1990

Relationship of activity to pain perception

Nandita Garg
San Jose State University

Follow this and additional works at: https://scholarworks.sjsu.edu/etd_theses

Recommended Citation

Garg, Nandita, "Relationship of activity to pain perception" (1990). *Master's Theses*. 47.
DOI: <https://doi.org/10.31979/etd.8de3-euvp>
https://scholarworks.sjsu.edu/etd_theses/47

This Thesis is brought to you for free and open access by the Master's Theses and Graduate Research at SJSU ScholarWorks. It has been accepted for inclusion in Master's Theses by an authorized administrator of SJSU ScholarWorks. For more information, please contact scholarworks@sjsu.edu.

INFORMATION TO USERS

The most advanced technology has been used to photograph and reproduce this manuscript from the microfilm master. UMI films the text directly from the original or copy submitted. Thus, some thesis and dissertation copies are in typewriter face, while others may be from any type of computer printer.

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleedthrough, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send UMI a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

Oversize materials (e.g., maps, drawings, charts) are reproduced by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps. Each original is also photographed in one exposure and is included in reduced form at the back of the book.

Photographs included in the original manuscript have been reproduced xerographically in this copy. Higher quality 6" x 9" black and white photographic prints are available for any photographs or illustrations appearing in this copy for an additional charge. Contact UMI directly to order.

University Microfilms International
A Bell & Howell Information Company
300 North Zeeb Road, Ann Arbor, MI 48106-1346 USA
313/761-4700 800/521-0600

Order Number 1342709

Relationship of activity to pain perception

Garg, Nandita, M.S.
Walberg, Ellen Elssner, M.S.
San Jose State University, 1991

U·M·I
300 N. Zeeb Rd.
Ann Arbor, MI 48106

NOTE TO USERS

**THE ORIGINAL DOCUMENT RECEIVED BY U.M.I. CONTAINED PAGES
WITH SLANTED PRINT. PAGES WERE FILMED AS RECEIVED.**

THIS REPRODUCTION IS THE BEST AVAILABLE COPY.

**RELATIONSHIP OF ACTIVITY
TO PAIN PERCEPTION**

A Thesis

Presented to

The Faculty of the Department of Occupational Therapy

San Jose State University

In Partial Fulfillment

of the Requirements for the Degree

Master of Science

By

Nandita Garg & Ellen Elssner Walberg

December, 1990

APPROVED FOR THE DEPARTMENT OF OCCUPATIONAL THERAPY

Lela A. Llorens, Ph.D., OTR, FAOTA

Lorraine Pedretti, M.S., OTR

Guy McCormack, M.S., OTR

APPROVED FOR THE UNIVERSITY

ABSTRACT

RELATIONSHIP OF ACTIVITY TO PAIN PERCEPTION

by Nandita Garg & Ellen Elssner Walberg

This study was designed to determine if activity involvement, concentration, and participation in art activities affect the perception of pain in patients with chronic low back pain.

The McGill Pain Questionnaire was used to determine pain intensity before and after engaging in each of three activities. An observation checklist was used to gauge overt signs of pain during the activities. Subjects ranked the activities according to the concentration and involvement required. Six subjects, three male and three female, 24 to 56 years old, were studied using a single case study research design.

Two subjects reported reduced pain perception for all art activities. Highest levels of involvement and concentration were related to reduction in the perception of pain for three of the six subjects. Recommendations are offered for future studies.

Acknowledgements

The authors gratefully acknowledge the support of families, friends, and staff at San Jose State University, and sincerely appreciate the expert guidance of Dr. Lela Llorens, Professor Lorraine Pedretti, and Associate Professor Guy McCormack in the completion of this study. We are also grateful to the staff at Stanford University Hospital out-patient back school facility at Lytton Gardens for providing us with the opportunity to gather subjects and with an area to conduct this study. Special thanks are due Mr. and Mrs. Egon Elssner for the use of their laser printer and our husbands, Vipin Garg and Randy Walberg, for their support, patience, and understanding.

Table of Contents

	Page
Abstract.	iii
Acknowledgements.	iv
Table of Contents	v
List of Tables.	ix

CHAPTER 1

INTRODUCTION

Purpose of the Study	1
Statement of the Problem	1
Questions.	3
Definitions.	3
Assumptions.	6
Limitations.	6
Significance of the Study.	7

CHAPTER 2

REVIEW OF THE LITERATURE.	10
Background Information	10
Current Theories of Pain	12
Purposeful Activity and Pain	20
Other Pain Research.	22
Instruments used in the Measurement of Pain.	24
Single Case Study Methodology.	28

Frames of Reference.	30
Summary.	34

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY	37
Subjects	38
Procedures	39
Instruments.	41

CHAPTER 4

DATA AND RESULTS

Introduction	43
Analysis	43
Subjects	44
Subject A.	44
Subject B.	47
Subject C.	50
Subject D.	52
Subject E.	54
Subject F.	55
Summary of Results as Related to Research	
Questions	57

CHAPTER 5

DISCUSSION, IMPLICATIONS AND RECOMMENDATIONS

Discussion	61
Subject A.	63
Subject B.	65
Subject C.	67
Subject D.	69
Subject E.	71
Subject F.	73
Conclusions.	75
Further Observations	75
Implications for Occupational Therapy	
Practice.	79
Practice Recommendations for Further	
Research.	81

REFERENCES.	83
---------------------	----

APPENDICES

A. McGill Pain Questionnaire--Pre-Test.	94
B. McGill Pain Questionnaire--Post-Test	96
C. Level of Concentration and Involvement	
Questionnaire	98
D. Volunteer Survey	100
E. Agreement to Participate in Research at	
San Jose State University	103

F.	Experimental Subject Bill of Rights and Consent	
	Form for Stanford University	106
G.	Draw to a Theme Scenario	110
H.	Session Format	112
I.	McGill Pain Questionnaire--Pain Chart.	117
J.	Pain Observation Checklist	119
K.	Pain Observation Terminology Definitions	121
L.	Definitions for Possible McGill Pain	
	Questionnaire Selections.	123
M.	McGill Pain Questionnaire Values	129

List of Tables

	Page
1. Scores on McGill Pain Questionnaire Pre-Test and Post-Test for Art Activities in Order of Participation	45
2. Subject's Classification of Least and Most Involvement Required to Complete Activities Relative to the Change in MPQ Scores.	48

CHAPTER 1

INTRODUCTION

Purpose of the Study

The purpose of this study was:

1. To determine if involvement in activities affects the perception of pain in patients with chronic pain.
2. To determine which of the activities used in the study was the most effective in decreasing the perception of pain.

Statement of the Problem

Chronic pain is a common and debilitating disorder in America (Bonica, 1986). Specifically, chronic low back pain is currently the number one cause of disability in patients less than 45 years old, being second only to the common cold as a cause of work time lost (Boachie-Adjei, 1988). In 1978, over one third of the American population was affected by chronic pain, and more than 50 million people were partially or totally disabled by chronic pain lasting from days to years. As a result, over 700 million work days per year are lost due to chronic pain, and an estimated 60 million dollars are spent on health cost, compensation, litigations, and quackery (Bonica, 1986). Some \$2 billion per year are spent on pain killing drugs in America, and

until recently, less than \$1 million was spent on research into alleviating pain (Lipton, 1984). Seventy to eighty percent of all chronic pain is due to low back and sciatic nerve pain, thus accounting for a loss of 1400 work days per 1000 American workers, making it the most expensive medical problem for people aged 30-60 years old. It is also estimated that more than 19 million doctor visits, or 14 million dollars, are spent each year on back pain in the United States (Belkin, 1986).

Pain can lead to a lifestyle of decreased activity, and can place economic, emotional, social, and family stressors on the person experiencing it. While the best methods to cure chronic back pain is to prevent the occurrence of back injury (Linton, 1987), it has been shown that a multidisciplinary approach that includes physical rehabilitation, psychiatric counseling, and occupational therapy can produce an 80% greater improvement in functional capacity when compared to a control group that did not receive therapy (Boachie-Adjei, 1988). The extent to which the use of purposeful activity in occupational therapy is effective in altering this pattern has only begun to be studied. Even though activities have been used throughout the history of occupational therapy to maintain and promote physical and psychological well being, there is little documented evidence of the effectiveness of general rehabilitation techniques or occupational therapy

intervention specifically on the reduction of chronic back pain (Moon, 1988; Pedretti & Pasquinelli, 1990; Philips, 1987).

Questions

The questions to be answered in the study were:

1. Is there a positive relationship between engagement in therapeutic activity and the reduction of pain as perceived by the patient with chronic back pain?
2. Is there a positive relationship between the level of involvement in an art activity and decreased perception of pain by the patient with chronic back pain?
3. Is there a positive relationship between concentration on an art activity and decreased perception of pain by the patient with chronic back pain?

Definitions

The following terms have been defined:

Acute Pain: Time limited or recent onset pain, often in responses to tissue damage (Fordyce, 1981; Guyton, 1982).

Art Activity: An activity that involves the use of construction paper and art supplies (such as crayons, paint brushes, color pencils) to draw, paint, or sketch pictures or themes.

Back: The posterior part of the trunk from the neck to the pelvis, also known anatomically as the dorsum (Dorland, 1981).

Chronic Back Pain: Symptoms of unremitting back pain lasting for six months or more which have not responded to medical management.

Chronic Pain: Pain that persists, regardless of known noxious stimulus (Fordyce, 1981). Pain that persists for six months or more without responding to medication or treatment (Kremer, Atkinson & Ignelzi, 1982).

Concentration: Directing one's thoughts or efforts, or fixing one's attention on or upon (McKechnie, 1970), as measured by the patient's self-report and researcher observation. In this study, concentration is the mental attention required by the subject in order to complete the task.

Involve: To occupy the attention of (McKechnie, 1970).

Involvement: Being involved; anything or anyone that is involved or participating in an activity (McKechnie, 1970). In this study, the complexity/number of steps required to complete the task will determine the level of involvement.

Pain: A more or less localized sensation of discomfort, distress, or agony, resulting from the stimulation of specialized nerve endings (Dorland, 1981). A negative emotional or protective experience which may be

identified by patient comment, observed decreased cooperation, facial grimacing, postures of discomfort, or irritability.

Pain Behavior: Behavior that depicts the negative influence of chronic pain on the personality of the individual, and the individual's reaction to the presence of chronic pain as seen by : fear and avoidance of activity, anxiety due to anticipating pain, frustration, and a decrease in functional activity.

Patient: A person who is ill or who is undergoing treatment for a disease.

Perception: The conscious mental registration of a sensory stimulus (Dorland, 1981).

Reduction of Pain: Diminishing in intensity of pain as determined by subject self-report and researcher observation; specifically, a physiological manifestation of pain as seen by a decrease in facial grimacing, knotted brow, perspiration, vocalization of pain complaints, rubbing/holding a part, tired/drawn look, and other comments relevant to an increase in pain.

Therapeutic Activity: Any form of purposeful and/or constructive action which is designed to meet a therapeutic goal; in this study the goal is to reduce pain.

Assumptions

The following assumptions were made for this study:

1. Art activity can be used to influence pain perception by patients with chronic back pain.
2. Patients with chronic back pain participate in occupational therapy to learn ways to reduce their perceived pain.
3. All subjects would engage in the activities to the best of their ability.
4. All responses to the questionnaires would be honest and accurate to the best of the respondent's knowledge and abilities.
5. The questionnaire is a reliable instrument for obtaining and measuring the chronic low back pain.

Limitations

The following limitations were identified for this study:

1. The accuracy of the patients' verbal and written responses to the McGill Pain Questionnaire may not be indicative of actual intensity of pain perceived during the activity.
2. The accuracy of the data may be limited because only one session of each type of activity was conducted with each patient, and therefore not enough data was

collected in order to account for possible patient mood swings.

3. The patient may have associated the art activity with past positive or negative experiences, and thus unknown error may be introduced into the study.
4. Possible small group effects may have skewed the results.
5. The amount or intensity of pain perceived and expressed by the patient may vary from day to day, and therefore affect performance as well as bias the results.
6. The clinical observations by the researchers of many of the visual and auditory signs of pain although objective, were not quantitative measures.
7. The study does not assess the therapeutic effect in the learning loop.

Significance of the Study

Chronic pain costs an estimated \$60 billion per year in time off from work, overutilization of health care, and frustration for patients and health care deliverers (Bokan, Ries, & Katon, 1981). Chronic pain is a national condition that places social and economic stress on the person and the family involved. It results in a loss of work productivity, and drains the resources of the national health-care system by the direct costs involved in medical, hospital and compensation services. In California alone, the cost of low

back pain was \$200 million in 1971 (Black, 1975). Avoidance of activities is common with patients with chronic pain, because they frequently believe that the activity or situation will cause more pain and exceed their capacity to cope (Evans, 1985). As a result, the individual tends to have reduced activity levels (Chapman, Brena, & Bradford, 1981; Fordyce, et al., 1981; Savitz, 1985; Yeh, Gonyea, Lemke, & Volpe, 1985).

Occupational therapy since its origin in the early 1900's has stressed the use of occupation, the goal directed use of time, energy and interest, as an important factor in treating both mentally and physically challenged individuals (Hopkins, 1983; Pedretti & Pasquinelli, 1990). Little, if any, quantitative research regarding the use of art activities, which require varying amounts of concentration, attention, or active involvement, has been conducted to determine whether these parameters affect the perception of pain by patients with chronic pain.

Studies have shown, however, that vigorous exercise and pain are incompatible, and it is the intent of this study to test whether a similar correlation exists between engagement in activities that require concentration and involvement and the perceived reduction of pain. If engagement in an activity, such as the art activities described in this study, can be shown to assist in the reduction of pain perception, then an effective means of managing and coping

with pain would be available to patients in their homes,
rather than in a medical setting.

CHAPTER 2

LITERATURE REVIEW

The literature review for this study includes background information on pain, current theories of pain and pain research, the use of purposeful activity for pain, and measurement of pain. It also describes single case study methodology and frames of reference which are relevant for this research.

Background of Information

Although pain is one of the primary reasons that people seek medical attention, surprisingly little is known about pain or the neurophysiology involved in pain sensation (Cohen & Sherman, 1983). It is known that pain, particularly chronic pain is a complex and multifaceted phenomenon, or condition, that has physiological, psychological, cognitive, and social dimensions (Bokan, Ries, & Katon, 1981; Tait, Duckro, & Margolis, 1988). In the last ten years alone, there has been significant growth in interest in chronic pain and its management (Philips, 1987).

Pain is a primitive protective phenomenon which is characterized by a variety of qualitative sensations, such as burning, aching, stinging, and soreness. Pain is

difficult to appreciate scientifically, since not only is the neuronal activity associated with pain qualitative, but pain is also believed to be the most easily modified sensory phenomenon in the body (Kelly, 1981). For this reason, the terms nociception (the sensation associated with damaged tissue that then leads to the sensation of pain) and pain, are often used interchangeably in physiology texts and literature when discussing pain (Cohen & Sherman, 1983). Some authors argue that pain is not a sensation, but rather a perception, an unpleasant emotional experience, or a symptom (Maciewitz & Sandrew, 1985; Wyke, 1981).

