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Subject-generated internal imagery coupled with relaxation as a treatment for chronic pain

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Subject-Generated Internal Imagery Coupled with Relaxation as a Treatment for Chronic Pain

M.A. Thesis For Clinical Psychology

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Abstract

The chronic pain experience is a multifaceted phenomenon involving sensory, cognitive, affective, motivational and behavioral dimensions. There has been no single consistently successful method of pain control and multiple treatment approaches are frequently utilized by the chronic pain sufferer. The treatment approach investigated in this experiment used a relaxation technique coupled with visualization. Thirty-two chronic pain subjects with various diagnoses were divided into four groups using a quasi-random design. Two groups received training in a relaxation technique for eight weeks, and two groups started with relaxation and then were also given a visualization procedure for the final four weeks. Assessments using the McGill Pain Questionnaire, the Multidimensional Health Locus of Control, the Profile of Mood States, and the West Haven-Yale Multidimensional Pain Inventory were done before treatment, at the mid-point, and at the end of treatment.

The results showed no consistent differences between treatment groups and failed to indicate any clear-cut advantages for either relaxation or visualization in controlling chronic pain. There was no consistent reduction in pain or pain behaviors over the course of the experiment regardless of situation.

Introduction

Chronic pain has always been part of the human experience. It is one of the most widespread, debilitating and costly presenting symptoms in our society (Weintraub, 1988; Miller and Kraus, 1990), and is a "major medical, social and economic problem" (Wise, 1986). More than ten years ago, it was reported that low-back pain alone disabled 7 million Americans annually, at a loss of 250 million work days per year (Bonica, 1982). Bonica also reported that the direct and indirect costs of back pain approached $24 billion in the United States each year. With the addition of persons who suffer from migraine or other chronic headache syndromes, neck and shoulder pains related to injuries, arthritis pain, dysmenorrhea, cancer, gastritis, angina, gout, muscle pain, and dental problems, the number of chronic pain sufferers approaches astronomical levels. According to Webb (1986), 700 million work days per year are lost in industrialized countries due to chronic pain. According to Turk & Rudy (1992), "the amount of attention devoted to pain has been disproportionately small given the magnitude of the problem."

When pain is present, it limits the lifestyle of the pain patient who tends to develop depressed mood states and a constellation of other difficulties over time (Miller and Kraus, 1990). Although controlling acute pain with medications can be beneficial, there are certain undesirable side effects associated with the long term use of most chemical interventions for chronic pain. However, positive effects have been noted from the use of relaxation techniques coupled with various cognitive

strategies, and these have no known negative side effects. The need for more cost effective, non-addicting, and readily teachable, learnable, and available methods of pain control that gives the sufferer a selection of ways to control his or her pain becomes obvious.

The following research was conducted for the purpose of determining whether relaxation coupled with guided internal imagery could increase individuals' effectiveness of self control over chronic pain. It is a technique which is easily taught and with practice and habituation could be used by individuals in most environmental settings.

Definitions

There has been no one generally accepted definition for pain. The definition used by the medical model, which views pain as a direct indication of the amount of physical or tissue damage the patient has suffered (i.e.: the more damage, the more pain), but this does not adequately explain all of the components of the pain phenomenon. The following definitions attempt to more completely capture the scope of the pain experience.

"Physical pain is perceived as a sensation of hurt and discomfort in some part of the body. It is usually associated with and caused by an injury, a disease, or a systemic or functional disorder." (Miller and Kraus, 1990). Pain may also be described as a personal phenomenological experience ("pain perception" or "pain experience"), or an organismic response which includes subjective awareness ("pain response")

(Degenaar, 1979). Pain is sometimes a manifestation of emotional distress, and can result from anxiety, stress, or tension (Miller and Kraus, 1990).

It is also important to distinguish between acute pain and chronic pain. Acute pain serves the purpose of alerting the person that the body has suffered some degree of damage that needs immediate intervention or attention and is characterized by being of specific and limited duration (Miller and Kraus, 1990). The level of pain diminishes as healing occurs.

Chronic pain, on the other hand, persists for more than six months, and in many cases outlasts the initial injury or ailment, or may be disproportionate to the physical findings (Weintaub, 1988). Chronic pain itself becomes a disorder and is frequently accompanied by feelings of depression, helplessness and/or hopelessness, disturbances in sleep and appetite, somatic preoccupation, and a tendency to formulate most life events and problems in the context of pain (Miller and Kraus, 1990; Hendler, 1982; Arnoff and Evans,1982; Halpern, 1982).

