state that they will be (probable self) and that they would like to be (ideal self) less elevated on these dimensions will be more likely respond to treatment

than patients who rate their probable and ideal self
high on these dimensions. That is, patients who
endorse less disabling images of their probable and
ideal selves will, after treatment, report less
distress, less pain, and more physical and occupational
activity than patients whose probable and ideal selves
are more closely linked to the chronic pain
experience. Also, it is likely that probable self
ratings will show a modest positive correlation with
optimism. However, the two constructs should not be
thought of as the same thing since the probable self
refers to domain specific images of the self,
(employed, walking upstairs, taking drugs) while
optimism tends to refer to global expectations about
the self and the world.

Method

The intake sample consisted of 80 chronic pain
patients who were admitted to a three week in-patient
program, during the months of June through November
1986, at the Orthopaedic-Arthritis Pain Center,
Hospital for Joint Diseases Orthopaedic Institute
(OAPC) in New York City. (A detailed demographic
profile of the sample is reported in the results
section).

Treatment

The treatment team consisted of three physiatrists,
one psychiatrist, two psychologists, two physical
therapists, two occupational therapists, and two social
workers. Nurses on the ward where the patients were
treated had been trained in chronic pain management.
Usually there were six patients treated during a three
week inpatient period. Prior to admission patients
were given a medical, psychiatric, physical therapy,
and occupational therapy exam, as well as a
questionnaire battery. Admissions were decided at team
conferences. Efforts were made not to admit patients

with extensive psychopathology. The medical component consisted of a "pain cocktail" to reduce or eliminate dependence on pain medication, and anti-depressants for patients who presented depressive symptoms. The physical therapy included daily exercise, physical activities, massage, and a back school. The psychological component consisted of time management, assertiveness training, occupational therapy, hypnosis, and stress management. After discharge from the hospital most patients received outpatient treatment.

Instruments and Procedure

A week or two prior to being admitted demographics, family, social, employment, medical history, pain behaviors, and coping and beliefs about health were assessed with the Computerized Pain History Questionnaire (CPHQ) (Snow, Pinter, Gusmorino, Jimenez, & Weiser, 1985) a questionnaire developed at the OAPC. Items 29A to 29G on the CPHQ assess activities of daily living. These items were drawn from the modified version of the Stanford Health Assessment Questionnaire (Pincus, Summey, Soraci, Wallston, & Hummon, 1983). The standard OAPC assessment battery also included the MMPI, the McGill-Melzack Pain Questionnaire (MMPQ) (Melzack, 1975), the Profile of Mood States (POMS) (McNair, Lorr, & Doppleman, 1971) and the Poor Self-

esteem scale from the Psychiatric Epidemiological Research Inventory (PERI) (Dohrenwend, Shrout, Egri, & Mendelson, 1980). Refer to Appendix D for the intake assessment package and Appendix E for a categorical list of variables assessed. In addition to these tests, patients, within the first three days of their stay, were given a list of 45 possibilities for the self (see Appendix A). These items represent the five domains previously discussed: control; physical vulnerability; dependence on medical care; social isolation; and defendence towards physicians (see Appendix B for breakdown of items by domain). These items were intuitively derived or selected from pain patients' self descriptions, items from various self-concept scales, and from Roget's Thesaurus. Efforts were made to keep these items contextually anchored to the chronic pain experience. Subject's were asked whether the item represented them as they were in the present (now self); 2) whether the item represented them as they believed they would be in one year (probable self); 3) and whether the item represented them as they would like to be in one year (ideal-self). One year was chosen in order to provide patients with a point in time at which treatment gains would have been envisioned as enduring.

In addition to measuring self-concepts linked to the chronic pain experience a generalized measure of dispositional optimism was given to the patients. Since probable and ideal self-percepts represent how one expects or hopes to be in the future they were thought to show some link to generalized outcome expectancies. The 12 item Life Orientation Test (Appendix C) which has been found to predict symptom reports among college students (Scheier & Carver, 1985) and outcome among clinical populations (Strack, Carver & Blaney, in Press; Carver & Gaines, in Press) was used.

During the course of their hospital stay informal semi-structured interviews (see Appendix G for the outline of this interview) were conducted with the patients. These interviews represented an ancillary feature of this study.

Respondents were assessed approximately five weeks after in-patient discharge with an abbreviated version of the OAPC Follow-up Questionnaire (see Appendix F). This questionnaire contains items which assessed patients on such critical variables as post-discharge work and medical history, sexual activity, sleep, and an array of pain behaviors such as walking tolerance, time spent in bed, and pain ratings. In addition

patients were again administered the Profile of Mood States scale, the Poor Self-esteem scale and the McGill-Melzack Pain Questionnaire. In instances where patients refused or failed to return the follow-up questionnaire structured and/or open-ended phone interviews were conducted. The questions typically asked in these interviews were about occupational status and physical activities (items 2, 2A, 4, 4A and 9) and subjective estimates of improvement (items 26 through 29). An earlier study at the OAPC with this population has shown that, in instances where phone contacts have been made with patients, 56% to 76% return the questionnaire and that less than 4% refuse to either fill in a questionnaire or allow a phone interview. In the study discussed here patients were expected to be more responsive since, 1) patients, at intake, were asked for their consent to participate in the follow-up study; 2) follow-up occurred considerably earlier than with the previous in-patient sample; and 3) the follow-up questionnaire for this sample of patients was shorter than the one previously administered. The follow-up questionnaire, along with a self addressed stamped envelop, was given to patients (in a sealed envelop) at their time of discharge from

the hospital. Patients were instructed to complete and return the questionnaire one month after discharge.

The dependent variables were pain relief, employment, vocational, and household activities, decreased use of pain medications, increased physical and social activities, mood disturbance and self-esteem.

Intake findings were compared with the possible selves scores. It was expected that now self, probable self, and ideal self ratings should correlate with the intake measures of mood disturbance, as measured by the POMS, and with self-esteem, as measured by the Psychiatric Epidemiological Research Inventory. Two types of analysis regarding the relationship between possible selves scores and outcome data were undertaken. The first type of analysis used correlational and regression techniques to determine whether possible selves ratings predicted response to treatment. In instances where intake and outcome scores for the same measure were available intake scores were statistically controlled so that a measure of change could be obtained. The major hypothesis was that there would be significant association between outcome scores and the ratings of probable and ideal self. Discrepancy scores (Self/Ideal-self and

Self/Probable-self) were also obtained in order to determine whether increased discrepancy correlated with distress at intake (adjustment hypothesis) and whether high discrepancy would predict a better response to treatment (motivational hypothesis). The second type of analysis utilized a categorical measure of adequate functioning. An operational definition of successful outcome was derived from a modification of the criteria used by Roberts and Reinhardt (1980). In order to meet criteria for a successful outcome patients were required to be: employed, looking for a job, working as a volunteer, in school, or engaged in a hobby or housework more than 50% of the time. Patients who reported that they met none of these criteria were classified as unsuccessful (inactive). It was expected that the Probable Self and Ideal Self means would be higher for the active group than for the inactive group.

Results

Initial status

Demographic, medical and behavioral measures.
Tables 1 and 2 present a breakdown of the demographic,
medical and behavioral characteristics of the 80
patients in the intake sample. The overall profile is
dominated by a middle aged, Caucasian, reasonably well-
educated, Jewish or Catholic and 75% female clientele.
Sixty-two (77.5%) of the patients were admitted with
some type of back pain, four patients (5.0%) were
admitted with chronic intractable cervical pain, four
were admitted with some type of lower extremity pain;
among the other pain complaints were facial pain, hand
pain, and trunk pain. The mean number of years in
pain was 6.9. Ninety percent of the patients reported
previous hospitalizations for pain; 57.4% had at least
one surgery for their pain and 26.5% reported at least
two surgeries. Although 71.4% of the patients were
employed before the onset of their pain, at intake only
10.3% were working. Ninety percent of the patients
reported using pain medications and 50.6% reported
using some type of narcotic medication.

Table 1

Demographic Characteristics of Intake Sample N=80*

Variable	N	Percentage
Males	22	27.5%
Females	58	72.5%
Race		
white	63	79.7%
black	9	11.4%
Hispanic	5	6.3%
other	1	1.3%
Education		
grades 1-8	2	2.4%
grades 9-11	13	16.9%
high school	22	28.6%
tech/2 year college	24	31.2%
college	7	9.1%
graduate school	9	11.7%
Marital status		
never married	20	27.0%
married	28	37.8%
separated or divorced	15	19.3%
widowed	11	14.9%
Religion		
Protestant	9	11.5%
Catholic	29	37.2%
Jewish	31	39.7%
other	5	6.4%
none	4	5.1%

Age: Median: 43   Mean: 46.1   S.D.: 15.9 Range: 20-84
* On this table and all subsequent tables sample size may vary for individual items.

Table 2

Medical and Behavioral Characteristics of Intake
Sample N=80

Variable	N	Percentage
Employed prior to pain	55	71.4%
Working at intake	8	10.3
Financial difficulties	49	69.0
Decrease in income since pain	47	77.0
Using pain medication	67	90.5
Using narcotics	39	50.6
Litigation	20	27.0
Using assistive devices	46	59.7

Variable	Median	Mean	S.D.	Range
Years in pain	4.75	6.90	8.06	.25 to 38
Past treatments for pain	8	8.79	4.33	1 to 17
Past hospitalizations · for pain	2	4.00	4.53	0 to 25
Number of surgeries for pain	1	1.26	1.67	0 to 7
Hours in bed during the day	5	4.96	3.38	0 to 12

Clinical measures. The psychological profiles of these patients show high levels of disturbance (Table 3). T-Scores on seven of the 10 clinical scales of the MMPI are over 60. The mean scores for hypochondriasis, depression and hysteria are over 70, placing the average pain patient in this sample two standard deviations above the mean. A high elevation on the left side of the MMPI scale is a typical profile of the chronic pain patient (e.g., Sternbach, 1974; McArthur, Cohen, Gottlieb, Naliboff, & Slander, 1987). This is likely due to a high level of depression and a large number of physical complaints. The Profile of Mood States (POMS) for patients in this sample looks similar to the T-score profile of a group of psychiatric out patients (McNair et al., 1971).