To philosophers and psychologists, pain was an emotional experience, while scientists described pain as a specific sensation with its own sensory apparatus. The ventral roots of the spinal nerves are concerned with motor function, while sensory function is under the control of the dorsal roots. Pain is comprised of structural, functional, and perceptual energies, and reactions to pain are influenced by a complex array of factors such as cognitive function, culture, past experience, and psychologic aspects (Bonica, 1977). Pain can be classified as chronic if the patient experiences symptoms of unremitting pain for a period of over six months, that has not responded to medication (Kremer, Atkinson, & Ignelzi, 1982).

Current Theories of Pain

There is strong debate over the way in which noxious stimuli are processed by the central nervous system (CNS). Currently there are three major theories, the specificity, the pattern, and the gate control theory (Cohen & Sherman, 1983). As yet, none of these theories has been universally accepted; however, although the gate control and specificity theories currently have more available supporting experimental evidence than the pattern theory (Cohen & Sherman, 1983). The specificity theory states that pain is a specific modality, with specific nociceptive transducers and receptors that only respond to nociceptive stimuli, and transmit the input to the brain along specific neural pathways (Cohen & Sherman, 1983; Melzack & Wall, 1965). The pattern theory argues that noxious stimuli activate non-specific receptors and are relayed to the CNS along non-specific neural pathways. It is hypothesized that noxious stimuli are differentiated from non-noxious stimuli by their pattern and intensity of activity (Kelly, 1981). The gate control theory, proposed by Melzack and Wall (1965), incorporates features of both the specificity and pattern theories, and may be described as follows: the dorsal horns of the spinal cord contain neural mechanisms which can act like a gate, and can increase or decrease the nerve impulse flow from peripheral fibers to cells in the spinal cord that project to the brain. The gate has a modulating influence

on any somatic input before it gives rise to pain. Furthermore, large-fiber input tends to close the gate, and small fiber input opens it (Melzack & Dennis, 1978). The gate control theory views the perception of pain and response to it as arising from "the interaction of sensory-discriminative, motivational-affective, and cognitive-evaluative components" (Turk, Michenbaum, & Genest, 1983, p. 81).

In accordance with the specificity and gate control theories, painful stimulation of the peripheral nervous system causes free nerve endings in the skin or other interstitial nociceptive receptors to be activated. These receptors respond to either strong mechanical or chemical stimuli such as lactic acid, substance P, potassium ion, polypeptide kinins, serotonin, prostaglandin E, histamine, or any other acidic substance or environment; factors which are typically present when tissue is damaged or inflamed (Kelly, 1981; Lindahl, 1974; Wyke, 1981). The input from these receptors is then conveyed to the CNS along either small, myelinated A-delta fibers, or small, unmyelinated C-fibers, to the spinal cord where they synapse before ascending to higher levels of the CNS along the spinothalamic tract (Kelly, 1981; Savitz, 1985). It is believed that at the level of the thalamus, information regarding the location, intensity and nature of the painful stimulus is defined, as well as affective responses and

stimulation of the autonomic nervous system occurs (Savitz, 1985). Several of these fibers continue to the limbic system, via the hypothalamus, where the sensory impulses may play an important role in the integration of emotional aspects of pain sensations, and in the modulation of pain perception by the individual's emotional status (Kelly, 1981).

Chronic pain, unlike acute or traumatic pain has no biological usefulness (Sample, Page, & Hayes, 1985). Several definitions of chronic pain and descriptions of chronic pain patients have been given by various authors. In general, chronic pain is considered to be persistent pain of six months or more that has not responded to medical treatment (Black, 1975; Bokan, Ries, & Katon, 1981; Fordyce et al., 1984; Moore, Berk, & Nypaver, 1984). These patients are often described as profoundly disabled relative to medical physical findings, and are dependent on, or excessively use drugs, narcotics, or alcohol. They tend to avoid social interaction and are described as attention-seeking, self-centered, demanding, and dependent (Black, 1975; Pilowsky, 1981; Moore, Berk & Nypaver, 1984; Sample, Page & Hayes, 1985; Yeh, Gonyea, Lemke & Volpe, 1985). Frequently they have impaired problem solving ability, some functional impairment, reduced activity levels, and changed verbal and body language (Flower, Naxon, Jones & Mooney, 1981; Fordyce et al., 1981; Fordyce et al.,

1984). Often the person who has chronic pain sustains changes in job, social, economic, and family status and he/she has altered sleep and circadian rhythm patterns, progressive mental and physical disability and no realistic future plans (Black, 1975; Kremer, Atkinson & Ignelzi, 1982). Thus, chronic pain is not only an uncomfortable physical sensation for the patient, but a major health problem with major social and economical implications as well.

While the gate control theory effectively explains acute pain, it is inadequate to explain chronic pain (Philips, 1987), since chronic pain is influenced by complex sensory, motivational, and cognitive factors, therefore, there is an observable asynchrony between pain behavior and sensory experience, which can be regarded as crucial defining characteristic of chronic pain problem. Another factor that the gate control theory does not explain is the persistent pain when potential financial and social rewards may be gained by sustaining the pain behavior, i.e., habits of inactivity. However, Pfingsten, Bautz, Eggebrecht, & Hildebrandt (1988), have suggested that the reason for maintaining the chronic nature of the pain is that these individuals have a pre-disposition to attempt to adjust and over-extend themselves in their social surroundings, by perhaps taking on various tasks and commitments. This over-commitment arises from a tendency to accept rather than

refuse or say "no" to requests by others. This tendency to oblige, can lead to an exorbitant demand on the individual, which not only is evident by bodily symptoms of pain, but psychological depression and hostile distrust as well. These authors also found a relationship between muscle tension and chronic pain. Specifically, in a social context, these patients were prone to inhibiting muscular relaxation, thereby causing increased tension in muscles. This lack of relaxation is believed to be caused by the blocking of active muscle relaxation from higher brain centers. As a result of the increased muscle tension, an increase in pain level was perceived. In the presence of constant negative social input (i.e., stress), the individual was found to maintain a state of muscle contraction, thus leading to chronic back pain. In addition, depression, if present can play a significant role in maintaining the chronic nature of the problem.

Fordyce (1976) used a behavioral model as a treatment method for patients with chronic pain. In this rationale, Fordyce referred to nociception as actual noxious stimuli acting upon peripheral nerve receptors (A-delta and C fibers) while the term "pain behavior" was commonly understood to reflect the presence of nociception, and referred to all forms of behavior expressed by the individual, including speech, facial expression, posture, seeking health care attention, taking medications, and

refusing to work. Pain behaviors therefore are considered to be obvious manifestations, and constitute direct clinical observations of chronic pain.

Patients with chronic pain may demonstrate the "chronic pain syndrome," which includes characteristics such as depression, anxiety, and excessive preoccupation with the pain problem (Black, 1975). In addition, Vlaeyen, Van Eek, Groenman, and Schuerman, (1987) found that chronic pain behavior seemed to be composed of at least nine components: anxiety, attention seeking, verbal pain complaints, medication use, general verbal complaints, distorted posture and mobility, fatigue, insomnia, and depressive mood. This classification provides a useful basis for the development of an observational measurement technique for chronic pain. These authors also found that the amount of observed motoric behavior is often in discordance with the self-reported pain level. The mnemonic, SHAFT, for Sad, Hostile, Anxious, Frustrating patients who Tenaciously cling to the health care system, has been coined by Black (1975) to describe patients with chronic pain.

Philips, (1987) investigated the process by which chronic pain could be modified by cognitive-behavioral treatment, and showed a significant improvement in 83% of treated cases. The author's work suggested that many patients with chronic pain express feelings of helplessness about their pain, and self-management approaches are

directed at curtailing this helplessness. The approach taken by Philips was to teach skills that allow patients to minimize and alleviate their pain. Patients were taught management strategies such as relaxation, graded increase in exercise and physical fitness, graded reduction in dependence on analgesics and increased control over episodes of chronic pain. The author found a dramatic relationship between self-efficacy and problem size, which develops as a consequence of training, suggesting the possibility that an important effect of treatment is the development of a sense of control over pain.

Another method used to gain control over pain has been the Vanderbilt Pain Management inventory, which is a self-report questionnaire. This instrument was designed to assess the frequency with which patients with chronic pain use active or passive coping strategies when their pain reaches a moderate or greater level of intensity. When active strategies were used, where the patient made an effort to function in spite of the pain or distract himself from the pain, it was revealed that these patients felt a greater sense of self-efficacy, a greater locus of internal control, resulting in a lowering of depression, helplessness, pain, and functional impairment (Brown & Nicassio, 1987).

The findings were also supported by Philips (1987b), who explained that avoidance behavior is a major contributor

to chronic pain problems. By avoiding activities that are viewed by the individual as having the potential to increase pain, there is a resultant loss of a sense of control over the pain. As a result, there is a further expectation that pain will result from engaging in activity. Eventually, cognitive changes can result in the individual repeatedly avoiding or withdrawing from normal activities and developing a growing intolerance for stimulation, and decreased senses of self-efficacy. This avoidance not only includes basic activities of daily living, but is extensive and complex, including sensory, motivational and cognitive process and is visible in various aspects, such as movement, activity, social interactions, leisure activities, and any other types of stimulation.

Relative to a variety of situations, Rachman and Lopatka (1988) showed that chronic pain patients can accurately predict the amount of pain they will perceive in a given situation, possibly because they have suffered chronic pain, and therefore have experienced repeated, prolonged pain, giving them sufficient information to make accurate predictions. Overpredicting the amount of pain that patients will individually feel can be both beneficial and detrimental. It may be functional in that it serves to protect the individual from further damage or danger; however, over-predicting can also become a clinical problem

if it causes rigidity or unreasonable avoidance in the subject's response.

Purposeful Activity and Pain

It has been found that perception of the intensity of pain may be reduced by psychological factors and control techniques, thus the gate control theory may aid in explaining the concept that purposeful activity may decrease the intensity of pain (Blackeney, 1984). Purposeful activity is described by occupational therapists as a task or experience in which the person actively participates. Engagement in the activity requires coordination among the physical, emotional, and cognitive systems of the individual and direction of attention to the task itself, rather than to the internal processes required for the achievement of the task. As such, purposeful activity may increase the amount of sensory (particularly large-fiber) input, which influences the central control mechanism that modulates the perception of pain. Engagement in purposeful activity may alter the cognitive, perceptual, and emotional factors which contribute to the central control mechanism (Blackeney, 1984).

Occupational therapy focuses on occupation, the goal-directed use of time, energy, and interest (Pedretti & Pasquinelli, 1990); thus, activity is central to

occupational therapy. Patients with chronic pain usually have a reduced activity level and impaired psycho-social functioning, thus one of occupational therapy's primary goals is to replace pain-centered, inactive behavior with more productive and active use of time (Flower, Naxon, Jones & Mooney, 1981).

Art activities are frequently used by occupational therapists to facilitate discussion, to teach leisure skills, to increase gross and fine motor movement, and to increase attention span. Art activities can be relatively inexpensive, require little or no knowledge to perform, and can easily be done in the home or other environment. Art also provides a type of therapeutic media, where patients can communicate stress, frustration, and tension, while engaging in an activity that can give them a sense of achievement and accomplishment (Gibson, 1975; Hurley, 1968; Shrewsbury, 1982).

People of all ages, educational backgrounds, and socio-economic status can identify with art, and it can provide an excellent way to utilize leisure time (Comer, 1982). While participating in art activity, the patient is being cognitively distracted, which according to some studies leads to reduced pain perception (Rybstein-Blinchik, 1979; Spanos, Horton, & Chaves, 1975). Studies by Rosenstiel and Keefe (1983), however, found that patients with chronic pain perceived more pain with cognitive distraction. Johnson

(1983) hypothesized that diversional physical or cognitive activities may be important in reducing pain perception.

Other Pain Research

Research using the Minnesota Multiphasic Personality Inventory (MMPI) showed that while pain patients demonstrate a considerable amount of depressive symptomatology such as sleep disturbances, poor self-esteem, apathy, feelings of unhappiness, anxiety, and dissatisfaction, they do not have the personality characteristics associated with severe depression. However, a significant portion of the pain group studied demonstrated certain characteristics of hypochondriacs, but their responses did not conform to the classic hysterical pattern (Watson, 1982). However, research using the MMPI on chronic back pain patients shows a tendency for this population to have elevations on both the hypochondriasis and hysteria scales.

Keefe, Block, Williams, and Surwit (1981) carried out a comprehensive behavioral treatment program on 111 patients with chronic low back pain, emphasizing relaxation procedures. Significant reductions were obtained on measures of subjective tension, electromyographic activity, and pain. Many patients also decreased their intake of analgesic/narcotic agents and reported an increase in activity level.

Anderson (1984) studied the effectiveness of applying relaxation techniques to relieve chronic back pain while performing pain-producing activities. Although the results of her study were inconclusive, the subjects demonstrated an increased activity tolerance during the course of the study, and it was demonstrated that relaxation offered some control over painful stimuli.

Research has also suggested that individuals who experience pain adopt ways to assist them in tolerating, minimizing, or reducing their pain. Tan (1982) used questionnaire data to assess cognitive and behavioral pain coping strategies in a sample of 61 patients with chronic low back pain. It was found that the reported use of coping strategies is related to adjustment to a chronic pain problem, but the use of these strategies was not related to better adjustment. Patients who scored high on diverting attention and praying reported more pain and functional impairment. These results did not support findings from previous studies that do show that coping methods such as cognitive distraction are related to lower ratings of pain in studies conducted on pain (Spanos, Horton, & Chaves, 1975). However, experimental pain is of a time-limited duration, as opposed to chronic pain, which is often described as constant. It may be more feasible to be distracted for the shorter duration of experimental pain,

but while coping with chronic pain, this strategy may not be as effective (Rosenstiel & Keefe, 1983).

According to Lutz, Silbret, and Olshan (1983) a large number of patients who have shown marked improvement in a pain program often regress to a pre-admission level within the first few months after participation in the program. The study assessed outcome and compliance measures, by mailing questionnaires to patients who had completed a multi-disciplinary pain program. It was found that of 74% of the patients who had returned the questionnaires, over 42% showed compliance with therapeutic regimens. It is suggested that regression may be due to insufficient generalization by the patients, who are not able to carry through into their home environment those skills and treatments that they learned and performed while participating in the program.

As can be seen, a considerable amount of research has been directed towards decreasing the level of pain in the patient with chronic pain. Chronic pain leads its victims to despair at what seems to be useless and endless suffering.