Treatment Issues

Pharmacological interventions for pain are often the first choice of treatment by health-care professionals and lay persons alike. There is a broad variety of "pain killers" readily available, which may lead to the belief that drugs are the preferred method of relieving pain (Arnoff, Wagner, and Spangler, 1986).

Aspirin has long been the preferred mainstay of pain therapy, and has been used as an analgesic since the time of Hippocrates (Aronoff, Wagner, and Spangler, 1986; Kantor, 1984; Miller and Kraus; 1990). It is generally a safe, effective analgesic, anti-inflammatory and antipyretic. However, there is a ceiling effect above which no increase in dose will result in a higher level of relief (Arnoff & Evans, 1985). Furthermore, with prolonged use, there can be some adverse side effects, the most common being: gastrointestinal irritation, ulcers, and a decrease in the ability of the blood to coagulate. Ibuprofen, naproxen, diflunisal, sulindac and others are nonsteroidal anti-inflammatory drugs (NSAIDs). Like aspirin, all are potentially ulcerogenic and may produce nausea and vomiting. Another over-the-counter pain remedy is acetaminophen which eliminates the side effects of aspirin and is becoming an important substitute for NSAIDs even though it is not anti-inflammatory.

Although the NSAIDs are useful in treating chronic pain syndromes, not all patients respond positively to these medications. There is also some indication that patients under value these medications since they are so common, and therefore ask their doctor for a more powerful analgesic (i.e.: narcotics) for pain relief (Miller and Kraus, 1990; Aronoff, Wagner, and Spangler, 1986). This may lead to what Gildenberg (1984) calls the "pain reflex": the doctor reflexively writes a perscription (In Voros, 1992).

The centrally acting analgesics, or narcotics, act on the central nervous system (CNS). These chemical interventions are known for

increased levels of tolerance and physical dependency with prolonged use. Narcotics may be the drug of choice for acute pain, and during the final stages of a life threatening illness accompanied by chronic pain; however their use for chronic intractable pain is limited. It is also difficult to teach other pain rehabilitation management strategies while a subject is taking narcotics, unless the dosage is drastically reduced (McNairy, Maruta, Ivnik, Swanson, & Ilstrup, 1984).

The behavioral and operant treatment approaches to the chronic pain syndrome base their modification techniques on two intervention strategies, both aimed at the extinction of pain behaviors. One approach withholds positive reinforcement for any kind of environmentally controlled pain behaviors. If the person exhibits behaviors that are normally associated with being in pain, the others in his/her environment refuse to respond to them, hypothetically leading to extinction of these behaviors. With the lessening of pain behaviors, there is thought to be a more normal response to life, and an increase in "well" behaviors such as higher levels of physical activity, social interaction, a return to work, and increased mobility.

The second approach rewards any "well" behaviors that are incompatible with pain behaviors. This type of therapy seeks an increase in what are considered to be "well" behaviors, equating this with less pain. Neither of these therapies address the internal state of the individual, their maladaptive cognitive processes, or whether they actually feel an overall reduction in internal sensations of pain.

Relaxation, imagery, relabeling, reframing or reinterpreting the pain experience are cognitive forms of therapy. This approach has been shown to be applicable to the sensory, affective, motivational, and cognitive components of treatment (Miller and Kraus, 1990; Cameron, 1982; Meichenbaum, 1982). Relaxation training in particular has shown promise in the reduction of chronic pain. In a study by Stuckey, Jacobs and Goldfarb (1986), which compared EMG training, relaxation training and a placebo condition, the relaxation training group showed the greatest pain decreases during function testing.

There are various other treatments or combinations of treatments for chronic pain such as transcutaneous nerve stimulation (TENS), acupuncture, individual psychotherapy, group and family therapy, and hypnosis, to name a few. These will not be discussed at this time, simply because a topic as broad as this one needs some limiting factors.