Pain. High levels of pain are indicated by a score of 69.6 on a 0 to 100 point scale from the Computerized Pain History Questionnaire (CPHQ) and a mean of 3.71 on the four point present pain intensity scale (PPI) from the McGill-Melzack Pain Questionnaire (MMPQ). The relative frequencies in Table 4 show that 54.3% of the sample reported their pain as either horrible or excruciating and 77.3% reported that they were constantly in pain. The other MMPQ scores appear (Table 3) to be consistent with what has been previously reported for pain patients (Melzack, 1975).

Table 3
Psychological Measures at Intake (N=74)

MMPI (validity & clinical scales)

	Mean	SD
Lie	52.4	6.46
Infrequency	59.5	9.02
K (Social desirability)	51.5	7.51
Hs	73.7	11.0
D	79.2	13.8
Hy	75.4	9.82
Pd	65.8	11.3
Mf	51.2	12.7
Pa	61.2	9.94
Pt	66.4	10.9
Sc	68.4	13.8
Ma	57.7	10.8
Si	57.9	10.6
Negative Affectivity#	63.3	11.8

Computerized Pain History Questionnaire

Pain (0 to 100)+	69.6	15.6
Stress (0 to 100)	66.9	20.7

Profile of Mood States*

Anxiety	47.6	8.37
Depression	48.6	9.18
Hostility	50.2	8.76
Activity	48.6	8.52
Fatigue	54.8	8.71
Confusion	46.2	9.31
Total Mood Disturbance	198.8	41.62

McGill-Melzack Pain Questionnaire

Sensory (0-41)	15.4	7.42
Affective (0-16)	3.25	2.58
Evaluative (0-5)	3.54	1.34
Miscellaneous (0-17)	5.47	3.12
Present Pain Intensity (1-5)	3.71	0.95
Number of Words Counted (0-20)	10.4	4.33

Negative Affectivity (NA) is measured by the Taylor
Manifest Anxiety Scale.
+ The intervals in parentheses refer to the possible
range of the scale.
* The norms for the T-scale used here for the POMS were
derived from a psychiatric population.

TABLE 4

**Relative Frequency Counts for Intensity and Frequency
of Pain at Intake**

Pain Intensity (from the Present Pain Intensity scale
of the McGill-Melzack Pain Questionnaire):

Value label	Frequency	%	Cumulative %
1 Mild	0	--	--
2 Discomforting	6	8.6	8.6
3 Distressing	26	37.1	45.7
4 Horrible	20	28.6	74.3
5 Excruciating	18	25.7	100.0

Pain Frequency (from the CPHQ):

Value label	Frequency	%	Cumulative %
1 80-100% (constant)	58	77.3	77.3
2 50-80%	16	21.3	98.3
3 25-50%	1	1.3	100.0
4 < 25%	0	--	100.0

Follow-up sample

Table 5 displays the response rate for the 80 pain patients originally selected for this study. Follow up data were not obtained for twenty of these patients due to such factors as failure to complete the program, comprehension problems, and refusals. Approximately 75% of the patients were contacted between four and eight weeks after discharge. However, seven patients were not reached until 12 weeks after discharge; therefor the interval between discharge and follow-up is positively skewed ($\underline{M}$=8.39, $\underline{SD}$=7.33, median=5).

Self Perception Scale and Optimism

The Now Self, Probable Self and Ideal-self scales were constructed in order to determine whether patients' expectations and idealizations of themselves in the future would predict response to treatment. These three self perception scales originally consisted of five subscales (control, dependency on medical care, physical vulnerability, affiliation and conflict with physicians). Each of these subscales possessed adequate reliability (Refer to Appendix I for a comprehensive description of the reliability of the Self Perception Scale).

Table 5

Post Treatment Assessment: Response Rate

	Intake Sample (N=80)		Posttrt (N=67)
Posttrt assessment	N	%	%
Questionnaire	47	58.7	70.2
Phone Interview	8	10.0	11.9
Brief Phone Int.	5	6.3	7.5
Refused	3	3.8	4.5
No posttrt contact	4	5.0	5.9
			100.00
Comprehension problem*	5	5.0	
Discharged early	8	10.0	
	80	100.00	

* Inadequate command of English or cognitive problem

Validity of the three self concept measures. The

15 Self Perception Scales (SPS) were factor analyzed

with principal axis factoring using varimax rotation in

order to determine whether Now, Probable and Ideal-self

could be viewed as separate dimensions (Table 6). The

results provided evidence for the construct validity of

the three self-concept measures. Four factors were

produced with eigenvalues greater than one. These four

factors accounted for 70.6% of the variance. Factor I

represented the dependency, control, vulnerability and

affiliation scales from Ideal-self. Factors III and IV

represented these same SPS scales from the Probable and

the Now Self. The scales that loaded on factor II were

the Probable, Now and Ideal-self conflict with

physicians scales. The interesting finding is that,

with the exception of conflict with physicians, the

scales cohere along the dimensions of Now Self,

Probable Self, and Ideal-self rather than along the

dimensions of control, dependency, physical

vulnerability and affiliation. This indicates that

pain patients are able to think about themselves as

they are now, as they expect to be and as they would

like to be. On the other hand, the three conflict with

physicians scales loaded on one factor. Conflict with

Table 6

Factor Analysis of the 15 Scales from the SPS: Principal Axis Factoring; Varimax Rotation*

Factor	Eigenvalue	% of Variance	Cum %
1	4.60	30.7	30.7
2	2.77	18.5	49.2
3	1.98	13.2	62.4
4	1.23	8.2	70.6

	I	II	III	IV
Ideal Self Dependency	.83			
Ideal Self Control	.76			
Ideal Self Vulnerab.	.66			
Ideal Self Affiliation	.66			
Probable Self C/W/P#		.86		
"Now" Self C/W/P		.77		
Ideal Self C/W/P		.69		
Probable Self Vulnerability			.91	
Probable Self Control			.66	
Probable Self Dependency			.54	
Probable Self Affiliation			.49	
"Now" Self Control				.76
"Now" Self Affiliation				.73
"Now" Self Vulnerability				.64
"Now" Self Dependency				.50

* All unreported loadings are $\leq$ .40.
\# C/W/P represents conflict with physicians.

physicians appears to represent something different than the other four scales since it was not differentiated by the three self-conflict scales.

Control, dependency and vulnerability. Among the five subscales of the Now Self scale patients scored lowest on control, dependency and physical vulnerability (Appendix I). During interviews with these patients 85% of the hopes and fears reported wererelated to these three dimensions (Appendix I). Since patients appear to identify these constructs as important and as their most disturbed areas of functioning subsequent analyses of the Now Self, Probable Self and Ideal-self scales will focus on the composite score of the control, dependency and physical vulnerability scales.

Optimism. The Life Orientation Test (LOT), Scheier and Carver's (1985) scale for optimism-pessimism, is used in many subsequent analyses along with the three Self Perception Scales. The rationale is that this measure of optimism has been conceptualized to represent a dispositional tendency to hold generalized expectancies about the future (Scheier & Carver, 1985), suggesting a theoretical link to the

probable self construct that I am exploring. The optimism mean obtained for the pain patients ($\underline{M}$ = 18.5, $\underline{SD}$ = 5.34) was significantly lower ($\underline{p}$ < .001) than the norms reported by Scheier & Carver (1985) for college males ($\underline{M}$ = 21.03, $\underline{SD}$ = 4.56, $\underline{t}$ = 4.17) and females ($\underline{M}$ = 21.21, $\underline{SD}$ = 5.22, $\underline{t}$ = 4.18). Optimism significantly correlated with Now Self ($\underline{r}$ = .36, $\underline{p}$ $\leq$ .001) and Probable Self (r = .34, $\underline{p}$ $\leq$ .005), but did not correlate with Ideal-self (Table 7).

The Self Perception Scale, Optimism and Other Pre-treatment Measures

In order to get a better understanding of pain patients' current, probable and ideal self-concepts the three self perception scales as well as optimism were correlated with the pain, distress and activity measures taken at intake. I will first review the relationship of the self perception variables and optimism with the pain and distress measures, I will then examine physical activities.

Since Now Self was thought to represent a self-schema of distress and disability it was expected that it should correlate with other scales measuring distress and, such as the Profile of Mood States

(POMS), MMPI, Poor Self-esteem. Convergent validity
appears to have been demonstrated given the high
proportion of significant correlations between the Now
Self scale and various measures of mood disturbance
(see Table 8). Coefficients ranging from
-.28 (p < .01) to -.50 (p < .001) were obtained for
correlations between Now Self and the distress measures
on the POMS. A similar pattern appears for
correlations between Now Self and Poor Self-esteem, and
Now Self and the MMPI scales. The relationship between

Table 7

Intercorrelations of the Self Perception Scales+,
Optimism and Negative Affectivity

	1	2	3	4
1. Now Self	--			
2. Probable Self	.36***	--		
3. Ideal-self	-.08	.29**	--	
4. Optimism	.36***	.34**	-.02	--
5. NA	-.53***	-.37***	.00	-.60***

+ On this table and all other tables in the Results
section the subscales for the three Self Perception
Scales are Control, Dependency on Medical Care, and
Physical Vulnerability.
* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$.