Instruments used in the Measurement of Pain

Several different methods have been used to measure pain, including pain drawings, the McGill Pain

Questionnaire, and other self-report methods which are described in this section.

Pain drawings, in which the subjects are requested to mark on an anatomical drawing the location of the perceived pain, are considered a convenient and accurate method of documenting the spatial distribution of pain (Uden, Astrom, & Bergenudd, 1988). They give the clinician both diagnostic and prognostic information, according to the pattern of the markings on the diagram. Diagrams that were marked in a diffuse or bizarre, poorly defined manner were indicative of patients who responded poorly to treatment (i.e., potentially chronic pain patients) and often correlated with various psychiatric disturbances. These authors also noted that expanded or non-anatomical pain pattern distributions were rarely found in patients with organic pathology, such as a herniated disk.

The McGill Pain Questionnaire (MPQ) has been used by researchers to measure pain as perceived by the patient, since this evaluation tool was designed to yield objective measures of clinical pain which can be statistically analyzed (Melzack, 1975). Research on the MPQ has shown that it has been widely used in pain research and treatment (Melzack, 1987; Reading, 1982). The major part of the questionnaire is comprised of a set of 78 adjectives that describe pain, and are separated into 20 categories.

Sensory, affective, and intensity component dimensions are represented by these adjectives.

The MPQ is easy to administer, taking only 5-15 minutes, while addressing three major dimensions of pain: intensity, sensory (location and type of pain), and affect (fear, tension and autonomic nervous system response). The patient is asked to select words from a list of these three major classes of words, which most closely describe his/her pain. An intensity scale of one to five, and other items to determine the properties of the pain experience, are also examined with the MPQ (Melzack, 1975).

According to Kremer and Atkinson (1981), the intensity, sensory, and affective dimensions of the MPQ can only be considered to have face validity, because the labelling of factors that underlie pain language is somewhat arbitrary. Studies have shown that the patient's selection of words from specific categories correlates well with emotional stress levels. The number of categories of pain that the patient chooses to select also relates to the level of physical as well as psychiatric dysfunction experienced by the patient (Paris, 1985). In one study, the MPQ was administered to a population of patients with chronic benign pain. It was found that patients with high affective dimensional scores were more depressed, anxious, and somaticized more than patients with low scores. These results suggested that a good summary of the overall

affective status of patients with chronic pain is provided by the affective dimension of the MPQ (Kremer & Atkinson, 1981). Although the MPQ is not a perfect measurement tool (Melzack, 1987), it provides a method for quantifying sensory-discriminant, motivational-affective, and cognitive-evaluative components of pain. Turk, Rudy, and Salovey (1985) have reported that the three separate scales do not demonstrate discriminative validity, but do measure the intensity of pain.

Studies have also been conducted on the accuracy of remembering chronic pain. In a study by Linton and Melin (1981), subjects completed pain ratings before entering a treatment program, and upon dismissal 3-11 weeks later. They were asked to remember how much pain they had experienced at baseline. The patients reported a significantly greater amount of pain than was actually rated during the baseline period. By contrast, Hunter, Philips, and Rachman (1979) found the recall of pain to be accurate up to 5 days after the patients had experienced an episode of acute pain. These results, however, were obtained from a population of patients with acute, not chronic, pain. Given these conflicting findings, it would appear that there is a need to exercise caution when using post-hoc measures with patients with chronic pain.

A study by Bisson (1987) which showed that increased activity level led to decreased pain perception in patients

with chronic pain involved self-reporting of daily activities, a method which has been reported to be unreliable with patients with chronic pain (Kremer, Block, & Gaylor, 1981). The problem with self-report measures is that they can be influenced by distorting factors such as depression, anxiety, or chronic nature of the problem itself; therefore, observational measures, carried out by trained observers, have received increasing attention (Vlaeyen, Van Eek, Groenman, & Schuerman, 1987).

Turk and Rudy (1987) stated that for an evaluation of chronic pain to be comprehensive and complete, it should assess physical, psychosocial, and behavioral aspects of function. Patients with chronic pain demonstrate large differences in their individual subjective responses to injury and treatment; thus it is valuable to assess observable behavior, since observable behavior is a response to pain, and can therefore be viewed as a means of communicating perceived pain.

Single Case Study Methodology

The literature on single case study methodology is included here to place this study in context as single case study designs are used for studies with small sample sizes or for studies involving single subjects. The single case study provides information and a rationale for the use of a particular treatment or intervention technique, and can

provide ideas and hypotheses for further study (Ottenbacher, 1986). Single case designs also enable the evaluation of individual overt behavior (Kazdin, 1982), as well as provide a framework for therapeutic intervention (Ottenbacher, 1986).

There are several types of single case study designs. One type of single case study design is known as the AB design. This design provides the therapist with a mechanism to report accurately the subject's functioning baseline (A) and the changes seen in the subject after therapeutic intervention (B), thus enabling a clear definition of treatment and outcome. However, a limitation of this design is that it is difficult to rule out the effects of uncontrolled variables, or the effects of the passage of time on the behavior being studied. To counteract these influences, and confirm results, replication can be used, which leads to variations of the basic AB design. An example is the ABA design, in which treatment is withdrawn in the third phase (second A); this provides greater confirmation of the effect of the treatment, and adds strength to establishing a relationship between the intervention and the subject's performance. However, an undesirable result of the ABA method could be the effects of withdrawing treatment. Another variation of the basic AB design is the ABAB design, in which the treatment is reintroduced in the final B stage, thus leaving the subject

with the treatment, and also providing increased replication for further confirmation of results (Ottenbacher, 1986).

Frames of Reference

The Occupational Therapy Frames of Reference which guided this study include the Model of Human Occupation and Occupational Performance (Kielhofner, 1985; Pedretti & Pasquinelli, 1990).

The Occupational Performance frame of reference is concerned with the individual's performance of his or her life roles and tasks, specifically those of self-care, work, play and leisure, as related to his or her developmental stage. Occupational performance refers to learned developmental patterns that depend on the individual's sensory-integrative, motor, social, psychological, and cognitive functioning; thus it takes into account the biological, psychological, and environmental influences that affect adaptation and recovery from illness or dysfunction. Treatment methods used by occupational therapists are directed towards remediating deficits in these areas, to facilitate a more functional performance of skills. In treatment and rehabilitation the patient engages in tasks that will aid in achievement of therapeutic objectives, in a way that is meaningful to the client in performance of life roles, and will enable productive use of time, energy, and interest in a goal-directed way.

According to the Occupational Performance frame of reference, active involvement in activity can facilitate adaptation, and can result in improvement in the level of pain perceived by the patient while engaged in an activity. The sense of accomplishment and encouragement that patients may feel when successfully completing a task/activity should aid in the achievement of an increased level of functional performance of their life roles. Through purposeful activity, it is believed that man can influence his physical and mental health, as well as his social and physical environment (Pedretti & Pasquinelli, 1990). Thus, occupational performance is a holistic approach, having treatment goals that involve the use of activities that are compatible with the individual's values and needs, and which combine mental, physical and environmental processes (Pedretti & Pasquinelli, 1990).

Since chronic pain is a multifaceted phenomenon that has physiological, psychological, and social dimensions, it is a disorder that can be approached from the holistic point of view of the occupational performance frame of reference. The individual uses both sensory integrative and motor components when participating in an art activity. Social components are important when participating in group activities with peers, and when interacting with the therapists/researchers. Cognitive and psychological processes are also important when participating in art

activities, since art facilitates the expression of feelings, can reduce tension and frustration, and provides a medium for gaining feelings of achievement and success while learning how to use and experiment with various tools, media, colors and textures (Adamson, 1983; Gibson, 1975; Hurley, 1968; Shrewsbury, 1982).

The Model of Human Occupation views man as an open system composed of interrelated structures and functions, which are organized into a coherent whole, and which interacts with the environment and can change and maintain itself within the environment (Kielhofner, 1985). As an open system, man is viewed as an active, spontaneous stimulus and tension seeking being, who maintains and changes his structure through a four component cyclical process of intake, throughput, output, and feedback. The intake component of this cycle involves the importation of information and energy from the environment, such as the events, objects, and people with whom the individual interacts. Throughput in this interaction is the transformation of the input into another form for incorporating it into the person's structure, thus resulting in structural change and maintenance. This is an evaluative, incorporative, and "digestive" process. Output refers to the action of the system, or individual, on the environment as a result of the intake and throughput processes. Finally, feedback is the process of returning

information back to the system about the process and consequences of its action; it is a type of self-monitoring and monitoring of other individual's reactions to his own actions (Kielhofner, 1985). The environment and art activities can serve as input to the patient with chronic back pain. The individual's feelings and participation in the art activity that occurs while engaging in the activities become the throughput which can result in, or have an output of, a finished art product and a decreased level of pain perception.

Kielhofner (1985) also considers occupational behavior to be motivated, organized and performed according to three subsystems, volition, habituation, and performance. Volition is the energizing and symbolic component which determines conscious choice and initiation of occupational behavior. It is further subdivided into several subsystems including, interests, values, and personal causation. In this study, an interest in art and in reducing pain perception would be considered the volitional subsystems energizing the individual to participate in the study.

Habituation is the collection of images that organize an individual's behaviors and guide him in the performance of routine behaviors (Kielhofner, 1985). Roles and habits constitute the habituation subsystem, and have been identified by several pain researchers as being central to the continuation of pain perception by patients with chronic

pain (Belkin, 1986; Evans, 1985; Fordyce et al., 1981; Latimer, 1982, Sample, Page, & Hayes, 1985; Savitz, 1985).

The performance subsystem is the "collection of images and biological structures and processes which are organized into skills and used in the production of purposeful behavior" (Kielhofner, 1985, p. 31). Internalized rules, and skills learned through exploration, imitation, and repetition guide the individual in the performance of occupational behavior. Perceptual motor, communication, interaction, and process skills are directly related to an individual's performance of occupational behavior (Kielhofner, 1985) and have also been implicated by other researchers in the pathology of chronic pain (Black, 1975; Bond, 1973; Flower, Naxon, Jones, & Mooney, 1981; Fordyce et al., 1981; Fordyce et al., 1984; Johnson, 1983; Khatami & Rush, 1982; Kremer, Block, & Gaylor, 1981; Latimer, 1982; Pilowsky, 1981; Rosenstiel & Keefe, 1983). As a result of the interaction of the volitional, habituation, and performance subsystems, output of occupational behavior is seen in the human system.

Summary

In summary, pain is a complex physiological and/or emotional phenomenon. Three major theories have been proposed to explain pain, the specificity, the pattern, and the gate control theories. The gate control theory suggests

that pain perception can be modified at several levels of the nervous system by psychological, cognitive, perceptual, and emotional factors.

Current theories of pain show that while the gate control theory can be used to explain acute pain, it is inadequate to explain chronic pain due to the complex sensory, motivational and cognitive factors that influence chronic pain. Pfingsten et al. (1988) stated that the maintenance of chronic pain is due to an individual's predisposition to accept an excess of tasks and commitments. Models used as treatments for patients with chronic pain, include the behavioral model by Fordyce (1976) and cognitive behavioral treatment described by Philips (1987). Philips showed a significant increase in reduction of pain by 83% of treated cases, by teaching skills that allowed patients to minimize and alleviate their pain by using cognitive, social, and physical pain reduction techniques. The Vanderbilt Pain Management inventory (Brown & Nicassio, 1987) showed that when active coping strategies were used by the patient, the patient felt a greater sense of self efficacy, and therefore a lowering of functional impairment.

The occupational therapy frames of reference of Occupational Performance and the Model of Human Occupation may be used to describe the use of purposeful activities to facilitate adaptation and the feeling of accomplishment. The occupational performance frame of reference is concerned

with the effective performance of an individual's life roles and tasks (self-care, work, play, and leisure). Illness and disabilities can lead to dysfunction in these areas.

Treatment methods are therefore directed towards remediating deficits to result in an increased level of functioning of the individual's life roles.

The model of human occupation focuses on a cycle of experience that influences an individual's observable performance or output. Man is regarded as an open system that is influenced by events (input) which in turn influence his further performance. The processing of information received into an observable output or result has been called throughput. These two frames of references have been used in this research.

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

The relationship between pain perception and the level of concentration and involvement required to engage in specific therapeutic art activities was studied in patients with chronic back pain. This study was originally planned to analyze the combined results of a sample population size of 35 subjects with chronic low back pain. However, only six patients, of a total of approximately 100 people contacted over a period of about one year, agreed to participate in the study. As a result, the study was changed from a correlational to a single case subject research design. Pre- and post-tests using the McGill Pain Questionnaire (MPQ), were used to measure pain perception before and after participation in three specific art activities (Appendices A and B). Concentration and involvement required to complete the specific art activities were measured by the Level of Concentration and Involvement Questionnaire (Appendix C).

The single case study is used for a small sample size, or is used to study a single subject individually. It can help to provide information and a rationale for the use of treatment interventions, and can aid in generating ideas and hypotheses for further study (Ottenbacher, 1986). In the

present study the AB study design was employed, which consisted of establishing a base-line for each subject (A) and then providing intervention, after which the subjects' response was recorded (B); responses were then analyzed for both the pre-intervention and intervention phases (Ottenbacher, 1986). In this study, the McGill Pain Questionnaire was used to record intensity of pain perceived by each subject prior to (A), and following (B) engagement in each of three art activities.

Subjects

Volunteer subjects were obtained from Stanford University Hospital's out patient back school. Patients who had experienced pain for six months or more, without having responded to previous medical intervention, and had previously or were currently taking the back school were given an explanation via telephone or in person at the class of the study on low back pain which was being conducted. A brief questionnaire (Appendix D) was either provided or read to potential volunteers to help determine best meeting time/date for volunteers. A total of three sessions were held at times volunteers selected as best meeting their schedules. Although a minimum of two volunteers per group was intended, group sizes ranged from one to three subjects due to subjects canceling without prior notice (even after confirming the appointment the day). Individuals who were

physically unable to participate in art activities, had a strong dislike for art, or had a primary psychiatric diagnosis, were excluded from the study.

Six patients, three men and three women, ranging in age from 24 to 56 years old, volunteered for the study. Each had experienced chronic low back pain for at least six months (10 months to 14 years). After a brief welcome and introduction, the volunteer subjects were asked to sign informed consent and release documents for both San Jose State University (Appendix E) and Stanford University Hospital (Appendix F).

Procedures

The art sessions were conducted at the Stanford University Hospital out patient back school. Subjects sat around an adjustable height therapy table, which was adjusted to a height where the subjects could comfortably rest their elbows when seated in wooden chairs with arm and back rests. Lumbar supports were made available for subjects' use, but were not required.

The following art activities were chosen by the researchers: creative drawing, guided drawing to a theme, and paint by number. Participants were given thirty minutes for each art activity. Two-fifteen minute breaks were provided directly after answering the MPQ post-test following the first and second art activities. Subjects

were allowed to get up and walk around or stretch during the thirty minute sessions if they wished. The order in which the art activities were completed was according to a previously agreed upon random order, to reduce the effect of sample bias (study was originally intended for a population of 35 subjects, as previously discussed).