Table 8

Correlations of the Self Perception Scales, Optimism
and Negative Affectivity with Measures of Distress,
Pain and Activity at Intake   (N=65)+

POMS	Now Self	Probable Self	Ideal Self	Opt	NA
Anxiety	-.28**	.04	.15	-.32**	.40***
Depression	-.44***	-.10	.10	-.47***	.52***
Hostility	-.48***	-.16	-.02	-.35**	.50***
Activity	.33**	.14	-.14	.32**	-.23*
Fatigue	-.41***	-.04	.15	-.25	.32**
Confusion	-.43***	-.12	.05	-.46***	.48***
Total POMS	-.50***	-.11	.12	-.46***	.53***
Poor Self-esteem	-.32**	-.21*	.08	-.45***	.43***
McGill-Melzack Pain Questionnaire					
Sensory	-.39***	-.19	.01	.07	.31**
Affective	-.19	.13	.18	.11	.12
Evaluative	.01	.10	.01	.06	-.12
Miscellan.	-.26*	-.01	.16	.13	.15
Present pain intensity	-.14	-.09	.23*	.03	-.02
Number of pain words	-.37**	-.07	.07	.03	.27*
CPHQ activity measures					
Physical tolerance	.37***	.03	-.27*	.22*	-.12
Weekly activities	.31**	.22*	.14	.00	-.07
Activities of daily living	.31**	.15	.11	.02	.14
Hobbies	.36**	.18	.00	.18	-.24*
Housework	.25*	.21	.22	.12	.14
Downtime	-.56***	-.17	.05	-.16	.28*
TV watching	-.41**	-.13	.08	-.11	.17

(Table continues)

Table 8 (continued)

<u>Correlations of the Self Perception Scales, Optimism</u>
<u>and Negative Affectivity with Measures at Intake</u>
<u>(N=65)</u>+

	Now Self	Probable Self	Ideal Self	Opt	NA
<u>MMPI</u>					
Lie	.09	.04	-.18	.16	-.27*
Infrequency	-.35**	-.22*	-.12	-.41***	.61***
K-scale	.28*	.23*	.08	.41***	-.60***
Hs	-.29**	-.14	-.13	.03	.24*
D	-.45***	-.36**	.00	-.44***	.57***
Hy	-.30**	-.12	-.09	.07	.25*
Pd	-.30**	-.36**	-.05	-.32**	.46***
Mf	-.02	-.03	-.13	.10	.04
Pa	-.32**	-.24*	-.08	-.23	.48***
Pt	-.37**	-.26*	.01	-.41***	.68***
Sc	-.41***	-.24*	-.11	-.34**	.62***
Ma	-.08	.04	-.05	.14	.07
Si	-.33**	-.26*	-.02	-.49***	.54***

+ All significant correlations are in the expected
direction except for Ideal Self.
* p ≤ 0.05   ** p ≤ 0.01   *** p ≤ 0.001

Now Self and the McGill-Melzack Pain Questionnaire
(MMPQ) is not as robust; only three of the six pain
scales are significantly correlated with Now Self.

The relationship between the Probable Self
variable and the intake measures of distress and pain
is much weaker than the relationship between Now Self
and the intake variables. No significant correlations
occur with the POMS or with the MMPQ scales.
Correlations between Probable Self and the MMPI scales
and Poor Self-esteem, though significant, are not as
high as the Now Self correlations.

There were no significant correlations between
Ideal Self and the intake measures of distress. Only
one significant correlation occurs between Ideal-self
and one of the pain scales. Correlations between
optimism and other intake measures of distress show
significance for Poor Self-esteem, and several POMS and
MMPI scales. No relationship appears between optimism
and pain.

Physical activities. When the relationship
between the three self-concepts and disability is
examined, Now Self is shown to be strongly related to
physical activity at intake. In this analysis the
three Self Perception scales were correlated with seven
activity measures from the CPHQ. These CPHQ variables

were: a composite score of walking, standing and sitting tolerance (physical tolerance); the total number of weekly physical activities; activities of daily living (ADL) (Pincus, et al., 1983); hobbies; housework; time in bed during the day (downtime); and hours spent watching TV. during the day. The items from the ADL scale represented difficulty with common daily activities such as dressing, sitting in a chair, walking and washing, etc. (In the tables presented in the results section the sign of the ADL coefficients has been changed so that positive correlations represent increased, rather than decreased, activities of daily living). Housework, hobbies, downtime and TV were one item measures. The reliabilities of the multi-item measures ranged from .54 to .90. The pattern of correlations (Table 8) shows that all seven of the activity variables correlate with Now Self; only one activity measure, weekly activities, correlates with Probable Self ($r = .22$); Ideal-self is negatively correlated with physical tolerance ($r = -.27$); and optimism is positively correlated with physical tolerance.

What the data appear to show is that pain patients' perceptions of their current levels of control, dependency on medical care and physical

vulnerability are strongly related to mood disturbance and physical activity, and are moderately related to pain. Probable Self does not appear to be related to pain or to state measures of distress (POMS) at intake but does appear to be weakly related to self-esteem, trait measures of distress (the MMPI clinical scales) and physical activity. The relationship between Ideal-self with the intake measures is weak and inconsistent. Optimism is related to measures of psychological distress but not to pain or physical activity.

Self-perceptions, Optimism and the Follow-up Measures

Probable self. When the correlations between Probable Self and the measures taken at follow-up are examined (see Table 9) a stronger association between Probable Self and mood, pain and activity emerges than had been found when Probable Self had been correlated with the intake measures. Five of the six POMS scales taken at follow-up are significantly correlated with Probable Self. And, whereas the correlation between Probable Self and the Total Mood Disturbance Scale at intake was -.11 (p = n.s.), the correlation between the Total Mood Disturbance at follow-up and Probable Self is -.45 (p < .01). Probable Self ratings of control, dependency and vulnerability also show significant

correlations with Poor Self-esteem, the Sensory, Affective and Evaluative pain scales, and weekly activities, activities of daily living (ADL), hobbies and housework.

Partialing out Now Self from Probable Self. One criticism of the utility of the Probable Self measure is that the relationship between this measure and outcome could be attributed to shared variance between Now Self and Probable Self. This question was addressed by partialing out Now Self from the correlations between Probable Self and the outcome measures (Table 9). The pattern that emerges shows that Probable Self is no longer related to pain, moderately related to mood and self-esteem and continues to remain strongly related to physical activity.

Now self. The pattern of correlations between Now Self and the follow-up measures of distress and pain is similar to the pattern with the intake measures: Now Self correlates with Poor Self-esteem, all of the POMS scales and with three pain scales from the MMPQ. The pattern of correlations between Now Self and activity is less robust; Now Self correlates with three of the activity follow-up measures rather than with all seven.

<u>Optimism and ideal-self</u>. Optimism shows a similar pattern with the follow-up measures as it had with the intake measures: significant correlations with the POMS and Poor Self-esteem; and insignificant correlations with the MMPQ scales and the activity measures. Ideal Self correlates in the expected direction with evaluative pain, weekly activities, and ADL.

The pattern of correlations suggests that measures of self, probable self and optimism taken before admission are associated with the post treatment measures of mood and, in the case of Now Self and Probable Self with activity and to a lesser extent with pain. The relationship between Probable Self and the physical activity variables seems especially strong since these were the highest correlations that remained after the variance contributed by Now Self had been removed.

<u>Negative affectivity</u>

The significant correlations between Probable Self and the MMPI clinical scales (trait measures of distress) and the failure for Probable Self to

Table 8

<u>Correlations of the Self Perception Scales, Optimism</u>
<u>and Negative Affectivity with Measures of Distress,</u>
<u>Pain and Activity at Followup (N=42)+#</u>

	Now Self	Probable Self	Probable Self W/Now Self Partialed out	Ideal Self	Opt	NA
POMS						
Anxiety	-38**	-30*	-18	-15	-34*	66***
Depression	-40**	-43**	-35*	-20	-37**	52***
Hostility	-32*	-38**	-30*	-13	-33*	56***
Activity	50***	44**	32*	19	18	-37**
Fatigue	-31*	-32*	-24	02	-25*	12
Confusion	-19*	-18	12	-04	-45***	26*
Total POMS	-46**	-45**	-34*	-15	-41**	52***
Poor Self-esteem	-36**	-36**	-26*	-18	-54**	46***
MMPQ						
Sensory	-33*	-27*	-17	-26	-06	33*
Affective	-36*	-31*	-20	-16	-10	18
Evaluative	-22	-33*	-30	-17	-06	31*
Miscellan.	-09	-26	-24	-28*	-10	-09
PPI	-16	-04	-02	06	-10	22
NWC	-30*	-23	-14	-23	00	37**
CPHQ						
Physical Tolerance	40**	19	05	-01	06	-11
Weekly activities	32*	64***	60***	35*	12	-39**
ADL	45**	48***	38**	39**	-10	-15
Hobbies	26	47**	41**	23	-18	14
Housework	16	27*	23	24	-02	09
Downtime	-19	-05	02	-10	-04	14
TV	-17	00	06	10	-02	-01

+ All significant correlations are in the expected direction.
# Decimal points have been deleted.
* p ≤ 0.05   ** p ≤ 0.01   *** p ≤ 0.001

correlate with the intake measures of the POMS (a state measure of distress) suggests that Probable Self may be more closely related to trait measures of affect than to state measures of affect. In order to explore this issue further the role of negative affectivity was investigated. Watson and Clark (1984), in their comprehensive review of this construct, describe negative affectivity (NA) as a mood dispositional dimension of negative emotionality and self-concept. Negative affectivity is somewhat more general than the traditional theory of trait anxiety. Not only are people who are high in NA reactive to stress but they also show a predisposition to experience distress and dissatisfaction at all times. Watson and Clark (1984) list a number of scales which have been frequently used to measure neuroticism and trait anxiety. These authors argue that the high intercorrelations among these scales represent one unifying construct, namely, NA. The most highly correlated scale in this matrix is the Taylor Manifest Anxiety Scale (TMAS) (Taylor, 1953). This scale is available to me since it is one of the many research scales (Appendix E) scored from the MMPI that pain patients had taken at intake.

Pain patients, at intake, display a relatively high level of NA with a mean on the Taylor Manifest Anxiety Scale (TMAS) of 63.3 ($\underline{SD}$ = 11.8). Table 7

shows that TMAS significantly correlates with Now Self
(r = -.53), Probable Self (r = -.37) and with optimism
(r = -.60). No relationship is found between TMAS and
Ideal-self.

The relationship between negative affectivity and
the other intake measures shows a robust pattern of
correlations between TMAS and the POMS, self esteem and
the MMPI clinical scales. A weaker relationship is
found between TMAS and the intake measures of pain and
physical activity. TMAS correlates with only two of
the six MMPQ scales and with only two of the seven CPHQ
activity scales.

A similar pattern of correlations is found between
TMAS and measures taken at follow-up. Table 9 shows
that TMAS correlates with all of the POMS scales except
with fatigue (a measure of low positive affect). Four
(anxiety, depression, hostility and total mood
disturbance) of these correlations are impressive (.52
$\leq r \leq$ .66). TMAS also correlates with self-esteem,
three of the MMPQ scales and one of the physical
activity measures.

Predicting Change

Table 10 shows the results of a series of
hierarchical and stepwise multiple regression analyses
which were carried out in order to determine the degree
to which self perception, optimism and negative

affectivity predicted pain, distress and physical activity at follow-up, as well as to see if a combination of these variables would prove more predictive than simply using one variable. In these regression analyses the dependent variables (all given at follow-up) were the six POMS scales, POMS Total Mood Disturbance, Poor Self-esteem, the six MMPQ scales, and the seven CPHQ activity measures. Initial levels of these variables were controlled for by first entering the corresponding pre-treatment measure of the POMS, Self-esteem, MMPQ, or CPHQ as an independent variable and then entering, in a stepwise fashion, the three Self Perception Scales, optimism and NA. Because of the small sample size significance level was set at 0.10. Regression analysis of the POMS shows that Probable Self contributed a significant proportion of the variance to depression and Total Mood Disturbance, NA predicted changes in anxiety and hostility, Now Self predicted activity, and that none of the predictors contributed to changes in either fatigue or confusion. The effects of NA on anxiety and hostility are impressive since the change in R-Square is greater than the R-Square for the intake measures of anxiety and hostility. Probable Self contributed significant variance to the MMPQ miscellaneous pain scale. Negative affectivity contributed to five of the MMPQ

Table 10

Regression Analysis of Mood, Self-esteem, Pain and
Activity at Follow-up

Profile of Mood States (N=38)

Measures

Dependent	Independent	Beta#	R-Square Change	Fch	p
Anxiety	Anxiety		.13	5.42	.025
	NA**	.71	.33	21.85	<.001
	TOTAL		.46	15.2	<.001
Depression	Depression		.24	11.81	.001
	Probable Self	-.36	.13	7.16	.011
	TOTAL		.37	10.5	<.001
Hostility	Hostility		.08	3.32	.076
	NA*	.57	.20	9.98	.003
	TOTAL		.28	7.05	.003
Activity	Activity		.01	0.34	n.s.
	Now Self*	.47	.22	10.05	.003
	TOTAL		.22	5.24	.01
Fatigue	Fatigue		.10	4.07	.051
Confusion	Confusion		.24	11.58	.002
Total POMS	Total POMS		.25	12.18	.001
	Probable Self	-.35	.12	6.66	.014
	TOTAL		.36	10.3	<.001
Poor Self-Esteem	Poor S.E.		.32	17.03	<.001
	Optimism	-.38	.12	7.59	.00
	TOTAL		.44	10.3	<.001

(Table Continues)

Table 10 (continued)

Regression Analysis of Mood, Self-esteem, Pain and Activity at Follow-up

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McGill-Melzack Pain Questionnaire (N=30)

Dependent	Independent	Beta#	R-Square Change	Fch	p
Sensory	Sensory		.30	14.5	<.001
Affective	Affective		.0005	0.14	n.s.
	NA	.38	.15	4.11	.054
	TOTAL		.15	2.06	.15
Evaluative	Evaluative		.01	0.35	n.s.
	NA	.43	.18	6.18	.019
	TOTAL		.20	3.30	.052
Miscellaneous	Misc.		.09	3.22	.082
	Prob. Self	-.42	.081	2.95	.096
	NA	-.31	.079	3.08	.090
	TOTAL		.25	3.30	.034
Present pain intensity	PPI		.16	5.97	.020
	NA	.41	.07	2.88	.100
	TOTAL		.23	4.61	.07
Number of words counted	NWC		.31	14.7	<.001
	NA*	.40	.16	9.47	.004
	TOTAL		.47	14.0	<.001

(Table continues)

Table 10 (continued)

Regression Analysis of Mood, Self-esteem, Pain and Activity at Follow-up

CPHQ activity variables (N=35)

Dependent	Independent	Beta#	R-Square Change	Fch	p
Physical	Phys. tol.		.23	9.49	.004
tolerance	Now Self	.28	.07	3.28	.08
	TOTAL		.30	6.72	.004
Weekly acts.	Weekly acts.		.25	9.43	.005
	Prob. Self**	.57	.30	18.31	<.001
	TOTAL		.55	16.8	<.005
Acts. of	ADL		.40	23.11	<.001
Daily Living	Prob. Self	.36	.12	8.50	.006
	TOTAL		.53	18.4	<.001
Hobbies	Hobbies		.16	5.45	.027
	Prob. Self	.34	.10	3.56	.070
	TOTAL		.26	4.75	.017
Housework	Housework		.09	3.42	.073
Downtime	Downtime		.25	12.2	.001
TV	TV		.29	16.4	<.001

Note: The dependent variables represent measures given at follow-up. The independent variables represent measures given at intake. The intake variables of mood, pain or activity were entered first and then the three self perception scores, optimism and NA were entered in a stepwise fashion. Criteria for admission of the predictors into the stepwise regression analysis was set at $p \leq 0.10$.

All Beta weights are in the expected direction except for Miscellaneous pain regressed on NA.
* Meets criteria for the Bonferroni correction for joint effects at the .10 level of significance (.10/21=.005).
** Meets criteria for the Bonferroni correction for joint effects at the .05 level of significance (.05/21=.002).

scales. (However, the beta weight for one of these scales, Miscellaneous pain, was in the opposite direction). Negative Affectivity failed to make any significant contributions to the CPHQ activity measures. Probable Self contributed to three of these measures (weekly activities, Activities of daily living, and hobbies) and Now Self contributed to physical tolerance. The only pre-post treatment change which optimism contributed to was self-esteem. Ideal-self made no significant contributions to any of the dependent measures.

Among the five predictors it appears that improvement in mood and reduction in pain is best predicted by negative affectivity. However Probable Self appears to be the best overall predictor in that it predicted improvement within each of the three categories: mood, pain and physical activities. In only one of the regression equations does entering an additional predictor significantly increase the variance contributed. Failure to find more regression equations with multiple predictors may be due to the small sample size or to the redundancy between Probable Self, Now Self, optimism and NA. That is, once the variance of one the predictors had been removed there is no remaining variance that can be explained by additional variables.

Bonferroni correction. The use of the .10 level of significance was selected because of the small number of subjects. However, as a result of this significance level and the 21 regression equations calculated, the positive findings are subject to a Type II error. In order to control for this a Bonferroni correction procedure was utilized. This procedure divides the initial selected level of significance by the number of tests performed. Table 11, which is drawn from the results in table 10, shows the predictors at their different levels of significance. When the .10 level was adjusted NA predicted Anxiety, Hostility and the number of pain words, Now Self predicted Activity, and Probable Self predicted Weekly activities. When a more stringent criteria for significance was applied (Bonferroni correction for a .05 level of significance) NA predicted increased Anxiety and Probable Self predicted increased number of weekly activities.

On the follow-up questionnaire patients were asked 21 questions regarding improvement on various domains such as pain, activity, mood, social relationships and work. Patients were also asked to rate their satisfaction with the program as well as the degree to which they believed the program had helped. An

Table 11

Change Predicted at the .10 Level among the 21 Regression Analyses

	Change		
	Mood	Pain	Physical activity
Predictors NA	Anxiety*** Hostility **	Affective Evaluative* - Miscellaneous PPI NWC**	
Now Self	Activity**		Physical tolerance
Probable Self	Depression* Total POMS	Miscellaneous	Weekly activities*** ADL* Hobbies
Optimism	Self-esteem*		

- Opposite to the predicted direction.

*   p ≤ .05

** p ≤ .005 (Bonferroni correction for .10 level of significance).

*** p ≤ .002 (Bonferroni correction for .05 level of significance).

examination of Table 12 shows that Now Self significantly correlates with reduced pain, coping with pain, increased sitting, standing and walking tolerance, more time working or volunteering, increased social activities, fewer health worries and greater satisfaction with the program. Probable Self shows a significant relationship with less pain, coping with pain, improved sleep, increased standing and walking tolerance, reduced loneliness, less time watching TV ., increased time working or volunteering, fewer health worries, satisfaction with the program, and a belief that the program had helped. Ideal-self correlates with self-reports of increased sexual activity, better relationship with spouse, increased social activities, less time watching TV, increased time working or volunteering, and a belief that the program had helped. Negative affectivity correlates with only one of the improvement variables; reduction in pain medications ($r = -.30$). Optimism correlates with increased physical activities and (unexpectedly) increased TV watching. It appears that all three of the self perception variables are associated with self-reports of improvement, and that NA and optimism show a very weak relationship with these domain specific outcome measures.