The subjects were provided with the appropriate art supplies, and instructed to complete the various tasks as described below.

Creative Drawing. Construction paper, color pencils, and crayons were provided. The activity was introduced by defining creative drawing to the subjects, and the subjects were instructed to proceed by drawing anything they wished.

Guided Drawing/Drawing to a Theme. Supplies were provided as above, and the activity was introduced by defining guided drawing. A scene was verbally described to the subjects (Appendix G), and then the subjects were asked to draw a picture of the scene.

Complex Paint-by-Number. A paint-by-number picture was provided with numbers in each sub-section designating which color should be painted into that area. Paint brushes, water soluble paints, water, and paper towels were also provided. The procedures involved in completing a paint-by-number painting were explained, and the subjects then completed the task.

Instructions with session introduction (thanking subjects for participating, session format description, and informed consent and bill of rights instruction), and directions for administering the MPQ and each art activity was read aloud by the researchers to each subject group (Appendix H). Immediately after signing the consent forms, the subjects were asked to mark on a diagram where they experienced their pain (Appendix I).

In all the activities, accuracy and active participation were encouraged, and guidance offered as needed.

Instruments

The following instruments were used to measure the pain experienced before, during, and after each art activity:

Pain Observation Checklist. Throughout the activities, the researchers visually observed the subjects, from a distance of about ten feet, for overt signs of pain, such as facial grimacing, perspiration, tired/drawn look, rubbing/holding aching part, and vocalization of pain complaints (Fordyce et al., 1981; Hebben, 1985; Johnson, 1977). The observations were recorded on a pre-designed checklist (Appendix J). Consistency in pain observation and terminology was ensured by pre-defining all words on the Pain Observation Checklist (Appendix K). The subjects were not told prior to or during the activities what the

researchers were tallying while they worked on their art projects.

MPQ Pre- and Post-Tests. Before and after each activity, the subjects were given the MPQ, which is a list of over 75 words in twenty subclasses. Subjects were asked to circle those words that described their pain at that moment, but to circle only one word per subclass. Detailed definitions of possible word selection choices for the MPQ were made available to participants to help ensure accuracy of test results (Appendix L).

Concentration and Involvement. After completing all three art activities, the subjects completed a questionnaire asking which of the three activities required the most concentration and involvement (Appendix C).

The results of the questionnaires and pain observations were tabulated, using the appropriate values assigned to each word of the MPQ (Appendix M) for each individual, in order to determine if relationships exist between engagement in art activities and reduction of pain as perceived by the patient with chronic back pain, as well as to see if the level of involvement and concentration in an activity influenced the perception of pain.

CHAPTER 4

DATA AND RESULTS

Introduction

This study sought to determine if: 1. There is a relationship between therapeutic activity and the reduction of pain as perceived by patients with chronic back pain, 2. The level of involvement in activity affects the perception of pain, and 3. The level of concentration on an activity affects the perception of pain.

Analysis

Six patients with chronic low back pain, who had previously or currently were participating in Stanford University Hospital's out-patient back school, participated in the study. The data were collected and analyzed and the relationships among pain perception, concentration, and involvement were examined. The data were individually analyzed to determine whether the task that required the most involvement and concentration as reported by the subject correlated with the most significant reduction in pain he/she perceived as reported by the McGill Pain Questionnaire and as observed by the researchers.

Subjects

Three men and three women participated in the study. Each was diagnosed with chronic low back pain and had experienced the pain for over six months. The age of subjects ranged from 24 to 56 years old, with the onset of pain ranging from 10 months to 14 years prior to the study. The precipitating causes of the chronic back pain included back strain, gradual onset pain, disc herniation, radiculopathy, non-disc origin pain secondary to large breast size, and narrow disc space. Findings for each participant follow.

Subject A

Subject A is a white 47 year old female who has experienced chronic low back pain for three years since experiencing a strain in her lumbar back region three years ago. The first activity in which Subject A participated was creative drawing. Upon administration of the MPQ pre-test, she described the pain as aching and annoying, and obtained a score of 2.20. At the end of the activity she noted throbbing, burning, aching, troublesome, and radiating pain for a total score of 2.79, thus demonstrating an increase of 0.59 in perceived pain level (Table 1). The subject appeared cheerful talkative and chatty, and was observed to rub her lower back four times, during this art activity.

Table 1

Scores on McGill Pain Questionnaire Pre-Test and Post-Test
for Art Activities in Order of Participation.

Subjects (n = 6)		Pre-Test	Post-Test	Perceived Pain
A				
1.	Creat.	2.20	2.79	+0.59
2.	Theme	2.90	2.50	-0.40
3.	Number	2.50	2.50	0.00
B				
1.	Creat.	2.12	2.47	+0.35
2.	Theme	1.91	2.52	+0.61
3.	Number	2.04	2.52	+0.48
C				
1.	Creat.	2.36	2.38	+0.02
2.	Number	2.42	2.48	+0.06
3.	Theme	2.43	2.25	-0.18
D				
1.	Creat.	3.00	2.57	-0.43
2.	Number	2.72	2.46	-0.26
3.	Theme	2.06	2.03	-0.03
E				
1.	Creat.	2.76	2.63	-0.13
2.	Number	2.78	2.61	-0.17
3.	Theme	2.21	1.87	-0.34
F				
1.	Theme	0.00	0.00	0.00
2.	Creat.	0.00	0.00	0.00
3.	Number	0.00	2.42	+2.42

Key:

Creat. = Creative Drawing
 Theme = Draw to a Theme
 Number = Paint-by-Number
 + = Increase in Pain
 - = Decrease in Pain
 0.00 = No change in Pain

The second activity in which Subject A participated was drawing to a theme. Prior to administration of this activity, the subject described the pain as aching and spreading on the MPQ pre-test, which gave her a score of 2.90. At the end of the activity she recorded the pain as aching and no longer as spreading, thus obtaining a score of 2.50, and demonstrating a decrease in perceived pain level of 0.40 (Table 1). During this activity the subject continued to be talkative and seemed to be easily distracted from the activity. She was observed to rub her lower back once and make one facial grimace.

Subject A participated in paint-by-number as the third of the three art activities. She described her pain as aching, thus giving her her a score of 2.50 on the MPQ pre-test. At the end of the activity she again described her pain as aching, thus giving her the same score of 2.50, and showing no change in pain perceived (Table 1). During the course of this art activity the subject was observed to make one facial grimace. She was also talkative at the beginning of the session, after which she appeared to concentrate intently on the task.

Upon completion of all three art activities the subject ranked drawing to a theme as requiring the most concentration and paint-by-number as requiring the least. She demonstrated a 0.40 reduction in pain perception, and no change in pain perceived, respectively, for these

activities. She also ranked drawing to a theme as requiring the most involvement with creative drawing as requiring the least (Table 2).

Subject B

Subject B is a white 52 year old male with repeated low back pain complaints with a gradual onset over the last 13 years. The first activity in which Subject B participated was creative drawing. Upon administering the MPQ pre-test, he described the pain as pressing, dull, tiring, annoying, and nagging, and thus obtained a score of 2.12. At the end of the activity on the MPQ post-test he noted pressing, tugging, aching, tiring, troublesome, spreading, tight, and nagging pain for a total score of 2.47, thus demonstrating a 0.35 increase in perceived pain level (Table 1). During this activity the subject appeared very engrossed in the activity and rubbed his back once. He was also observed to make two facial grimaces and appeared to have a tired, drawn look.

The second activity for Subject B was drawing to a theme. Prior to administering this activity the subject described the pain as dull, annoying and nagging thus obtaining a score of 1.91 on the MPQ pre-test. At the end of the activity he recorded the pain as aching, tiring, troublesome, spreading, tight, and nagging, thus obtaining a score of 2.52, with a resultant increase in pain perception

Table 2

Subject's Classification of Least and Most Involvement
Required to Complete Activities Relative to the Change in
MPQ Scores

<u>Subjects (n = 6)</u>		<u>Least</u> <u>Conc.</u>	<u>Most</u> <u>Conc.</u>	<u>Least</u> <u>Involve</u>	<u>Most</u> <u>Involve</u>
A	MPQ	0.00	-0.40	+0.59	-0.40
	Task	Number	Theme	Creat.	Theme
B	MPQ	+0.61	+0.48	+0.48	+0.61
	Task	Theme	Number	Number	Theme
C	MPQ	+0.02	+0.06	+0.02	+0.06
	Task	Creat.	Number	Creat.	Number
D	MPQ	-0.43	-0.26	-0.43	-0.26
	Task	Creat.	Number	Creat.	Number
E	MPQ	-0.13	-0.17	-0.13	-0.17
	Task	Creat.	Number	Creat.	Number
F	MPQ	0.00	+2.42	+2.42	0.00
	Task	Creat.	Number	Number	Theme

Key: Conc. = Concentration
 Involve = Involvement
 + = Increase in Pain
 - = Decrease in Pain
 Creat. = Creative Drawing
 Theme = Draw to a Theme
 Number = Paint-by-Number

by 0.61 (Table 1). During the course of the art activity the subject verbally analyzed the activity and hypothesized that the more "directed" an activity is, the less pain is perceived. The subject made three facial grimaces and had a tired drawn appearance.

Subject B participated in paint-by-number as the third of the three art activities. He described his pain as dull, tiring, annoying, and tight, giving him a score of 2.04 on the MPQ pre-test. At the end of the activity the pain was described as aching, tiring, troublesome, spreading, tight, and nagging, giving him a score of 2.52, and thus showing a 0.48 increase in pain perception (Table 1). During this art activity the subject complained about the activity at the beginning of the session but was quiet during the activity itself. He was observed to grimace eight times.

Upon completion of all three art activities the subject ranked paint-by-number as requiring the most concentration and drawing to a theme as the least. He experienced a 0.48 and 0.61 increase in pain perception for each activity, respectively. He ranked drawing to a theme as requiring the most involvement during which he perceived a 0.61 increase in pain perception and paint-by-number as requiring the least with a 0.48 increase in pain perception (Table 2). Overall, during the course of the art sessions, he experienced a 0.40 increase in pain perception, the increase

in pain perception noted for all three art activities (Table 1).

Subject C

Subject C is a white 24 year old female who 10 months ago received a paraspinal muscle sprain and has been experiencing back pain since. The first activity in which Subject C participated was creative drawing. Upon administering the MPQ pre-test, she described the pain as flickering, flashing, pricking, pinching, tugging, burning, tingling, sore, taught, tiring, annoying, spreading, tearing, and nagging thus obtained a score of 2.36. At the end of the activity on the MPQ post-test she included "sharp, tight, piercing, troublesome, and hot" to her previous list of pain adjectives, and excluded the adjectives "tearing, annoying, sore, spreading," giving her a total score of 2.38, and thus demonstrating a very small increase in pain perception level of 0.02 (Table 1). During this art activity the subject appeared to squirm, but also appeared very absorbed in the activity.

The second activity for Subject C participated was paint-by-number. Prior to administering this activity the subject described the pain as pulsing, shooting, pricking, sharp, pinching, pulling, hot, tingling, aching, taught, tiring, annoying, radiating, tight, and nagging, using the MPQ pre-test, thus obtaining a score of 2.42. At the end of

the activity she also included the adjectives "flashing, boring, cramping, hurting, exhausting, troublesome, spreading" but excluded "shooting, pricking, pinching, aching, tiring, annoying, radiating," thus obtaining a score of 2.48 for a 0.06 increase in pain perception (Table 1). During this activity the subject appeared to squirm six times and was observed to stretch her neck once making circular head rotations.

Subject C participated in drawing to a theme as the third of the three art activities. Her score on the MPQ pre-test was 2.43, having indicated her pain as pulsing, flashing, boring, gnawing, pulling, hot, tingling, aching, taught, exhausting, troublesome, spreading, tight, and nagging. At the end of the activity she described the pain as flickering, pricking, cramping, tugging, hot, tingling, sore, taught, tiring, annoying, radiating, tight, and nagging, thus showing a decrease in pain perception by 0.18 (Table 1). During the course of the art activity the subject was observed to hold her head, grimace, yawn, and sigh one time each, but she also appeared absorbed in the task.

Upon completion of all three art activities the subject ranked paint-by-number as requiring the most concentration and involvement, with a 0.06 increase of pain perception noted, and creative drawing as requiring the least

concentration and involvement with a 0.02 increase in pain perception (Table 2).

Subject D

Subject D is a white 56 year old male with a right herniated disc and Lumbar 4-5 radiculopathy. He has experienced low back pain for 8 years. The first activity in which he participated was creative drawing. Upon administering the MPQ pre-test, he described the pain as throbbing, shooting, stabbing, sharp, cramping, wrenching, smarting, aching, splitting, exhausting, fearful, grueling, miserable, radiating, drawing, and agonizing, and obtained a score of 3.00. At the end of the activity on the MPQ post-test he described the pain as pounding, boring, pinching, pulling, smarting, hurting, miserable, penetrating, tight, and agonizing, for a total score of 2.57, and thus noted a decrease in pain perception level of 0.43 (Table 1). During this art activity the subject stated "I'm done" every four to five minutes, and also stated "It hurts more," and was observed to grimace twice and to perspire.

The second activity in which Subject D participated was paint-by-number. Prior to administering this activity the subject described the pain as throbbing, boring, pressing, hurting, vicious, annoying, penetrating, and nagging, using the MPQ pre-test, thus scoring 2.72. At the end of the activity he recorded the pain as pulsing, shooting, boring,

gnawing, hurting, tiring, annoying, drawing, and nagging, thus obtaining a score of 2.46, a 0.26 decrease in pain perception (Table 1). During this activity the subject was observed to make five facial grimaces.

Subject D participated in drawing to a theme as the third of the three art activities. His score on the MPQ pre-test was 2.06 since he selected the terms flickering, flashing, tugging, tingling, dull, annoying, squeezing, and nagging. At the end of the art activity his score was 2.03 on the MPQ, having selected the terms, flickering, tugging, tingling, aching, tender, tiring, annoying, tight, and nagging. He thus showed a decrease in pain perception of 0.03 (Table 1). During the course of the art activity the subject was observed to shift restlessly, rub his neck one time, grimace five times, and stop then start drawing five times.

Upon completion of all three art activities the subject ranked paint-by-number as requiring the most concentration and involvement and experienced a 0.26 reduction in pain perception and creative drawing as requiring the least concentration and involvement with a 0.43 reduction in pain perception (Table 2). Overall, Subject D experienced a 0.97 reduction in pain perception during the course of the art sessions, having experienced a reduction in pain perception ranging from 0.03 to 0.43 in all three art activities (Table 1).