Table 12

Correlations of Self Perception, Optimism, and Negative
Affectivity with Follow-up Estimates of Improvement
(N=50)#@

	Now Self	Probable Self	Ideal Self	Opt	NA
Less pain	24*	24*	06	-13	-11
Coping w/pain	24*	35**	15	05	-18
Better sleep	17	25*	10	14	-13
Sitting	26*	19	10	08	-19
Standing	33*	24*	08	08	-12
Walking	32*	31*	18	05	-22
Physical activity	19	19	19	27*	02
Sexual functioning	14	22	37**	09	-17
Relationship w/spouse	04	26	38*	-11	-22
Relate w/family	-17	19	-05	01	05
Relate w/best friend	01	05	-05	-05	08
Social activities	25*	08	30*	16	-18
Less loneliness	02	30*	23	17	-18
Less stress	17	16	08	-12	-12
Fewer health worries	36**	33*	05	-15	00
Less pain medication	18	10	07	20	-30*
Less contact w/health care workers	01	24	06	00	-02
Less T V watching	-09	39**	32*	-24*	14
Less downtime	01	21	18	-15	21
Housework	-19	05	16	09	00
Work/volunteer	29*	29*	45***	08	-10
Satisfaction with program	23*	28*	20	-03	-06
Degree program helped	17	28*	28*	-21	02

For the Self Perception scales and Optimism positive
correlations are in the direction of adjustment
(expected direction). For NA negative correlations are
in the expected direction.
@ Decimal points have been deleted.
* p ≤ 0.05   ** p ≤ 0.01   *** p ≤ 0.001

Status at Outcome

Probable self should also predict patients who will either be active or inactive at follow-up. At follow-up patients were placed in either an active or inactive group. The active group consisted of patients who reported that they were either working, doing volunteer work, engaged in housework or in a hobby more than 50% of the time, looking for work, or in school. The results provide support for the hypothesis. Table 13 presents comparisons of the active (n=23) and the inactive (n=33) patients' scores for Now Self, Probable Self, Ideal-self, NA, optimism, Poor Self-esteem, and for Total Mood Disturbance. Patients who reported an active status at follow-up scored significantly higher on the Probable Self scale and Ideal-self scale and marginally higher on the Now Self scale than patients who reported an inactive status at follow-up. No significant differences between the active and inactive groups were found for NA, optimism, Poor Self-esteem, or for Total Mood Disturbance. In addition no significant differences were found between the active and inactive patients on the six POMS scales or on the six pain scales from the MMPQ.

Table 13

<u>Comparisons of Pre-treatment Scores of Patients</u>
<u>Reporting an Active or Inactive Status at Follow-up</u>

Pre-treatment	Follow-up Status					
	Active (n=23)		Inactive (n=33)			
Scale	Mean	SD	Mean	SD	t	Prob
Now Self	42.4	(15.6)	35.6	(12.1)	1.73	.052
Probable Self	66.0	(9.01)	59.6	(9.45)	2.60	.012
Ideal Self	77.0	(4.15)	71.5	(9.02)	2.73#	.010
Optimism	19.0	(4.48)	18.9	(4.66)	0.06	ns
Negative Affectivity	61.6	(12.4)	63.7	(12.2)	-0.62	ns
Poor Self-esteem	16.3	(5.47)	15.0	(6.53)	0.82	ns

<u>POMS Total Mood Disturbance</u>

	200	(43.6)	196	(44.0)	0.31	ns

#The variances of the Ideal-self control-depression-
vulnerability score for the active and inactive groups
are unequal; an approximation of t (as used by SPSSX)
is reported.

Discrepancy scores

Now Self was subtracted from Ideal-self in order to obtain a Self/Ideal-self discrepancy score, and Now Self was subtracted from Probable Self in order to obtain a Self/Probable-self discrepancy score. These scores were then correlated with measures of pain and distress at intake and with measures of pain and distress at follow-up. A significant association is found between an increased level of Self/Ideal-self discrepancy and Self/Probable-self discrepancy with the intake measures of distress, pain and inactivity (see Table 12). Results at follow-up show a sharp drop in these correlations. When intake scores were controlled for with regression analysis only one variable (Activity) predicted Self/Ideal-self discrepancy. When the correlations between Self/Probable-self discrepancy and the follow-up measures were examined only one of the 21 variables reached significance.

The discrepancy scores for the active and inactive subjects were compared. No differences between the discrepancy scores and the two outcome groups were found. The active group's Self/Ideal-self discrepancy mean was 36.1 (SD=15.6) and the mean for the inactive

group was 36.2, (SD=16.7), t= -.02 (51). For the discrepancy score of Self/Probable-self the mean for the active group was 23.2 (SD=12.8) and the inactive group mean was 24.0 (SD=13.2), t= -.22 (51).

Table 14

Correlations of the Self Perception Discrepancy Scores
with Measures of Pain, Distress, and Activity at Intake
(N=65) and at Follow-up (N=42)

| | Discrepancy Scores+ | | | |
| | Self/Ideal-self | | Self/Probable-self | |
POMS	Intake	Follow-up	Intake	Follow-up
Anxiety	.30**	.24	.31**	.20
Depression	.40***	.23	.37***	.12
Hostility	.39***	.20	.36***	.07
Activity	-.30**	-.34*	-.22*	-.24
Fatigue	.39***	.28*	.39***	.08
Confusion	.36**	.15	.34**	.06
Total POMS	.46***	.32*	.42***	.18
McGill-Melzack Pain Questionnaire				
Sensory	.31**	.15	.23*	.15
Affective	.26*	.16	.25*	.18
Evaluative	-.01	.07	.05	.10
Miscellan.	.27*	-.09	.27*	-.06
PPI	.26*	.16	.10	.15
NWC	.32**	.14	.29**	.13
PERI				
Poor				
Self-esteem	.28*	.22	.15	.13
CPHQ				
Phys. Tol.	-.48***	-.37**	-.33**	-.30*
Weekly Acts.	-.16	-.12	-.14	.09
ADL	-.20	-.20	-.21*	-.15
Hobbies	-.26*	-.14	-.22*	.04
Housework	-.10	-.06	-.10	.02
Downtime	.48***	.10	.42***	.18
TV	.40***	.16	.48***	.21

+Now Self was subtracted from Ideal-self and Probable-
self in order to obtain the Self/Ideal-self discrepancy
score and the Self/Probable-self discrepancy score.
* $p \leq 0.05$;   ** $p \leq 0.01$;   *** $p \leq 0.001$

Discussion

The findings of this study indicate that
perceptions about the self in the future, and to a
lesser extent, negative affectivity, optimism, and
perceptions about one's current self and ideal-self are
predictive of response to treatment. When intake
levels of distress and inactivity were statistically
controlled and when patients' reports of improvement
were examined the probable self measure of control,
dependency on medical care and physical vulnerability
was the variable most consistently related to pre-post
treatment change. Also, probable and ideal self
significantly discriminated patients who reported, at
follow-up, that they were engaged in some activity from
patients who reported that they were inactive; now self
was only marginally related to active status at
outcome.

The modest correlations between now self and
probable self suggest that there is some overlap
between these two constructs but that they are not
identical. Furthermore, the separate factors that
resulted when all of the self-perception scales were
factor analyzed (Table 6) provides additional evidence

that patients are able to cognitively differentiate between now self, probable self and ideal self.

The fact that now self consistently correlated with the intake measures and that probable self correlated more robustly with the follow-up measures than with the intake scales suggests that the now self construct is related to current status and that the probable self construct is related to future status. Introducing the concepts of state and trait provides some understanding for the different pattern of correlations between the self-perception scales and the intake measures and the self-perception scales and the follow-up measures. There is evidence that probable self is more closely linked to trait measures of affect than to state measures of affect since it correlated with the MMPI (which is generally regarded as a trait measure of affect) and did not correlate with the POMS given at intake.

The weak relationship between probable self and current status was an unexpected finding and contrary to Markus's (Markus & Nurius, 1986) theory of possible selves and one of the minor hypotheses in this study. One of the possible reasons for this is that the probable self in this study was defined as the self after treatment. Patients were provided a context and

an expectation that their probable self would differ
from their current self. Therapeutic intervention is
not implied in the administration of the Possible
Selves Questionnaire that Markus & Nurius (1986) have
constructed.

Only partial support was produced for a
relationship between the ideal-self construct and
outcome. The number of significant correlations were
too few to suggest a relationship between ideal-self
and the intake and outcome measures of distress, pain
and activity (Tables 8 and 9). However, ideal-self did
discriminate between active and inactive patients and
correlated with pain patients' subjective estimates of
improvement (Table 12).

Negative affectivity and outcome

The results from the regression and correlation
analyses appear consistent with the recent research
findings reported for the NA construct (see, Watson &
Clark, 1984; Watson & Pennebaker, In Press). NA,
measured by the Taylor Manifest Anxiety Scale (TMAS),
appears to be more closely linked to measures of
negative affect than to positive affect. (A
description of the two-dimensional model of negative
and positive affect can be found in Watson and
Tellegen, 1985). The correlation between NA and

the intake and follow-up measures of anxiety,
depression and hostility (state measures of negative
affect) are higher than the correlations between NA and
fatigue and activity (state measures of low and high
positive affect). Furthermore, NA predicted changes in
anxiety and hostility. In fact, NA made a stronger
contribution to state measures of anxiety and hostility
at follow-up than did the pre-treatment scores of these
two affects. This provides evidence for the stability
of NA, since the NA measure taken at intake (TMAS) was
related to state measures of negative affect at follow-
up.

The fact that negative affectivity was also
related to changes in reported pain but that it was not
predictive of physical activity or able to discriminate
between active and inactive patients at follow-up is
consistent with the recent literature that has emerged
on negative affectivity (Watson & Clark, 1988; Watson &
Pennebaker, In Press). According to these authors NA
is associated with self-reports of psychosomatic
distress but it is not anchored to overt illness
behavior. The findings reviewed by Watson and
Pennebaker show that NA is correlated with reports of
physical symptoms such as headaches and back pain but
that it is not related to long term health status such

as extent of current disability, general fitness and lifestyle variables. Watson and Clark (1988) found that daily mood ratings of negative affect were related to health complaints and irritability but that negative affect was not related to physical activities such as skiing, traveling/sightseeing and "doing nothing at home".

It appears that NA is a more limited predictor of outcome than probable self perceptions; NA does predict patients' reports of negative mood and, to a lesser extent, pain but it is not predictive of pain patients' reports of overt behavior such as the number of weekly activities and interference with activities of daily living.