Subject E

Subject E is a white 27 year old female with chronic low back pain for 10 years. Her pain is of non-disc origin, secondary to large breasts. She has had breast reduction surgery but continues to have low back pain. The first activity in which Subject E participated was creative drawing. Upon administering the MPQ pre-test, she described the pain as throbbing, burning, aching, grueling, annoying, spreading, and nauseating, and obtained a score of 2.76. At the end of the activity she noted throbbing, stabbing, pinching, burning, hurting, annoying, radiating, and nagging pain for a total score on the MPQ of 2.63, thus demonstrating a 0.13 decrease in pain perception level (Table 1). During this art activity the subject appeared quiet and concentrated on the activity.

The second activity for Subject E was paint-by-number. Prior to administering this activity the subject described the pain as throbbing, gnawing, burning, hurting, tiring, punishing, annoying, and piercing, using the MPQ pre-test, thus obtaining a score of 2.78. At the end of the activity she recorded the pain as throbbing, aching, annoying, penetrating, and nagging, thus obtaining a score of 2.61, a 0.17 decrease in pain perception (Table 1). During this activity the subject appeared to concentrate on the task.

She used the magnifying glass provided, grimaced three times, and shifted her weight once in her chair.

Subject E participated in drawing to a theme as the third of the three art activities. Her score on the MPQ pre-test was 2.21, having selected throbbing, burning, sore, tender, tiring, annoying, and nagging as pain descriptors. At the end of the activity she described the pain as dull, tender, exhausting, and annoying, for a total score of 1.87. She thus showed a 0.34 decrease in pain (Table 1). During the course of the art activity the subject was observed to rub her face once and to concentrate on the task.

Upon completion of all three art activities the subject ranked paint-by-number as requiring the most concentration and involvement with a 0.17 reduction in pain perception and creative drawing as requiring the least and a 0.13 reduction in pain perception (Table 2). Subject E demonstrated an overall reduction in pain perception by 0.89 during the course of the art sessions, with a reduction in pain perception in all three art activities ranging from 0.13 to 0.34 (Table 1).

Subject F

Subject F is a white 53 year old male with sacroiliac radiculopathy and narrow disc space. He has had chronic low back pain for 14 years. The first activity in which

Subject F participated was drawing to a theme. Upon administering the MPQ pre-and post-tests, he stated he felt no pain thus giving him scores of zero on both the MPQ pre-and post-tests. Similar results were obtained for the second activity, creative drawing (Table 1). During both of these activities, the subject was smiling. He stretched and arched his back seven times and hummed tunes during the first activity; however, he appeared very engrossed in the second activity.

Subject F participated in paint-by-number as the third of the three art activities. His score on the MPQ pre-test was zero, having not selected any pain descriptors. At the end of the activity, however, he selected "tiring" pain, for a total score of 2.42, thus showing an increase in pain perception (Table 1). During the course of this third art activity the subject was observed to grimace three times and appeared engrossed in the activity. He rubbed his neck one time and smiled occasionally.

Upon completion of all three art activities the subject ranked paint-by-number as requiring the most concentration with a 2.42 increase in pain perception and creative drawing as requiring the least with no change in pain perception. He also ranked drawing to a theme as requiring the most involvement with no change in pain perception and paint-by-number as requiring the least with a 2.42 increase in pain perception (Table 2). Overall, Subject F demonstrated an

increase in pain perception by 2.42, having chosen no pain descriptors for any of the MPQ survey subgroups, except after completing the last of the three art activities, paint-by-number (Table 1).

Summary of Results as Related to Research Questions

The results of this study as related to the research questions are as follows:

1. Is there a positive relationship between engagement in therapeutic activity and the reduction of pain as perceived by the patient with chronic back pain? Of the six volunteer subjects, four (Subjects A, D, E, and C) experienced some degree of reduction in perceived pain during at least one activity. The decrease ranged from 0.03 to 0.43. Two subjects, D and E, experienced a reduction in pain perception with all three art activities. The two subjects who experienced no reduction in pain perception consistently reported either no change, or an increase in pain perceived. Only three subjects, however, had an overall reduction in pain from the time just prior to performing the first activity to just following the third of three art activities (Table 1).

A positive relationship was found between engagement in therapeutic activity and the reduction of perceived pain for three subjects. No positive relationship was found for three subjects.

2. Is there a positive relationship between the level of involvement in art activity and decreased perception of pain by the patient with chronic pain? Of the six subjects, three (A, D, and E) experienced a reduction in pain perception during the activities they considered to require the most involvement. Their pain perception reduction ranged from 0.17 to 0.40. Two subjects, B and C, experienced an increase in pain perception of 0.06 and 0.61, respectively, during the activity which they considered to require the most involvement. One experienced no change in pain intensity. Four subjects, A, B, C, and F, experienced an increase in pain perception during the activity ranked as requiring the least involvement. The reported increase ranged from 0.02 to 2.42. Subjects B and C, however, reported less of an increase in pain perception in this activity than during the activity selected as requiring the most involvement. Additionally, Subjects D and E experienced a reduction in pain perception ranging from 0.13 to 0.43 during the activity which they stated required the least involvement. Interestingly, one of the two subjects (D) reported a larger reduction in pain perception during the activity he reported to require the least involvement than was reported for the activity which he stated to require the most involvement. Three subjects (A, B, and F) reported that drawing to a theme required the most involvement, while three (C, D, and E) reported that paint-

by-number required the most involvement. Four subjects (A, C, D, and E) reported that creative drawing required the least involvement, whereas the other two (B and F) stated that paint-by-number required the least involvement (Table 2).

No positive relationship was found between the level of involvement in art activity and decreased perception of pain by the patient with chronic pain. The variability of the findings require further study.

3. Is there a positive relationships between concentration on an art activity and decreased perception of pain by the patient with chronic pain? Of the six subjects, three (A, D, and E) experienced reduction in pain perception ranging from 0.17 to 0.40 during the art activity they reported as requiring the most concentration, whereas the other three subjects (B, C, and F) experienced an increase in pain perception ranging from 0.06 to 2.42. Two subjects, B and C, experienced an increase in pain perception; two, D and E, a reduction in pain perception; and two, A and F, experienced no change in pain perceived during the art activities which they reported as requiring the least concentration. One subject, D, experienced greater reduction in pain perception during the art activity that he reported to require the least concentration, compared to the activity he reported to require the most concentration. One subject, C, experienced less of an increase in the amount of

pain perceived during the activity that she reported to require the least concentration when compared to the activity she reported to require the most concentration. A third subject, F, reported no change in pain perception during the activity he reported to require the least concentration when compared to a large increase in pain during the activity he reported to require the most concentration. Five subjects, B, C, D, E, and F, reported that paint-by-number required the most concentration, while subject A reported that drawing to a theme required the most concentration. Four subjects, C, D, E, and F, reported that creative drawing required the least concentration, one subject, A, reported that paint-by-number required the least concentration, and one subject, B, reported that drawing to a theme required the least concentration (Table 2).

A positive relationship was found between the level of concentration on an art activity and decreased perception of pain for three subjects. No positive relationship was found for three subjects. The variability of the findings require further research.

CHAPTER 5

DISCUSSION, IMPLICATIONS AND RECOMMENDATIONS

Discussion

It was the intent of this study to provide additional support for previous studies by Johnson (1983), Bisson (1987), and Blackeney (1984), which have shown that increased cognitive involvement in activities leads to a decrease in pain perception. This study was also intended to test the hypothesis that a similar relation exists in the minimization of pain perception and the engagement in art activity, as experienced by the patient with chronic pain.

This study was originally designed as a correlational study with an intended sample size of at least 35 subjects which could have permitted statistical analysis of the data. The researchers contacted approximately 100 patients (in person while they attended the back school, or by telephone) with chronic back pain who had attended, or were attending, Stanford University Hospital's out-patient back school. After a brief introduction of themselves, the researchers explained the study without giving enough detail to bias the results. Only six patients agreed to participate in the study. Since the small sample size ($n=6$) would not produce results that would lend themselves to sophisticated analysis, a change was made in the research design, from

correlational to single-case study methodology, with each of the six subjects discussed as a single case and serving as his/her control.

The AB single subject research design is particularly suited to occupational therapy research in that a basic tenet of occupational therapy is to provide treatment to the individual according to his/her unique needs and skills (Smith & Tiffany, 1983). Therefore, each subject is discussed individually according to his/her individual test results and findings. In order to further understand this information and to gain a better feeling for the overall significance and findings of this study, however, the researchers will compare and contrast the results for each subject.

Art activities were chosen for the inherent therapeutic aspects of this modality, which are described by Gibson (1975), Hurley (1968), and Shrewsbury (1982), and also since art provided a relatively simple, inexpensive, and non-threatening modality which could be easily graded, or ranked by the subjects with regard to how much involvement and concentration they felt was involved in completing each task. Additionally, by selecting the three art tasks, rather than three very different tasks (such as mathematical computations, watching television, and reading a simple textbook), several variables could be controlled, such as body mechanics required to do the task, environmental

differences, amount of physical energy and endurance required, previous educational background, to name a few.

Subject A

Subject A's MPQ results inconsistently supported the first question of this study, namely that engagement in activity affects the perception of pain. She reported an increase in pain perception (0.59) after the first activity in which she participated, creative drawing, and a decrease in pain perception (by 0.4) in the second activity (draw to a theme), and no change in pain experienced after the paint-by-number task. Overall, her MPQ ratings showed an increase of 0.30 in pain perception following the course of the art activities.

In support of the present study, Subject A experienced the greatest reduction in pain perception according to the MPQ with the draw to a theme activity, the activity she regarded as requiring the most concentration and involvement. In addition, her MPQ results reported the most increase in pain perception following the creative drawing task, the activity she reported as requiring the least involvement. With this task, she was also noted to rub her back four times (as opposed to not at all and once with the other activities) thus perhaps indicating an increase in pain felt, as well.

Subject A was very talkative throughout the art sessions, with the exception of the paint-by-number task, where she appeared to become quickly engrossed in the activity, and very quiet. By the end of the art activities, however, she reported that this task (paint-by-number) required the least amount of her concentration. Perhaps the discrepancy noted could be due to differences in interpretations of "concentration" and "involvement" by the subject, although written definitions of each were provided. Discrepancies could also be due to the time lapse after each activity and the ranking of each activity, or due to subject fatigue and lack of topics to discuss. Similarly, Subject A reported that drawing to a theme required the most concentration and involvement, but she appeared to be the most distracted during this task, being very talkative, and rubbing her back and grimacing once each. She did, however, show a score of 0.40 for reduction in pain perception during the draw to a theme activity, according to her pre- and post-activity MPQ scores.

Although she experienced an overall increase in pain perception by the end of the entire art session, her MPQ results correlated well with her classification of the involvement and concentration required for the tasks, thus affirming the question regarding the relationships of concentration and involvement, in regard to the reduction of pain perceived. Her body language, as an indication of pain

perceived, however, was inconclusive with mixed signs of pain and lack of pain noted throughout the sessions.

The observable behaviors that were perceived as signs of pain may not necessarily reflect pain, but may have been expressions of fatigue, boredom, learned behaviors or habits. It is also significant to note that the subject reported no increase in pain perception during the activity that the researchers hypothesized to require the most involvement and concentration (namely paint-by-number), and had the largest increase in pain perception during the activity hypothesized as requiring the least amount of involvement and concentration (creative drawing). This, however, does not explain the fact that the only reduction in pain perception occurred during the "draw to a theme" activity, that was proposed by the researchers as requiring an intermediate amount of involvement and concentration. The subject ranked the draw to a theme activity as requiring the most involvement and concentration, which is in keeping with the premise of this study that the activity that required the most involvement and concentration would be the one in which the least amount of pain was perceived.

Subject B

The results for Subject B did not support this study, in that all of his MPQ scores increased following the various art activities. He also reported the greatest

increase in pain scores after performing the two activities he reported as having required the most involvement and concentration, namely paint-by-number and "draw to a theme" (with a 0.48 and 0.61 increase, respectively). He also was noted to grimace the most frequently (eight times) with the paint-by-number task, although he reported the greatest increase in pain with the draw to a theme task. This finding is in accord with Turk and Rudy's (1987) study stating that observable behavior can serve as a more accurate evaluation of the patient with chronic pain than self-report of pain.

This subject also tended to be very analytical, continually offering his ideas and hypotheses regarding what the study was hoping to find. At one point, he accurately hypothesized that the current study was trying to "prove" that by being "distracted," one experiences less pain. It is interesting to note, that during the draw to a theme activity he reported the greatest amount of pain perception on the MPQ scale (0.61), but grimaced only three times as opposed to the paint-by-number activity, in which he grimaced eight times. In addition, he scored the draw to a theme activity as requiring the least amount of involvement with the most amount of concentration, and the paint-by-number as requiring the most concentration with the least involvement. This may be due to confusion regarding word

definitions, or differences between concentration and involvement.

Subject C

At initial glance of the results for Subject C's participation in the art activities, one would be led to believe that this subject's findings did not support the premise of this study. In a general way, this subject's results supported the study in that before beginning the first activity she obtained a pain level of 2.36 on the MPQ, and by the end of the last art activity her perception of pain level had decreased by 0.11 to 2.25. Perhaps, although she scored a 0.02 and 0.06 increase in pain perception with the first two art activities, the overall engagement in the art activities might have provided cognitive, perceptual and/or emotional factors for the subject which in turn might have affected the central control mechanism proposed in the gate control theory in a way that she experienced less intensity of pain. Perhaps, on a more basic level, the third activity, "drawing to a theme" might have provided a subtle, creative outlet, distraction or enjoyment that led to such a degree of involvement in the activity that she was no longer cognitively aware of her pain.

Subject C reported that creative drawing required the least involvement and concentration, however it was during this task that she appeared most absorbed in the task and

she was noted to have the least number of physical or observable manifestations of pain or discomfort. Though very slight, Subject C reported an increase of pain perception (0.02) with this activity. Ironically, paint-by-number required the most involvement and concentration according to this subject, but she was noted to be much more active physically (squirming six times, and making circular rotations of her head once), and her overall pain index by the MPQ increased by 0.06, the highest increase in pain perception noted. This would indicate that the physical observations for signs of increase in pain may be correlated with a quantifiable increase in pain as measured by the MPQ.

The activity in which Subject C demonstrated the least physical manifestations of pain, namely "draw to a theme," was not only the only activity where there was a reduction in pain perception noted (0.18), but the activity where she reported neither the most nor the least concentration and involvement required. Perhaps this is due to the fact that the subjects were not asked in advance to be aware of the amount of involvement or concentration they felt while engaged in the activity. Also, assuming or trying to predict how much involvement and concentration they were expending engaging in the activity may have falsified these ratings.

The subject's results supported the researchers' assumption that creative drawing would require the least

involvement and concentration, whereas paint-by-number would require the most. It is also noteworthy that the end result from the time she began the activities to the time that she finished showed an overall decrease in pain perceived. This supported one aspect of the present study, that engagement in activity could distract or engross (even though in a seated position) and result in a reduction in pain perceived by the patient with chronic back pain.