Contextualism and the dynamic self-concept

Though unanticipated, the dearth of correlations between probable self and the pre-treatment measures contributes to the discriminant validity of the probable self construct. It appears that pain patients do hold multiple conceptions about themselves and that these self-concepts are differentially related to functioning across time.

This distinction between self and probable self is linked with the renewed interest in and reformulation of the self-concept. Wylie (1974), after reviewing hundreds of studies, had concluded that there was little evidence to show that the self-concept directed behavior. However, Markus and Wurf (1987) have noted that there have recently been three major advances in self-concept research. First, self-concept is no longer explored as a unitary, monolithic entity. It is now viewed as dynamic and multifaceted. Second, the functioning of the self concept, "depends on both the self-motives being served [...] and on the configuration of the immediate social situation" (Markus & Wurf, 1987, p. 300). The third advance is that fine-grained behaviors have been introduced as dependent variables. In addition to overt actions these dependent variables include mood changes, shifts in self-esteem, choice of social setting, self-presentation and the construction of meaning.

Some of the features of these advances have been incorporated in this study. Self-concept was defined as dynamic and multifaceted in that current, probable, and ideal self-concepts were measured. Self-concept was not conceptualized as a global assessment of the self. Rather, it was thought to relate to issues that

were believed to be relevant to chronic pain patients
such as control, physical vulnerability and dependence
on medical care. And there was some approach made in
this study towards a fine-grained analysis. Dependent
measures included several subjective (e.g., mood, pain
and self-esteem) and objective (e.g., employment and
weekly activities) outcomes.

One of the problem areas in studying chronic pain
patients, noted earlier in this paper, is that it has
been difficult to predict response to treatment using
standardized personality tests. The findings in this
study provide some insight into why this has occurred.
In this study, while the self-perception scales were
related to activity status at outcome, all of the POMS
scales, NA, Poor Self-esteem, and optimism failed to
discriminate between active and inactive patients at
follow-up. A possible reason for this is that the SPS
scales differ from the other measures in two important
ways: 1) items from the SPS were generated in order to
be contextually anchored to the chronic pain
experience. That is, the items used such as seeing
doctors, taking public transportation and feeling
unproductive represented specific cognitions, affects
and behaviors important to the chronic pain patient.
Items used in the other scales are not domain

specific. Bandura (1977) and Mischel (Mischel & Peake, 1982) have argued that a primary reason for the zero or low non-zero correlations between psychological tests and behavior is that the tests are not contextually linked with the situation in which the behavior takes place. Bandura (1980) notes that one of the reasons for strong findings found in self-efficacy research is that microanalytic methods are used, that is, verbal ratings of self-efficacy parallel subsequent task performances. Mischel and Peake (1982) argue that behavioral consistency is much more likely to occur in situations that are similar than in dissimilar situations. 2) A second difference between the SPS and the other scales (with the exception of the optimism measure) is that the SPS measures how one will expect to be in the future. Since one of the hypotheses in this study is that a probable self schema will prove more predictive of one's future self than a now self schema it is not surprising that measures representing the current self tended not to be as predictive as the probable self measure. (However, the fact that NA also predicted pain and mood attenuates the importance of a probable self schema as a predictor of psychosomatic distress.)

Discrepancy scores

There was no support for the motivational hypothesis (e.g., Large, 1985) for a positive relationship between increased self/ideal-self discrepancy and improvement. None of the correlations between self discrepancy and outcome were in this direction. The few correlations which were in the opposite direction (high discrepancy, poor outcome) do not present a sufficiently robust pattern to conclude that elevated discrepancy predicts a poor outcome. There was support however for the more conventional hypothesis of a relationship between increased discrepancy and increased levels of current distress. Wylie (1974) has described self/ideal-self discrepancy as a measure of self-acceptance and adjustment and Higgins (Higgins, Klein, & Strauman, 1985) has found self/ideal-self discrepancy (what he calls actual-ideal discrepancy) to be associated with dejection related emotions and symptoms. It appears that while pain patients' discrepancy scores may tell us how depressed, pained, or inactive they are these discrepancy measures will not predict response to treatment.

Implications & Recommendations for Research and Treatment

Markus & Nurius (1986) have written that, "[...] negative possible selves can be powerfully imprisoning

because their associated affect and expectations may
stifle attempts to change or develop." (p. 963).   The
evidence reviewed above suggests that this is true for
chronic pain patients. It may prove helpful to provide
a special treatment regimen for patients who hold low
expectations of their future selves. This could be
accomplished by first identifying treatment goals that
patients feel that they are unlikely to achieve such as
exercising regularly and coping with stress and pain.
Various cognitive-behavioral treatment techniques could
then be used to promote the realization of these
goals. Patients could imagine themselves accomplishing
these goals (cognitive modeling), watch other pain
patients engage in them (modeling), and actually engage
in them (e. g., participant modeling). However, unless
these cognitions and performances change the probable
self schema treatment gains may be short lived.
According to the theory of possible selves people who
hold negative views of themselves in the future will
often remain attached to a negative view of themselves
despite contradictory positive evidence (Markus &
Nurius, 1986). As far as I am aware there is no
treatment that is specifically tailored towards
modifying the probable self schema although it is
likely that several types of treatments such as the

ones noted above could generate positive probable self perceptions.

I have argued that patients who at intake envision themselves after treatment as in control of their pain, capable, not dependent on medical care and physically resilient will be less distressed, less in pain, more physically active and more likely to be working after cognitive-behavioral treatment than patients with probable self schemas dominated by images of disability and dysfunction. Unfortunately it is not known by what mechanism the probable self-schema functioned to affect outcome. Since these processes have not been identified it is not known whether the measures reflect probable self or some other construct such as perceived self-efficacy or response expectancy. Kirsch (1985) has argued that expectancy is a good predictor of fear and avoidant behavior and that it explains the "placebo effect" which has been observed in psychotherapy. Another view of the impact of cognition on behavior is self-efficacy theory. Perceived self-efficacy is the belief that one can behave in such a way as to produce positive outcomes (Bandura, 1977). Although each of these predictive theories may be appealing because of their parsimony, neither of them appears sufficient to explain the probable self schema. The probable self,

like other possible selves, represents enduring goals, motives and fears that are personally relevant (Markus & Nurius, 1986). The attention to personal relevance and multiple identities appears to distinguish the theory of possible selves from the more circumscribed theories of behavioral change. While low expectations and perceptions of inefficacious coping may influence subsequent behavior the strength, generality and durability of these cognitions will likely be determined by the self-concept. In other words, the self-concept may be a superordinate category to self-efficacy and response expectancy. This may be especially likely to occur under circumstances in which self-schemas are activated. It should be remembered that unlike the experimental paradigms for expectancy or self-efficacy, patients' perceptions were assessed prior to treatment, that is, before expectancy or self-efficacy percepts had been manipulated. Future research could address itself to this question by assessing patients' probable self prior to treatment and then measuring the self-efficacy and/or expectancies after treatment. I would argue that the pretreatment measures of probable self would predict post treatment measures of efficacy or expectancy. I would also predict that although post treatment

measures of efficacy or expectancy may correlate with subsequent behavior, these correlations would be reduced when pre-treatment probable self measures had been partialed out.

Two recent unpublished studies have identified two motivational components of possible selves (Inglehart, Markus, Brown, & Moore, 1987; Inglehart, Wurf, Brown, & Moore, 1987). In these studies it was found that physicians, who at the start of their medical school, were either more focused or more affectively involved in becoming a doctor, were more likely to achieve higher grades. It was also found that career focus predicted career satisfaction. In addition, LISREL analysis produced a two factor model which showed that the cognitive (career focus) and affective (expectations of career satisfaction) components functioned independently. The cognitive motivational component of possible selves was thought to consist of clear goals, specific conceptions of the self and images of the desired end state. The affective motivational component was associated with the positive affect that an individual would experience in pursuing or realizing a goal. These findings suggest that by structuring and infusing with excitement the achievement of goals possible selves should motivate

pain patients to increase well behaviors and decrease pain behaviors.

The fact that negative affectivity was also related to outcome may suggest that pain patients are not amenable to treatment. After all, NA is thought to represent "[...] pervasive individual differences in negative mood and self-concept" (Watson & Clark, 1984, p. 477). If NA is hardwired to the personality it will not be likely to change even after treatment. However NA appears to be unrelated to overt pain behaviors. After treatment, subjects high in NA may be more likely to be anxious and hostile and even report higher levels of pain than patients low in NA. However, high NA subjects may be just as likely, after treatment, to be working, walking and vacuuming than their low NA cohorts. Further exploration of the impact and stability of NA among chronic pain patients, especially research to see if high NA individuals are more susceptible to the chronic pain syndrome, should prove a promising area of research.

Methodological issues

Although a factorial model consisting of the scales of the Self Perception Survey was produced a factorial model consisting of the 45 items of each of the three SPS scales was not constructed. A sample

size of at least 100 would probably be required in order to meet the minimum standards for an adequate factor analysis (Tabachnick & Fidell, 1983). Also there were no tests for convergent or discriminant validity for the five SPS sub scales. Therefore, it is difficult to know whether these rationally constructed scales (control, dependence, vulnerability, affiliation, and conflict with physicians) scales actually represent the constructs that their name implies.

Despite the limitations in establishing the validity of the control, dependency and vulnerability measures one implication of this research is that the probable self, because it is strongly linked to issues that are important to the chronic pain patient, represents more than expectancy or coping beliefs in particular situations. In this study the dimensions of self-schema were primarily derived from interviews with chronic pain patients and observations of a self-help group for people with chronic pain. It therefore is important that in order to identify the components of the self-schema one must have some grounding in the studied population's experience. For example, while the construct of control is prevalent in health psychology (e.g., Kobasa, 1982) and in cognitive models

of chronic pain (Rosenstiel & Keefe, 1983; Rudy et al.,
1985) issues such as dependency on medical care and
physical vulnerability are not as clearly evident. If
I had not had the opportunity to listen to my subjects'
descriptions of themselves, I would likely have had a
more limited understanding of chronic pain. While I
cannot be confident that I have measured dependency and
vulnerability the fact that these dimensions were
brought up by pain patients suggests that they will be
a fruitful area of inquiry.