Subject D

The results for Subject D also supported the present study in that engagement in activity led to a reduced perception of pain in many ways. Before engaging in any of the art activities, Subject D reported a pain perception level of 3.00 on the MPQ, and by the end of the last art activity, he reported a pain level of 2.03, a 0.97 reduction in pain perception overall. This is particularly noteworthy, in that all of the art activities required the subjects to remain seated for thirty minute intervals, an activity which alone usually causes patients with low back pain to experience an increase in discomfort or pain (Bigos & Battie, 1987; Boachie-Adjei, 1988).

The greatest overall reduction in pain perception as reflected by the MPQ was .43 during Subject D's first art activity, creative drawing. Although he reported that this task required the least involvement and concentration, he

was noted to have the least number of physical or observable manifestations of pain, namely, facial grimaces (two versus five for both paint-by-number and draw to a theme). This reduced number of grimaces supported the hypothesis or belief that physical manifestations of pain and subjective measurement of pain experienced may be correlated. The evidence to support his recording the least involvement and concentration required for this task, was observed by his statement, "I'm done," which occurred each 4 to 5 minutes, and required further verbal cueing for him to continue the task.

Paint-by-number required the most involvement and concentration according to Subject D, and it caused a significant but moderate reduction in pain perception for this subject (0.26). Paint-by-number was also the activity in which the subject appeared the least restless and worked the most consistently. Paint to a theme resulted in the least reduction in pain perception (0.03) and it was also the task in which he appeared the most restless, grimaced the most frequently (five times), and rubbed his neck once. He also started and stopped the activity five times before the end of the thirty minute session. The subject's grading of the art activities in order of least to most involvement and concentration by this subject was in agreement with the researchers' activity grading in terms of task design.

Subject E

Subject E experienced an overall reduction in pain perception according to the MPQ. In the first activity, creative drawing, Subject E reported a reduction in pain perception by 0.13 on the MPQ, and she appeared to concentrate quietly on the task. The patient ranked this activity as requiring the least involvement and concentration. In support of the present study, Subject E reported the least reduction of pain perception during the activity that she ranked as requiring the least amount of involvement and concentration. Perhaps it could be hypothesized that the subject found engagement in the activities to be an overall positive experience, and therefore in accordance with Kielhofner (1985) provided a positive throughput of reduction in pain perception. Ironically, however, the subject indicated that the task of creative drawing required the least concentration and involvement, although she appeared to concentrate the most on this particular task. One way of explaining this apparent discrepancy may be that she relied on a preconceived idea that an activity labelled "creative drawing" would automatically imply or require lesser amounts of concentration and involvement (i.e., doodling) than other more structured activities.

The next activity in which Subject E engaged was paint-by-number. Although she reported that this activity

required the most involvement and concentration, the overall reduction in pain perception during this activity was only slightly greater than that observed with creative drawing (0.17 on the MPQ for paint-by-number as opposed to 0.13 for creative drawing). In addition, it was during this activity that the subject was noted to grimace most frequently, and shift position once. Apparently, in this case, the observable behaviors did not correlate with the intensity of pain reported on the MPQ.

The third and last activity in which Subject E participated was drawing to a theme. It was during this activity that she reported the greatest reduction in pain. However, the subject did not report this activity as requiring the most or least involvement or concentration. It must be noted, however, that throughout all three activities the subject appeared to be deeply engrossed in the task, which strongly supported the premise that engagement in activity that requires concentration can lead to a reduction in pain perceived.

Kielhofner's (1985) idea of the volitional subsystem could also explain the influence on the outcome for Subject E. The activities may have appealed to the subject's volition and motivation, providing her with a "flowing" experience (Furlong, 1976), thereby increasing her absorption in the task, which could have distracted her from

feeling the pain, and thus resulted in a lower level of reported pain.

Subject F

Subject F reported no pain on the MPQ before beginning any of the art activities. However, by the end of the third activity (paint by number) the subject reported the presence of pain. Because of the lack of reported pain at the beginning of any of the activities, the question of the role of activity in focusing pain may be raised. The observable behaviors demonstrated by the subject, however, were of interest.

During the first activity, (drawing to a theme) the subject was noted to hum tunes, smile and stretch frequently (seven times), and arch his back. Ironically, he reported that this task required the highest level of involvement and concentration. It is significant to note that although the subject was sitting at the table for thirty minutes, he did not report any pain during the activity. His observable behavior of smiling and humming showed a positive relationship with no reported pain. However, stretching and arching his back seven times would seem to be an indication of back discomfort, and/or fatigue, or possibly boredom.

The second activity in which Subject F participated was creative drawing. The subject appeared very engrossed in this activity; however, he reported the least amount of

involvement and concentration required, which does not support the present study regarding the relationship between level of involvement and reported level of concentration. Again, it is noteworthy that there was no reported or observable increase in pain perceived.

Subject F reported pain and grimaced three times during the third activity (paint by number). In this case, the observable behavior of grimacing did appear to show a relationship with the reported pain perceived. The fact that he appeared very engrossed in the activity related well with his assessment that this activity required the highest level of concentration; however, the subject reported that this task also required the least involvement of the three activities. As opposed to the researchers' premise, this subject reported the presence of pain (2.42 on the MPQ) during the activity which was believed to require the greatest amount of involvement and concentration with the least amount of pain or the greatest reduction in pain perceived.

The most significant observation that can be made from Subject F's results was that he came into the study with no complaint of pain, and by the end of the session reported pain. This reported pain may be explained by the fact that the subject sat for a period of three half hour sessions, with fifteen minute breaks between sessions, and this prolonged sitting in itself, may have resulted in pain,

since sitting is known to be associated with back pain (Bigos & Battie, 1987; Boachie-Adjei, 1988).

Conclusions

In some cases there appears to be a positive relationship between engagement in therapeutic art activities and the reduction of pain, and in others there is not (Table 1). Likewise, in some cases there appears to be a positive relationship between the engagement in therapeutic activity, level of involvement, and/or the level of concentration in art activities and the reduction of pain perceived, whereas in other cases there is not (Table 2). As can be seen from the results, no definite conclusion regarding the relationships between perceived back pain and engagement in therapeutic activity, level of involvement, and level of concentration, can be drawn. This study, however, may serve as a pilot for further research in these areas.

Further Observations

A significant limitation of this study was the small sample size. Out of a total of approximately 100 individuals contacted, only six attended the sessions. Some of the reasons that were given for not attending, were lack of time in schedule, fear of pain increasing during participation, and no interest in involvement. Philips

(1987) suggested that avoidance behavior is a major contribution to chronic pain problems. He also has stated that these can include avoidance of stimulation from activity and leisure pursuits. In telephone conversations with some of the potential participants for the study, individuals gave multiple vague reasons for being unable to participate. This may be in accordance with the avoidance behavior described by Philips (1987).

It was a belief of the researchers that the design of the study would provide a means of enabling the subject to gain a sense of control over the pain by actively participating in art activities. Art may be seen as an active coping strategy (Philips, 1987), since engaging in art could reduce the perception of pain by actively redirecting the individual's involvement and concentration away from the pain and onto the art activity. However, since these results did not support this notion further study with a larger sample is indicated.

Additionally, the use of pre-tests and post-tests with self-report may not have provided a true reflection of the pain the subjects actually perceived during the study. The use of self-report instruments with patients with chronic back pain has been reported to be somewhat less reliable than observational pain assessments (Kremer et al., 1981; Vlaeyen et al., 1987). A pain observation checklist was therefore designed to help offset this possible source of

unreliability. It might have been interesting to have interrupted the subjects while they were engaged in the art activities, and surveyed them to find out if they felt more or less pain while they were actually doing the art tasks. However, data bias due to the subjects' possible pre-conceived ideas regarding activity and pain perception could still be a possible source of error.

The chronic pain syndrome, as described by Black (1975), includes among other factors, excessive preoccupation with the pain problem, which was distinctly noted in this study. The findings from the behavioral checklist of observable signs of pain were in accordance with the Vlaeyen et al (1987) theory, in that distorted posture, generalized verbal complaints, and fatigue were observed. This observable checklist provided particularly insightful data in that notable discrepancies between observed pain behavior and self-reported pain levels (as indicated by the MPQ) were found. This further confirmed a need for a behavioral assessment of pain as suggested by Turk and Rudy (1987).

In accordance with the Occupational Performance frame of reference, the aim of this study was to provide an activity that would enable the use of time, energy, and interest in a goal directed manner, which would result in a decrease in pain perceived. The results of this study, however, were inconsistent, as previously stated, in that

some subjects reported an increase, and others a decrease in pain perceived with activity. It is acknowledged that many variables other than the art activity itself could have affected the intensity of pain perceived, such as group interactions with other participants, location and time of day of the study, seating conditions, temperature of the room, and other environmental, psychosocial, or physical stress the subject may have experienced that day or during the art session.

The process of participation in the session can also be viewed in terms of Kielhofner's Model of Human Occupation (Kielhofner, 1985). For some subjects, the input (in the form of the art activity) may have been processed in a positive or negative manner, depending on the subjects' response to such factors as the activity, the environment, and the people engaged in the activity, and discomfort or pain felt during participation. In this study, output could be observed using the behavioral checklist, in the form of verbal complaints, grimacing, and distorted posture, thus demonstrating a negative throughput, or by praising the activity, appearing relaxed, friendly and talkative, thus demonstrating a positive throughput. The overall resultant experience would provide feedback for the subject, which would in turn determine the individual's motive to participate in a similar activity again or carry over the task to a new environment.

Implications for Occupational Therapy Practice

Occupational therapy, through the use of purposeful activities, can enable a person to adjust to the environment, and lead a more functional life. Providing activities to increase function is a major role of the occupational therapist, and according to Anderson (1984), successful participation in activity provides positive feedback, giving a person evidence that he/she can function in a more effective manner, which can encourage higher levels of activity for maintaining general physical wellness.

If a person with chronic back pain can engage in an activity of interest to him/her (such as an art activity for a leisure-time hobby) and can perceive a decrease in pain, the experience may enable the person to generalize the positive experience to other areas of his/her life, and encourage active engagement in functional activities of daily living. The experience may also provide the support necessary to enhance the person's performance, and make him/her a more effective member of society, thus reinforcing the need to work toward functional enablement and the goals of occupational therapy.

As discussed earlier, three of the six subjects in this study reported a consistent reduction in pain perceived. These results can be viewed in terms of Kielhofner's Model of Human Occupation and Pedretti's Model of Occupational

Performance. In support of Kielhofner's theory, the subject may have viewed the activities as being of interest to them and therefore experienced a positive input, a positive throughput, and a resulting positive output of reduced pain perception. Having participated in a leisure/play activity of interest that was appropriate for them as a hobby, the subjects may have identified with the activity as being purposeful and engaged in it with interest, thus leading to a reduction in pain perception, and supporting Pedretti's frame of reference.

The fact that three subjects did not report a consistent decrease in pain perceived could also support the theory behind each of the two frames of reference used in this study. These subjects may not have viewed the art activities as being interesting or felt that they were not engaging in purposeful or appropriate activity and therefore were experiencing negative input and throughput, with a resulting negative output of pain perceived. The significance of these results may be that the activity must be appropriate and of interest to each person in order to produce the desired positive outcomes. It is acknowledged that a limitation of this study was that activities of interest were not selected for the likes/dislikes of each individual. However, prior to volunteering for this study, the subjects were informed that this study would involve the

use of art modalities, although the exact art modalities were not specified.

Practice Recommendations for Further Research

In view of these findings, and the specific and individual differences in each case study, it is not appropriate to draw a single conclusion from the study. In occupational therapy, the need to recognize individual differences and to tailor activities to individual needs is well documented. As a result, any study using identical protocol for all subjects is likely to fall short of individual needs.

Suggestions for methodology in future research include:

1. Providing activities of interest for each subject. For example, have each participant engage in an activity that he or she considers as a hobby, instead of limiting the activity to art.
2. Increasing the number of participants in the study (perhaps by using a financial incentive, recruiting participants from numerous sources) to obtain statistically relevant data for a correlational study.
3. Asking participants to rank either involvement or concentration required to complete the activities (as opposed to both), since defining the difference between

these two terms seemed at times to be confusing to the participants.

4. Conducting a quick measurement of the pain perceived during the art activity when cognitive distraction would be expected to be at its peak. This would offset some of the inconsistency in using a pre- versus post-test study when attempting to measure pain experienced during a task.

5. Conducting a similar study using an in-patient population, in order to gain a larger sample size for a correlational study. This would be beneficial for generalizing the results and findings of the study.

References

- Adamson, E. (1983, December 14). The patient as artist. Nursing Times, pp. 8-10.
- Anderson, E. M. (1984). Effects of Relaxation on Activity Tolerance in Patients with Chronic Pain Disorders. Unpublished master's thesis. San Jose State University, San Jose, CA.
- Belkin, S. (1986). Back pain. In G. M. Aronoff (Ed.), Evaluation and treatment of chronic pain (pp. 333-350). Baltimore: Urban & Schwarzenberg.
- Bigos, S. J., & Battie, M. C. (1987). Acute care to prevent back disability: Ten years of progress. Clinical orthopaedics and related research, 221, 121-130.
- Bisson, M. (1987). The Relationship of Activity Levels to Perception of Pain in the Patient with Chronic Pain. Unpublished master's thesis. San Jose State University, San Jose, CA.
- Black, R. G. (1975). The chronic pain syndrome. Surgical Clinics Recent Development in Anaesthesia, 55, 999-1011.
- Blackeney, A. B. (1984). Occupational therapy intervention in chronic pain. In F. S. Cromwell (Ed.), Occupational Therapy and the patient with pain (pp. 43-53). New York: Haworth Press.

- Boachie-Adjei, O. (1988). Conservative management of low back pain: An evaluation of current methods. Postgraduate Medicine, 84, 127-133.
- Bokan, J. A., Ries, R. K., & Katon, W. J. (1981). Tertiary gain and chronic pain. Pain, 10, 331-335.
- Bond, M. R. (1973). Personality studies in patients with pain secondary to organic disease. Journal of Psychosomatic Research, 17, 257-263.
- Bonica, J. (1977). Neurophysiologic and pathological aspects of acute and chronic pain. Archives of Surgery, 112, 750-761.
- Bonica, J. (1986). Introduction: Importance of the problem. In G. M. Aronoff (Ed.), Evaluation and treatment of chronic pain (pp. XXXI-XLIV). Baltimore: Urban & Schwarzenberg.
- Brown, G. K., & Nicassio, P. M. (1987). Development of a questionnaire for the assessment of active and passive coping strategies in chronic pain patients. Pain, 31, 53-64.
- Chapman, S. L., Brena, S. F., & Bradford, L. A. (1981). Treatment outcomes in a chronic pain rehabilitation program. Pain, 11, 255-268.
- Cohen, D. H., & Sherman, S. M. (1983). The somatosensory system. In R. M. Berne, & M. N. Levy (Eds.), Physiology (pp. 145-164). St. Louis: C. V. Mosby.

- Comer, S. (1982, March 4). Arts in hospitals: Art and well being. Health and Social Service Journal, pp. 268-270.
- Dorland's Illustrated Medical Dictionary. (1981). (26th ed.). Philadelphia: W. B. Saunders.
- Evans, W. O. (1985). A cognitive-behavioral approach to chronic pain. In G. M. Aronoff (Ed.), Evaluation and treatment of chronic pain (pp. 549-560). Baltimore: Urban & Schwarzenberg.
- Flower, A., Naxon, E., Jones, R. E., & Mooney, V. (1981). An occupational therapy program for chronic back pain. American Journal of Occupational Therapy, 35, 243-248.
- Fordyce, W. E. (1976). Behavioral methods for chronic pain and illness. St. Louis: C. V. Mosby.
- Fordyce, W. E., Lansky, D., Calsyn, D. A., Shelton, J. L., Stolov, W. C., & Rock, D. L. (1984). Pain measurement and pain behavior. Pain, 18, 53-69.
- Fordyce, W. E., McMahon, R., Rainwater, G., Jackins, S., Questad, K., Murphy, T., & DeLateur, B. (1981). Pain complaint--exercise performance relationship in chronic pain. Pain, 10, 311-321.
- Furlong, W. B. (1976, June). The flow experience: The fun in fun. Psychology Today, pp. 35-37, 80.
- Gibson, G. L. (1975). A survey of treatment modalities used by mental health clinicians and activity therapists. Hospital and Community Psychiatry, 26, 441-443.

- Hebben, N. (1985). Toward the assessment of clinical pain. In G. M. Aronoff (Ed.), Evaluation and treatment of chronic pain (pp. 451-462). Baltimore: Urban & Schwarzenberg.
- Hopkins, H. L. (1983). An historical perspective on occupational therapy. In H. L. Hopkins & H. D. Smith (Eds.), Willard and Spackman's occupational therapy, (6th ed.). (pp. 3-24). Philadelphia: J. B. Lippincott.
- Hunter, M., Philips, C., and Rachman, S. (1979). Memory for Pain. Pain, 6, 35-46.
- Hurley, H. P. (1968, November 15). Art therapy. Nursing Times, pp. 1555-1558.
- Johnson, S. J. (1983). Psychological assessment of chronic pain. In S. F. Brena & S. L. Chapman (Eds.), Management of patients with chronic pain (pp. 85-100). New York: S. P. Medical & Scientific.
- Kazdin, A. E. (1982). Single case research designs. New York: Oxford University Press.
- Keefe, F. J., Block, A. R., Williams, R. B., & Surwit, R. S. (1981). Behavioral treatment of chronic low back pain: Clinical outcome and individual differences in pain relief. Pain, 11, 221-231.
- Kelly, D. D. (1981). Somatic sensory system IV: Central representations of pain and analgesia. In Kandel, E. R., & Schwartz, J. H. (Eds.), Principles of neural

- science (pp.199-214). New York: Elseveir/North-Holland.
- Kerns, R. D., Finn, P., & Haythornthwaite, J. (1988).
Self-monitored pain intensity: Psychometric properties
and clinical utility. Journal of Behavioral Medicine,
11, 71-82.
- Khatami, M., & Rush, A. J. (1982). A one year follow-up of
the multimodal treatment for chronic pain. Pain, 14,
45-52.
- Kielhofner, G. H. (Ed.). (1985). A model of human
occupation: Theory and application. Baltimore:
Williams & Wilkins.
- Kremer, E. F., & Atkinson, J. H. (1981). Pain measurement
construct validity of the affective dimension of the
McGill Pain Questionnaire with chronic benign pain
patients. Pain, 11, 93-100.
- Kremer, E. F., Atkinson, J. H., & Ignelzi, R. J. (1982).
Pain measurement: The affective dimensional measure of
the McGill Pain Questionnaire with a cancer population.
Pain, 12, 153-163.
- Kremer, E. F., Block, A., & Gaylor, M. S. (1981).
Behavioral approaches to treatment of chronic pain:
The inaccuracy of patient self-report measures.
Archives of Physical Medicine and Rehabilitation, 62,
188-191.
-

- Latimer, P. R. (1982). External contingency management for chronic pain: Critical review of the evidence. American Journal of Psychiatry, 139, 1308-1312.
- Lindahl, O. (1974). Pain--A general chemical explanation. In J. J. Bonica (Ed.), Advances in neurology volume 4: international symposium on pain (pp. 45-47). New York: Raven Press.
- Linton, S. J. (1987). Chronic pain: The case for prevention. Behavioral Research and Therapy, 25, 313-317.
- Linton, S. J., & Melin, L. (1981). The accuracy of remembering chronic pain. Pain, 13, 281-285.
- Lipton, S. (1984). Conquering pain. New York: Arco Publishing.
- Lutz, R. W., Silbret, M., & Olshan, N. (1983). Treatment outcome and compliance with therapeutic regimes: Long-term follow-up of a mulitdisciplinary pain program. Pain, 17, 301-308.
- Maciewicz, R., & Sandrew, B. B. (1985). Physiology of pain. In G. M. Aronoff (Ed.), Evaluation and treatment of chronic pain (pp. 17-38). Baltimore: Urban & Schwarzenberg.
- McKechnie, J. L. (Ed.). (1970). Webster's New Twentieth Century Dictionary of the English Language: Unabridged (2nd ed.). Cleveland: World Publishing.

- Melzack, R. (1975). The McGill Pain Questionnaire: Major properties and scoring methods. Pain, 1, 277-299.
- Melzack, R. (1987). The short-form McGill Pain Questionnaire. Pain, 30, 191-197.
- Melzack, R., & Dennis, S. G. (1978). Neurophysiological foundations of pain. In R. A. Sternbach (Ed.), The psychology of pain. New York: Raven Press.
- Melzack, R., & Wall, P. D. (1965, November 19). Pain mechanisms: A new theory. Science, pp. 971-979.
- Mendelson, G. (1987). Measurement of conscious symptom exaggeration by questionnaire: A clinical study. Journal of Psychosomatic Research, 31, 703-711.
- Moon, M. H. (1988). Social factors in chronic pain rehabilitation. New Zealand Medical Journal, 101, 16-18.
- Moore, M. E., Berk, S. N., Nypaver, A. (1984). Chronic pain: Inpatient treatment with small group effects. Archives of Physical Medicine and Rehabilitation, 65, 365-361.
- Ottenbacher, K. J. (1986). Evaluating clinical change: Strategies for occupational and physical therapists. Baltimore: Williams & Wilkins.
- Paris, S. V. (1985). Manual therapy: Treat function not pain. In T. H. Michel (Ed.), International perspectives in physical therapy: Pain (pp. 152-167). New York: Churchill Livingstone.

- Pedretti, L. W., & Pasquinelli, S. (1990). A frame of reference for occupational therapy in physical dysfunction. In L. W. Pedretti & B. Zoltan (Eds.), Occupational therapy: Practice skills for physical dysfunction (3rd ed.) (pp. 1-10). St. Louis: C. V. Mosby.
- Pfingsten, M., Bautz, M., Eggebrecht, D., & Hildebrandt, J. (1988). Social interaction in low-back pain patients. Psychotherapie, Psychosomatik, Medizinische Psychologie, 38, 328-332.
- Philips, H. C. (1987). Avoidance behavior and its role in sustaining chronic pain. Behavioral Research and Therapy, 25, 273-279.
- Philips, H. C. (1987). Editorial. Behavioral Research and Therapy, 25, 235.
- Philips, H. C. (1987). The effects of behavioral treatment on chronic pain. Behavioral Research and Therapy, 25, 365-377.
- Pilowsky, I. (1981). Current views on the role of the psychiatrist in the management of chronic pain. In M. Swerdlow (Ed.), The therapy of pain (pp. 31-60). Philadelphia: J. B. Lippincott.
- Rachman, S., & Lopatka, C. (1988). Accurate and inaccurate predictions of pain. Behavioral Research and Therapy, 26, 291-296.

- Reading, A. E. (1982). A comparison of the McGill Pain Questionnaire in chronic and acute pain. Pain, 13, 185-192.
- Rosenstiel, A. K., & Keefe, F. J. (1983). The use of coping strategies in chronic low back pain patients: Relationship to patient characteristics and current adjustment. Pain, 17, 33-44.
- Rybstein-Blinchik, E. (1979). Effects of different cognitive strategies on the chronic pain experience. Journal of Behavioral Medicine, 2, 93-102.
- Sample, S., Page, M. B., & Hayes, M. (1985). Chronic pain management: The nurse's role. In G. M. Aronoff (Ed.), Evaluation and treatment of chronic pain (pp. 561-570). Baltimore: Urban & Schwarzenberg.
- Savitz, D. (1985). Medical evaluation of the chronic pain patient. In G. M. Aronoff (Ed.), Evaluation and treatment of chronic pain (pp. 39-60). Baltimore: Urban & Schwarzenberg.
- Shrewsbury, J. (1982). Painting: A coping device for pre-school children. Maternal-Child Nursing Journal, 11, 11-16.
- Smith, H. D., & Tiffany, E. G. (1983). Assessment and evaluation--An overview. In Hopkins, H. L. & Smith, H. D. (Eds.), Willard and Spackman's Occupational Therapy (pp. 143-148). Philadelphia: J. B. Lippincott.

- Spanos, N. P., Horton, C., & Chaves, J. F. (1975). The effects of two cognitive strategies on pain thresholds. Journal of Abnormal Psychology, 84, 677-681.
- Tait, R. C., Duckro, P. N., & Margolis, R. B. (1988). Quality of life following treatment: A preliminary study of in- and outpatients with chronic pain. International Journal of Psychiatry in Medicine, 18, 271-282.
- Tan, S. Y. (1982). Cognitive and cognitive-behavioral methods for pain control: A selective review. Pain, 12, 201-228.
- Turk, D., Michenbaum, D., & Genest, M. (1983). Pain and Behavioral Medicine. New York: Guilford Press.
- Turk, D. C., Rudy, T. E. (1987). Towards a comprehensive assessment of chronic pain patients. Behavioral Research and Therapy, 25, 237-249.
- Turk, D. C., Rudy, T. E., Salovey, P. (1985). The McGill Pain Questionnaire reconsidered: confirming the factor structure and examining appropriate uses. Pain, 21, 385-397.
- Uden, A., Astrom, M., & Bergenudd, H. (1988). Pain drawings in chronic back pain. Spine, 13, 389-392.
- Vlaeyen, J. W. S., Van Eek, H., Groenman, N. H., & Schuerman, J. A. (1987). Dimensions and components of observed chronic pain behavior. Pain, 31, 65-75.

- Watson, D. (1982). Neurotic tendencies among chronic pain patients: An MMPI item analysis. Pain, 14, 365-385.
- Wyke, B. D. (1981). Neurological aspects of pain therapy: A review of some current concepts. In M. Swerdlow (Ed.), The therapy of pain (pp. 1-30). Philadelphia: J. B. Lippincott.
- Yeh, C., Gonyea, M., Lemke, J., & Volpe, M. (1985). Physical therapy: Evaluation and treatment of chronic pain. In G. M. Aronoff (Ed.), Evaluation and treatment of chronic pain (pp. 251-261). Baltimore: Urban & Schwarzenberg.

APPENDIX A**McGill Pain Questionnaire
(Pre-Activity)**

PLEASE NOTE

Copyrighted materials in this document have not been filmed at the request of the author. They are available for consultation, however, in the author's university library.

**Appendix A 95
Appendix B 97**

University Microfilms International

APPENDIX B
McGill Pain Questionnaire
(Post-Activity)

APPENDIX C

Level of Concentration and Involvement Questionnaire

Level of Concentration and Involvement Questionnaire

Please rank the activities you have just completed according to the amount of concentration (see *1) required to complete the tasks. Use the following criteria:

- 1 = minimum concentration required
- 2 = moderate concentration required
- 3 = maximum concentration required

_____ Creative drawing
_____ Drawing to a theme
_____ Paint-by-number

Please rank the activities you have just completed according to the amount of involvement (see *2) required to complete the tasks. Use the following criteria:

- 1 = minimum involvement required
- 2 = moderate involvement required
- 3 = maximum involvement required

_____ Creative drawing
_____ Drawing to a theme
_____ Paint-by-number

Name/Initials _____

Thank you for your time and participation. Your cooperation will greatly aid us in gaining knowledge about activity use.

- *1 Concentration--mental attention required to complete the task
- *2 Involvement--the complexity/number of steps required to complete the task

APPENDIX D
Volunteer Questionnaire

Much research is now being done in the area of chronic low back pain, and there continues to be a need for more. In order to add to the body of knowledge in this area, we are conducting a study with groups of patients with chronic low back pain who will engage in performing certain simple art activities. No previous art skills are required, and the art activities will not be graded or analyzed.

The study will require three hours of your time and all activities will be conducted at the Lytton Garden out-patient center. We would like to know the following:

1. Would you be interested in participating in our study, and thus add to the scientific research in the area of chronic low back pain?

Yes _____

No _____

2. Would you prefer week nights, or week-ends?

Week nights _____

Week-ends _____

3. Rank in order which times would be the most convenient for you to participate in the study:

a. Week nights:

_____ 5-8:30 pm (1 session)

_____ 5-6:00 pm (3 nights, 1 hr each)
Consecutive nights?

Yes _____

No _____

_____ 5-7:00 pm (2 nights, 2 hrs each)
Consecutive nights?

Yes _____

No _____

2. Week-ends

_____ Saturdays 9-12:00 (1 time session)

4. Which week nights would be best for you? (Please Rank, 1 = best)

Mon. _____

Tues. _____

Thurs. _____

Fri. _____

In order for us to contact you regarding the study, please give us your name, address, and phone number. Thank you.

Name: _____

Address: _____

Street

Apt. No.

City

State

Zip Code

Phone (_____) _____
Home

(_____) _____
Work

APPENDIX E

**Agreement to Participate in Research at
San Jose State University**

A campus of The California State University

School of Applied Arts and Sciences • Department of Occupational Therapy
One Washington Square • San Jose, California 95192-0059 • Main Office: 408/924-3070 • Fieldwork Office: 408/924-3078

AGREEMENT TO PARTICIPATE IN RESEARCH AT SAN JOSE STATE UNIVERSITY

RESPONSIBLE INVESTIGATORS: Nandita Garg
Ellen Elssner

TITLE OF PROTOCOL: The Relationship of Activity
Participation to the Perception of Pain in Patients
with Chronic Back Pain

I have been asked to participate in a research study that is investigating the relationship between activities used by occupational therapists and the perception of pain in patients with chronic back pain. The results of this study should further our understanding of the effectiveness of specific therapeutic activities often used by occupational therapists to aid in the reduction of the amount of pain as perceived by chronic back pain patients. The amount of concentration and involvement in specific activities, versus the amount of pain perceived, will also be studied.