Dismissal of the affiliation and conflict with
physicians scales was a post-hoc decision. However the
selection of the dimensions of control, dependence and
vulnerability was consistent with one of the initial
hypotheses in this study, i.e., that dimensions on
which patients rate current self low on are dimensions
modulated by the chronic pain experience. And that it
is to the extent that patients view their probable
selves high on these central dimensions that predicts
response to treatment. Interviews with the
hospitalized pain patients provide additional evidence
to buttress the validity of the saliency of the three
selected dimensions. Patients' hopes and fears were
much more likely to be associated with
control,dependency on medical care and physical

vulnerability than with affiliation or conflict with physicians (Table I-7).

Failure to show a relationship between the two discrepancy scores (self ideal-self and self probable-self) and outcome deserves comment. The use of difference scores, e.g., subtracting now-self from ideal-self, has been criticized for lowering reliability which, in turn, sharply attenuates correlation with other variables (Cohen & Cohen, 1975). This loss in true score variance in the discrepancy measure may have prevented significant correlations with the outcome measures.

Another problem area in the methodology was that sample size varied. In the follow-up phase of the project there was a problem with missing data. Fewer patients completed the Profile of Mood States (POMS) or the McGill-Melzack Pain Questionnaire (MMPQ) than had completed certain items on the follow-up Computerized Pain History Questionnaire (CPHQ). Although for each separate analysis missing data was not included sample size did vary from analysis to analysis. (For example in the regression analyses for the MMPQ N was 30 and for the t-test comparisons of the active and inactive groups N was 56).

Conclusion

The major finding of this study is that probable self and to a lesser extent negative affectivity, now self, ideal self and optimism predict treatment outcome among chronic pain patients. Probable self was related to a number of different outcome measures such as mood, pain, physical activity, subjective estimates of improvement and occupational activity. This self-schema for functioning after treatment appears to be uniquely related to outcome since it was only marginally related to current levels of distress. This provides both a caveat for assessment and some promise for future treatment. Reliance upon state measures at intake may overlook important strengths and weaknesses of the chronic pain patient. Assessment of probable self perceptions may provide a more comprehensive picture of the patient.

The Self Perception Survey

This questionnaire contains a group of items which may or may not describe you and your feelings towards physicians. It is in three parts. Part I refers to your self as you are now, Part II refers to your probable self, that is, the way you believe you will be one year from now, and Part III refers to your ideal self, that is, the way you would like to be one year from now.

This questionnaire is part of a research study being conducted on the impact of treatment for chronic pain. Participation in this study, and therefore completion of this questionnaire is voluntary. All responses are confidential and will be seen only by the OAPC staff. We will be contacting you one month after discharge from the inpatient program to ask you questions on your status.

Name:_____

Date:____·_____

For office use only:

ID:_____   Group:_____   SPSint_____

Sall_____   Pall_____   Iall_____

Scon_____   Pcon_____   Icon_____

Saff_____   Paff_____   Iaff_____

Svul_____   Pvul_____   Ivul_____

Sdep_____   Pdep_____   Idep_____

Sphy_____   Pphy_____   Iphy_____

Opt_____

Part I: In the blank to the left of each item indicate the degree to which each of these statements describes you as you are now. Use the following 0 to 3 rating scale:

0 = Not at all like me
1 = Only slightly like me
2 = Somewhat like me
3 = Very much like me

___1. Able to do housework

___2. Overcome by stress

___3. Compatible

___4. Sees many doctors

___5. Easily walks up stairs

___6. Incapable

___7. Close to friends

___8. Accident prone

___9. Able to work

___10. Receives many medical treatments

___11. Isolated

___12. Walks daily

___13. Able to control pain

___14. Visits doctors frequently

___15. Has fun with others

___16. Easily injured

___17. Accomplished

___18. Does not need pain medication

___19. Not able to fit in

___20. Exercises regularly

___21. Unproductive

___22. Does not need surgery

___23. Visits friends

___24. Disabled

___25. Vigorous

___26. Needs to see specialists

___27. Unimportant

___28. Bed-ridden

___29. Successful

___30. Rarely hospitalized

___31. Loses friends

___32. Has many medical tests

___33. Likes to be with friends

___34. Dependent on others

___35. Needs surgery

___36. Able to use public transportation

To what degree do the following descriptions represent yourself during your encounters with doctors (use the same 0 to 3 rating scale as above):

___1. Trusting

___2. Taken advantage of

___3. Respected

___4. Suspicious

___5. Treated well

___6. Guarded

___7. At ease

___8. Resentful

___9. Cooperative

Part II PROBABLE SELF: How likely is it that the following descriptions represent the type of person you will be in a year from now. Use the following 0 to 3 rating scale to indicate your agreement that you will be this way one year from now:

> 0 = Not at all likely
> 1 = Only slightly likely
> 2 = Somewhat likely
> 3 = Very likely

___1. Able to do housework

___2. Overcome by stress

___3. Compatible

___4. Sees many doctors

___5. Easily walks up stairs

___6. Incapable

___7. Close to friends

___8. Accident prone

___9. Able to work

___10. Receives many medical treatments

___11. Isolated

___12. Walks daily

___13. Able to control pain

___14. Visits doctors frequently

___15. Has fun with others

___16. Easily injured

___17. Accomplished

___18. Does not need pain medication

___19. Not able to fit in

___20. Exercises regularly

___21. Unproductive

___22. Does not need surgery

___23. Visits friends

___24. Disabled

___25. Vigorous

___26. Needs to see specialists

___27. Unimportant

___28. Bed-ridden

___29. Successful

___30. Rarely hospitalized

___31. Loses friends

___32. Has many medical tests

___33. Likes to be with friends

___34. Dependent on others

___35. Needs surgery

___36. Able to use public transportation

To what degree do the following descriptions represent the way you think you will feel, one year from now, during your encounters with doctors (use the same 0 to 3 rating scale as above):

___1. Trusting

___2. Taken advantage of

___3. Respected

___4. Suspicious

___5. Treated well

___6. Guarded

___7. At ease

___8. Resentful

___9. Cooperative

Part III IDEAL SELF: How much do the following items represent the way you would like to be one year from today. Use the following 0 to 3 rating scale:

0 = Not at all as. I would like to be
1 = Only slightly as I would like to be
2 = Somewhat as I would like to be.
3 = Very much as I would like to be

___1. Able to do housework

___2. Overcome by stress

___3. Compatible

___4. Sees many doctors

___5. Easily walks up stairs

___6. Incapable

___7. Close to friends

___8. Accident prone

___9. Able to work

___10. Receives many medical treatments

___11. Isolated

___12. Walks daily

___13. Able to control pain

___14. Visits doctors frequently

___15. Has fun with others

___16. Easily injured

___17. Accomplished

___18. Does not need pain medication

___19. Not able to fit in

___20. Exercises regularly

___21. Unproductive

___22. Does not need surgery

___23. Visits friends

___24. Disabled

___25. Vigorous

___26. Needs to see specialists

___27. Unimportant

___28. Bed-ridden

___29. Successful

___30. Rarely hospitalized

___31. Loses friends

___32. Has many medical tests

___33. Likes to be with friends

___34. Dependent on others

___35. Needs surgery

___36. Able to use public transportation

To what degree do the following descriptions represent the way you would like to feel, one year from now, during your encounters with doctors (use the same 0 to 3 rating scale as above):

___1. Trusting

___2. Taken advantage of

___3. Respected

___4. Suspicious

___5. Treated well

___6. Guarded

___7. At ease

___8. Resentful

___9. Cooperative

(APPENDIX B)

DOMAINS AND ITEMS OF CURRENT AND POSSIBLE SELVES:

Control/Helplessness	Physical vulnerabity & resilience:
Able to work	Easily walks up stairs
Able to control pain	Able to use public transportation
Accomplished	Walks daily
Vigorous	Exercises regularly
Successful	Able to do housework
Overcome by stress	Accident prone
Incapable	Easily injured
Unproductive	Disabled
Dependent on others	Bed-ridden

Affiliation/Isolation	Dependence on medical care
Close to friends	Does not need surgery
Compatible	Rarely hospitalized
Visits friends	Does not need pain medication
Has fun with others	Sees many doctors
Likes to be with friends	Receives many medical treatments
Isolated	Has many medical tests
Not able to fit in	Visits doctors frequently
Unimportant	Needs to see specialists
Loses friends	Needs surgery

Defendence towards physicians:	
Trusting	Taken advantage of
Respected	Suspicious
Cooperative	Guarded
At ease	Resentful
Treated well	

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These consist of pages:

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(APPENDIX G)

ID#:____ Name:_____ Date:_____Coh:____

SPS Interview

1) Discuss score distribution.

2) If you were still in pain one year from now would your probable self differ from how you rated it?

3) Many people have in mind one or more selves that are central to their view of themselves in the future. They value very highly becoming this sort of person, or having a particular role in life. What are three possible selves that you hope for most. What is the likelihood of becoming this hoped for self?

(Not at all likely 1   2   3   4   5 Very likely)

Likelihood
(1 - 5)

1. _____   _____

2. _____   _____

3. _____   _____

4) What are three possible selves that you fear or worry about most. What is the likelihood of becoming these feared selves.

Likelihood
(1 - 5)

1. _____   _____

2. _____   _____

3. _____   _____

APPENDIX H

List of Abbreviations

ADL   Activities of Daily Living (measures 7 common physical activities).

CDV   Control, Dependency on medical care, and Physical vulnerability scales from the SPS.

CPHQ   Computerized Pain History Questionnaire.

CWP   Conflict with Physicians (one of the five scales from the SPS)

LOT   Life Orientation Test (optimism).