I understand that:

1. I will be asked to participate in three art activity groups, of one half hour each, and complete a pre- and post- activity questionnaire (McGill Pain Questionnaire) regarding my perception of pain before and after participating in the activity. I will be observed during these activities.
2. The possible risks of this study are that I may perceive some pain while engaged in the art activity.
3. The possible benefits of this study to me are that I may learn a new effective technique for reducing my perception of pain.
4. Alternative procedures include: N/A
5. The results from this study may be published, but any information from this study that can be identified with

me will remain confidential and will be disclosed only with my permission or as required by law.

6. Compensation: N/A
7. Any questions about my participation in this study will be answered by Nandita Garg at 415-797-9830 and Ellen Elssner at 415-325-2568. Complaints about the procedures may be presented to Dr. Gordon Burton at 408-924-3074; and/or Dr. Lela Llorens at 408-924-3070. For questions or complaints about research subjects's rights, or in the event of research-related injury, contact Serena Stanford, PhD. (Associate Academic Vice-President for Graduate Studies) at 408-924-2480.
8. My consent is given voluntarily without being coerced; I may refuse to participate in this study, or in any part of this study, and I may withdraw at any time, without prejudice to my relations with San Jose State University.
9. I have received a copy of this consent form for my file.

I HAVE MADE A DECISION WHETHER OR NOT TO PARTICIPATE. MY SIGNATURE INDICATES THAT I HAVE READ THE INFORMATION PROVIDED ABOVE AND THAT I HAVE DECIDED TO PARTICIPATE.

Date

Subject's Signature

Investigator's Signature
(Nandita Garg)

Investigator's Signature
(Ellen Elssner)

APPENDIX F

**Experimental Subject Bill of Rights and
Consent Form for Stanford University**

A campus of The California State University

School of Applied Arts and Sciences • Department of Occupational Therapy
One Washington Square • San Jose, California 95192-0059 • Main Office: 408/924-3070 • Fieldwork Office: 408/924-3078

**Experimental Subject Bill of Rights and
Consent Form For Stanford University**

**The Relationship of Activity Participation
to the Perception of Pain
in Patients with Chronic Back Pain**

Investigators:

Nandita Garg

Ellen Ellsner

Experimental Subjects Bill of Rights

Persons who participate in a medical experiment are entitled to certain rights. These rights include but are not limited to the subject's right to: be informed of the nature and purpose of the experiment; be given an explanation of the procedures to be followed in the medical experiment, and any drug or device to be utilized; be given a description of any attendant discomforts and risks reasonably to be expected; be given an explanation of any benefits to the subject reasonably to be expected, if applicable; be given a disclosure of any appropriate alternatives, drugs or devices that might be advantageous to the subject, their relative risks and benefits; be informed of the avenues of medical treatment, if any available to the subject after the experiment if complications should arise; be given an opportunity to ask questions concerning the experiment or the procedures involved; be instructed that consent to participate in the medical experiment may be withdrawn at any time and the subject may discontinue participation without prejudice; be given a copy of the signed and dated consent form; and be given the opportunity to decide to consent or not to consent to a medical experiment without the intervention of any element of force, fraud, deceit, duress, coercion or undue influence on the subject's decision.

Informed Consent

You are invited to participate in a study that is investigating the complexity and effect of certain art activities used by occupational therapists when treating patients. We hope to learn of the effectiveness of these activities in treatment, thus contributing to the knowledge base of the use of activities in occupational therapy. You were selected as a possible participant in this study because you have been referred to occupational and/or physical therapy, and we feel that your participation would be appropriate.

If you decide to participate, we (Jennifer Green, OTR, Nandita Garg, OTS, and Ellen Elssner, OTS) will ask for your participation in three thirty-minute art activities doing paint by numbers, creative drawing, and drawing to a theme. Directions and art materials will be supplied at no cost. In addition, you will be asked to fill out a questionnaire (the McGill Pain Questionnaire) regarding the amount of pain you are feeling before, during and after doing the art activity. The possible risks of this study are that you may perceive some pain or discomfort while engaged in the art activity, but the possible benefits are that you may learn a new, and effective technique for reducing your perception of pain outside the medical setting. WE CANNOT AND DO NOT GUARANTEE OR PROMISE THAT YOU WILL RECEIVE ANY BENEFITS FROM THIS STUDY.

Any data that may be published in scientific journals will not reveal the identity of the subjects. In the interest of public safety, patient information will be provided to federal and regulatory agencies as required.

No payment will be provided for this project. There will be no additional cost to you for participation in this study.

This study is being conducted in order to meet the partial requirements for the degree of Masters of Science in Occupational Therapy at San Jose State University.

Your decision whether or not to participate will not prejudice you or your medical care. If you decide to participate, you are free to withdraw your consent and to discontinue participation at any time without prejudice to you or effect on your medical care.

If you have any questions, we expect you to ask us. If you have any additional questions later, we (Jennifer Green, at 415-723-8146; Nandita Garg, at 415-797-9830; and Ellen Elssner, at 415-325-2568) will be happy to answer them.

All forms of medical diagnosis and treatment--whether routine or experimental--involve some risk of injury. In spite of all precautions, you might develop medical complications from participating in this study. If such complications arise, the researchers will assist you in obtaining appropriate medical treatment but this study does not provide financial assistance for additional medical or other costs. (Additionally, Stanford is not responsible for research and medical care by other institutions or personnel participating in this study.) You do not waive any liability rights for personal injury by signing this form. For further information, please call 415-723-5244, or write the Medical Committee for the Protection of Human Subjects at Medical School Office Building, Room C-051, Stanford, California, 94305. In addition, if you are not satisfied with the manner in which this study is being conducted, or if you have any questions concerning your rights as a study participant, please contact the Human Subjects Office at the same telephone number and address.

YOUR SIGNATURE INDICATES THAT YOU READ AND UNDERSTAND THE ABOVE INFORMATION, THAT YOU HAVE DISCUSSED THIS STUDY WITH THE PRINCIPLE INVESTIGATOR, AND HIS OR HER STAFF, AND THAT YOU HAVE DECIDED TO PARTICIPATE BASED ON THE INFORMATION PROVIDED. AND THAT A COPY OF THIS FORM HAS BEEN GIVEN TO YOU.

Signature

Date

Signature of Investigator
or Witness

APPENDIX G

Draw to a Theme Scenario

Draw to A Theme Scenario

"Fishing by the Lake"

"Think of a warm, pleasant Sunday afternoon, with a blue sky above, green hills in the background, and a clear blue lake, surrounded by trees and bushes. A man sits at the edge of the lake, holding a fishing line thrown out into the water. A young boy sits by his side, watching. It is a calm and tranquil moment."

"Keep this scene in mind, and draw a picture that describes it."

APPENDIX H
Session Format

Session Format

I. Introduction: (10 minutes)

A. Thank You:

Thank you for participating in our study, in order to learn more about, and add to the body of knowledge regarding chronic back pain. My name is _____, and this is _____. We are both students at San Jose State University, completing a Master's degree program in Occupational Therapy.

B. Session Format:

In this study you will be involved in doing various art activities while we observe the sessions. No art experience or skills will be needed, and your art work will not be graded or analyzed. Before each session you will be asked to fill out a questionnaire regarding the amount of pain you are currently perceiving. You will then be asked to fill out the questionnaire again at the end of the activity. In order to reduce any experimental bias in the study, we are unable to tell you anything else about the study.

C. Informed Consent & Bill of Rights:

Before we can begin the activities, we are required by San Jose State, and Stanford University Hospital to have you each carefully read, and sign "Informed Consent Forms". These forms are rather self-explanatory, but if you have any questions, please feel free to contact either of us for further clarification.

---Allow 5 minutes for subjects to read material and sign papers.

---Have black ink pens available for subject's use.

---Be available to answer any questions.

II. Administering the McGill Pain Questionnaire (10 min.)

A. Provide each subject with a McGill Pain Questionnaire (word list).

Instructions:

---Read aloud the instructions printed at the top of the questionnaire. Instruct subjects to read along.

---Emphasize they are to circle only those words that describe their present pain.

---Emphasize they may choose only one item from a word list

---Emphasize they do not have to choose a word in every word subclass

---Be prepared to define/explain the meaning of the various words if confusion arises. See list of words and definitions titled: "Definitions for Possible McGill Pain Questionnaire Selections"

B. Provide each subject with a McGill Pain Questionnaire Pain Chart.

Instructions:

---Read the instructions aloud

---Assist subjects as needed

III. **Art Activities (30 min. each--timed)**

Have the subjects sit around a standard table, in standard chairs. Subjects may use their lumbar supports if they wish. Provide art supplies for each subject, as described below.

NOTE: Have the patients complete both sections of the McGill Pain Questionnaire before, and directly after doing each of the art activity.

Provide two 15 minute breaks. One directly after completing the first art activity and MPQ, and the second break directly after completing the second art activity and MPQ.

Describe each art activity to the subjects as follows:

A. Creative Drawing

Provide: White Construction Paper
Colored Pencils
Crayons

"For the next thirty minutes we will be doing creative drawing. Creative drawing, is a type of unstructured drawing activity, in which one draws whatever one wishes. We have provided construction paper, colored pencils, and crayons for you to use. You can draw a picture, sketch, or just doodle, it's up to you. There is ample paper, so if you finish your picture early, or would like to start a new picture feel free to. Remember, we will not be analyzing your skills as an artist, nor the content of your artwork. You may keep your art work."

B. Drawing to a Theme

Provide: Construction Paper
Color Pencils
Crayons

"Drawing to a theme, is a type of art activity in which one is described or given a scene or

scenario, and is then asked to paint or draw a picture accordingly. _____ will describe a scene, and then for the next thirty minutes we would like you to draw a picture according to that scene/theme. Art supplies have been provided, and there is ample paper available in case you finish early and would like to start another picture. If you do start additional pictures, please continue to draw according to the theme that was originally described. Remember, we will not be analyzing your skills as an artist, nor the content of your artwork. You may keep your art work."

The Scenario: "Fishing by the Lake"

"Think of a warm, pleasant Sunday afternoon, with a blue sky above, green hills in the background, and a clear blue lake, surrounded by trees and bushes. A man sits at the edge of the lake, holding a fishing line thrown out into the water. A young boy sits by his side, watching. It is a calm and tranquil moment. Keep this scene in mind, and draw a picture that describes it."

C. Paint by Number

Provide: Paint by Number Kit
 Paint Brushes (very fine brushes)
 Water Soluble Paint
 Water
 Paper Towels

Note: During the break, line the table with newspaper/butcher paper to protect table-top.

"Paint-by-Number involves painting each subsection of the paint-by-number picture with the pre-designated color. If you look closely at the picture, you will notice that each little area has a number written in it (occasionally a section will not have a number in it, in which case the number will be written in an adjacent subsection. For example, if one of the subsections has the number 3 in it, you would find the paint container with the number 3 on it, and fill that subsection) with that color of paint. We suggest painting all the subsections of a given number/color, before continuing on to the next color, making sure not to cover any numbers that might be pointing to another subsection. You will have 30 minutes to work. We recognize that you may not complete the

picture in 30 minutes, therefore, you may take the entire kit home and complete it at your leisure."

IV. Visual Observation:

While the subjects are working on the art projects, observe each subject for overt signs of pain and record on the provided Pain Observation Checklist. Note the frequency of facial grimacing, vocalization of pain complaints, rubbing/holding an aching part, using hash marks. Note the presence of perspiration and tired/drawn look. Note any other comments or pain behaviors that may be present, in the section labeled "other comments."

V. Level of Concentration and Involvement Questionnaire (5 mins.):

Provide each subject with a copy of the Level of Concentration and Involvement Questionnaire after the subject has completed all three activities. Explain: "You have just completed three art activities. In order to help us study the effects of mental concentration and actual involvement (complexity) in completing a task, we would like you to fill out this questionnaire. Please rank each activity according to amount of concentration, then involvement that you felt the activity required, with 1 being minimum, and 3 being maximum."

VI. Closing (1 min.):

"Thank you for participating in our study. We hope you have enjoyed the activities we have selected, and that you learned more about your pain and how it might relate to your level of concentration and/or involvement in a task."

APPROXIMATE TIME SCHEDULE

Introduction	10 minutes
MPQ	10
Art Activity #1	30
MPQ	10
Break	15
MPQ	10
Art Activity #2	30
MPQ	10
Break	15
MPQ	10
Art Activity #3	30
MPQ	10
Conc./Involv. Quest	5
<u>Closing</u>	<u>1</u>
Total	186 minutes = 3 hours 6 minutes

APPENDIX I**McGill Pain Questionnaire--Pain Chart**

PLEASE NOTE

Copyrighted materials in this document have not been filmed at the request of the author. They are available for consultation, however, in the author's university library.

Appendix I 118

University Microfilms International

APPENDIX J
Pain Observation Checklist

PAIN OBSERVATION CHECKLIST

Throughout each art activity record for each subject the number of/frequency of occurrence of each observable pain indication, according to the checklist below. Refer to the "Pain Observation Terminology Definitions" sheet for the definitions to be used as criteria for observing pain behavior. Note any additional comments in the space provided.

NOTE: Use a separate checklist for each art activity

Patient Name	Facial Grimacing	Perspiration	Vocalization of Pain Complaints	Rubbing/Holding a Part	Tired/Drawn Look	Other Comments

Activity: _____ Sequence of Activity: 1st, 2nd, 3rd _____ (circle)

Date: _____ Signature: _____

APPENDIX K**Pain Observation Terminology Definitions**

Pain Observation Terminology Definitions

Facial Grimacing--The subject demonstrates distortion/twisting of facial region, particularly the wrinkling of his/her nose, pouting/distorting the mouth and cheeks.

Perspiration--The subject sweating/perspiring, as demonstrated by visible skin dampness.

Vocalization of Pain Complaints--The subject mentioning or stating that he/she is experiencing pain or discomfort, particularly that pain felt in the lumbar region of the back.

Rubbing or Holding a Part--The subject rubbing or holding the lumbar region of the back, thus indicating pain or discomfort in that region.

Tired/Drawn Look--The facial features of the subject appear fatigued and weary. The eyes may droop or appear tired.

Other Comments--Any additional comment or noticeable behavior expressed by the subject should be recorded here.

APPENDIX L

Definitions for Possible McGill Pain Questionnaire
Selections

PLEASE NOTE

Copyrighted materials in this document have not been filmed at the request of the author. They are available for consultation, however, in the author's university library.

Appendix L 124-128

Appendix M 130-131

University Microfilms International

APPENDIX M
McGill Pain Questionnaire Values