MMPI   Minnesota Multiphasic Personality Inventory

MMPQ   McGill-Melzack Pain Questionnaire.

NA   Negative Affectivity.

NWC   Number of (pain) Words Counted (one of the scales from the MMPQ).

OAPC   Orthopaedic-Arthritis Pain Center.

OPT   Optimism (measured by the LOT).

PERI   Psychiatric Epidemiological Research Inventory (Poor self-esteem was the only scale used from this test).

POMS   Profile of Mood States.

PPI   Present Pain Intensity (from the MMPQ).

SPS   Self Perception Scale (or Survey).

TMAS   Taylor Manifest Anxiety Scale (used to measure negative affectivity)

MMPI clinical scales:

Hs	Hypochondrias	Pa	Paranoia
D	Depression	Pt	Psychasthenia
Hy	Hysteria	Sc	Schizophrenia
Pd	Psychopathic deviate	Ma	Mania
Mf	Masculinity-femininity	Si	Social Introversion

Appendix I

Properties of the Self Perception Scale

Reliability analysis using Cronbach's alpha revealed an
acceptable level of internal consistency for the "Now"
Self and Probable Self SPS scales (see Table I-1).
Alpha coefficients for these 10 scales range from .71
to .83. Reliabilities for the Ideal Self scales,
though acceptable, were not as consistently high,
ranging from .55 to .87.

Intercorrelations between the three total SPS
scales (Table I-2) showed moderately high correlations
between Now and Probable self (r=.48) and between
Probable and Ideal-self (r=.42). The correlation
between Now and Ideal self was not significant.
Intercorrelations between the five scales of the SPS
for Now Self (Table I-3), Probable Self (Table I-4) and
Ideal-self (Table I-5) showed that Control, Dependency,
Vulnerability and Affiliation significantly correlated
with each other. The Conflict with Physicians scale
correlated with all other scales except for Physical
Vulnerability on the Now Self scale and with Dependence
on Medical Care on the Now Self, Probable Self and
Ideal-self scales.

As predicted Now Self scores were lower than
Probable Self scores and Probable Self scores were
lower than Ideal-self scores. This was not surprising,
since it was expected that the rating order of pain
patients' pre-treatment self perceptions would be Now
Self, Probable Self and Ideal Self. The distribution
of the SPS means are Now Self ($\underline{M}$ 74.0; $\underline{SD}$ 20.1);
Probable Self ($\underline{M}$ 106.3; $\underline{SD}$ 15.62); and Ideal Self ($\underline{M}$
124.2; $\underline{SD}$ 11.3). An examination of the five Now Self
scale scores (Table I-6) revealed that patients scored
lowest on the dimensions of control ($\underline{M}$ 11.6; $\underline{SD}$ 5.96),
dependency ($\underline{M}$ 11.93; $\underline{SD}$ 5.96), and physical
vulnerability ($\underline{M}$ 12.87; $\underline{SD}$ 5.38) in contrast to
affiliation ($\underline{M}$ 17.92; $\underline{SD}$ 5.65) and conflict with
physicians ($\underline{M}$ 18.89; $\underline{SD}$ 5.30). Since it appeared
that patients identified control, dependency and
vulnerability as their most disturbed areas of
functioning and that these three scales were strongly
correlated with each other, subsequent analyses focused
on a composite score of these three variables.

Additional evidence for the greater importance
given to control, dependency on medical care and
physical vulnerability as opposed to affiliation and
conflict with physicians came from interviews conducted
with the patients during their hospital stay. Patients
were asked to list the three possible selves they hoped
for most and the three possible selves they feared or

worried about most (Markus & Nurius, 1986). Among the
41 patients interviewed 78 fears and 110 hopes were
reported (during the interviews patients had greater
difficulty listing fears than hopes). In order to
avoid the problem of missing data a frequency count was
made of the hoped for self and feared self listed
first. Among the hopes (41) and fears (37) listed
(Table I-7) 33 (42.3%) were related to control, 17
(21.8%) were associated with dependence on medical care
or being sick or in pain, 17 fell under the physical
vulnerability construct and four (5.1%) were related to
affiliation. Seven (8.9%) responses could not be
classified within any of the SPS constructs. Although
the classification of the hopes and fears is broad, it
does appear that the large majority of possible selves
reported are related to such issues as disability,
employment and pain; only a few of the possible selves
elicited are linked to social concerns such as
loneliness or an improved marriage.

Control-dependency-vulnerability and optimism

The control, depression and physical vulnerability
items were used to create a 27 item scale for Now Self,
Probable Self and Ideal Self. Adequate reliability was
obtained for each of these composite scales. Alpha for
these three scales was .85 for Now Self, .85 for
Probable Self .85, and .80 for Ideal-self. The mean

and standard deviation for each of these three scales
was: Now Self $\underline{M}$ = 36.7, $\underline{SD}$ = 13.5; Probable Self
$\underline{M}$ = 62.6, $\underline{SD}$ = 10.3; Ideal-self $\underline{M}$ = 74.3, $\underline{SD}$ = 7.3.
Significant correlations (Table 7, in the Results
chapter) were found between Now Self and Probable Self
($\underline{r}$=.36, $\underline{p}$ ≤ .001) and Probable Self and Ideal-self
($\underline{r}$ = .29, $\underline{p}$ ≤ .01). Now Self and Ideal-self were not
correlated with each other.

Table I-1

Reliabilities of the Self Perception Scales (SPS)* N=72

Dimension	Now Self Alpha	Probable Self Alpha	Ideal Self Alpha
Control	.82	.72	.63
Dependency	.74	.73	.55
Vulnerability	.72	.71	.62
Affiliation	.81	.76	.64
Conflict w/Physicians	.82	.83	.87
CDV	.85	.85	.80
Total SPS	.90	.89	.87

* The number of items on each of the subscales is nine. The CDV scale is composed of the Control, Physical vulnerability, and Dependence on medical care scales; the total SPS is composed of all five scales.

Table I-2

Intercorrelations of the Total SPS Scales

	1	2
1."Now" Self	--	
2. Probable Self	.48***	--
3. Ideal Self	.06	.42***

* $\leq$ .05; ** $p \leq$ .01; *** $p \leq$ .001.

Table I-3

Intercorrelations of the Five Scales of the Now Self

	1	2	3	4
1. Control	--			
2. Dependency	.28**	--		
3. Vulerability	.55***	.44***	--	
4. Affiliation	.70***	.34**	.52***	--
5. Conflict w/phys.	.40***	.01	.07	.44***

Table I-4

Intercorrelations of the Five Scales of the Probable Self

	1	2	3	4
1. Control	--			
2. Dependenc	.43***	--		
3. Vulerability	.68***	.52***	--	
4. Affiliation	.54***	.36***	.52***	--
5. Conflict w/phys.	.45***	.15	.33*	.39***

Table I-5

Intercorrelations of the Five Scales of the Ideal-self

	1	2	3	4
1. Control	--			
2. Dependency	.60***	--		
3. Vulerability	.59***	.48***	--	
4. Affiliation	.54***	.54***	.49***	--
5. Conflict w/phys.	.37***	.19	.23*	.45***

* $\leq$ .05; ** p $\leq$ .01; *** p $\leq$ .001.

Table I-6

Means, Standard Deviations, and Ranges on the Self
Perception Scales*

Dimension	Now Self		Probable Self		Ideal Self	
	M	SD	M	SD	M	SD
Control	11.60	5.96	20.40	4.27	24.85	3.00
Dependency	11.93	5.96	20.10	4.39	23.99	3.36
Vulnerabil.	12.87	5.38	22.21	3.65	25.51	2.22
Affiliation	17.92	5.65	23.16	3.70	25.67	2.47
Conflict with physicians	18.89	5.30	20.68	5.32	24.33	4.31

Control-Dependency-Vulnerability

	36.74	13.48	62.62	10.28	74.28	7.25

| Total scale | 74.04 | 20.07 | 106.3 | 15.62 | 124.2 | 11.33 |

Dimension	Range**	Range	Range
Control	0-24	10-27	13-27
Dependency	1-26	10-27	15-27
Vulnerability	2-24	10-27	18-27
Affiliation	5-27	13-27	16-27
Conflict w/Physicians	4-27	6-27	6-27

Control-Dependency-Vulnerability

	9-67	35-81	48-81

| Total scale | 31-120 | 54-133 | 92-135 |

* Higher scores represent more favorable view of the
self.
** Possible range on each of the five subscales is
0-27; on the Control-Dependency-Vulnerability
scale 0-81; and on the total SPS possible range is 0-
135.

Table I-7

Hopes and Fears Reported by Pain Patients (N=41)

HOPES (N=41)	FEARS (N=37)

Control (N=33)

Back to school	Unaccomplished
Not dependent on others	Helpless
Able to do more	Dependent (2)
Able to control pain	Not carrying on
Cope with pain (2)	Useless
Employed (6)	
Become an attorney	
Independent (3)	
Assertive (2)	
Work on Masters degree	
Accomplished	
Better concentration	
Productive (2)	
Functioning	
More active	
Active as a volunteer	
Successful	

Dependence on Medical Care (N=17)

Pain free (3)	In wheelchair (2)
Healthy	Surgery
Get proper medication	Addiction
Healthy and strong	Hurt by an operation
	Interminable pain (4)
	Disabling pain
	Extremely ill

Physical Vulnerability (N=17)

Physically active	Disabled/invalid/
Athletic	dysfunctional/crippled (10)
	Not able to walk
	Worse & older
	Injuring myself (2)
	Too Sedentary

Affiliation (N=4)

Better marriage	Isolated (2)
Socially active	

(Table continues)

Table I-7 (continued)

Hopes and Fears Reported by Pain Patients (N=41)

HOPES (N=41)	FEARS (N=37)
Other (N=7)	
Loose weight	Kids dependent on me
Look good	Frightened
Serene & calm, less anxious (2)	Financial difficulties

*Numbers in parentheses refer to number of patients,
when greater than one, reporting a hope or fear.

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