For most people, the predominant response to the onset of chronic pain is to try to avoid, minimize, or suppress it as quickly as possible. Since these tactics frequently do not successfully relieve pain, the first twinges of pain start a reaction which can include an increase in anxiety, worry, general arousal, and muscle tension. These factors can increase the pain experience (Wickramasekera, 1987). One of the cognitive-behavioral approaches to pain reduction involves "training the patient to mentally create and focus on pleasant physical sensations" (Miller and Kraus, 1990). This approach relies on coupling relaxation with distraction in order to reduce the patients' focus on the pain experience.

The particular approach to be investigated in this study will require that the subject use the opposite strategy: focus on their pain and create an image of it instead of distracting themselves from the pain experience. These two opposite approaches have been termed avoidant and nonavoidant strategies (Thompson, 1981).

Avoidant strategies seem to have more positive results during the initial stage of a traumatic event, and nonavoidant strategies seem to prove more useful later on (Thompson, 1981). It seems that with chronic pain patients, avoidant strategies are associated with poorer treatment outcomes (Keefe & Dolon, 1986; Turner & Clancy, 1986 in Weisenberg, 1987). Since all coping strategies may work differently for different people, and avoidant strategies, although more common, may only work in selective situations, it seems advisable to increase the possible repertoire of available pain management techniques with nonavoidant strategy.

Another significant component in pain management is the person's perceived level of self-efficacy. When the belief in his/her competency in using various coping strategies is high, there is a greater chance of sustained performance. The greater the perceived level of self-efficacy, the lower the assessed size of the pain problem (Philips, 1987). Cioffi (1991) suggests four psychological processes that may be related to the observed association between self-efficacy and outcome: (a) higher levels of perceived self-efficacy decrease anxiety and physical arousal which may, in turn, allow the person to approach a situation with

less distress; (b) the efficacious person may be better able to distract attention away from threatening physiological sensations willfully; (c) with higher levels of self-efficacy, the person may stoically persists despite distressing physical sensations; (d) physical sensations are neither ignored nor necessarily distressing to the efficacious person but are allowed to take on other meanings or interpretations.

As self-efficacy increases so does the level of perceived control, and vice-versa. According to Litt (1986) "Perceived control or perceived self-efficacy has been hypothesized as a central mediator in many kinds of pain treatment." . It also seems that the larger the repertoire of productive and successful coping strategies a client has for handling chronic pain, the higher the feelings of self-control and the ratings of self-efficacy. This helps decrease the length of the painful episode as well as the subjective pain rating. One way of trying to capture the level of perceived control a person feels that they have is to test for the possibility of high internal locus of control. Thus, it would be expected that the levels of internal locus of control influence the effectiveness of treatment. This relationship between locus of control and outcome will be further examined in this study.

One possible method of achieving an increased perceived level of self-control and self-efficacy is to assure a client who uses a coping technique that they will have a successful outcome. Learning and habituating a relaxation strategy will usually meet with success and should, therefore, elicit increased levels of perceived self-control and

self-efficacy. Starting the experimental protocol with a relaxation procedure was intended to create an environment where a positive outcome could be expected. Relaxation lowers physical arousal, reduces muscle tension, and produces a focused, receptive state of mind. As previously stated, it has been shown in controlled studies that relaxation training alone and also when coupled with a cognitive-behavioral therapy component, has resulted in significant improvements for many pain related variables including self reports of pain (Turner, 1982.).

The cognitive component of this study is the use of specific non-avoidant subject-generated imagery. After the subject completes the relaxation portion of the procedure, s/he is then directed by the experimenter to become an observer of his/her pain and to increase his/her awareness of it through the use of specific experimenter statements and questions (Appendix B). The pain is mentally reinterpreted by the subject in terms of size, shape, color, and position in the body. The subject is asked to release all attachment to the experience and simply accept whatever is happening internally as being appropriate and interesting. The directives from the experimenter are designed to keep the subject in an observer mode so that s/he can note, remember, and interact with the changing experience at an emotional distance. As this takes place, there can be a metamorphasizing effect which reduces the intensity of the pain. A common observation of the author is that for persons who use this technique, pain either disappears

or recedes to a managable level in a short period of time. In some cases, there is pain relief for long periods of time; in other cases it is of much shorter duration.

When a strategy such as this one is within the complete control of the individual and is an internalized process without a 'right' or 'wrong' way to do it, there can be a much higher chance of success. Success brings with it higher levels of perceived internal locus of control and self-efficacy; hypothetically, this should enhance pain control and reduce painful sensations. Some of the persons who have been taught this technique have also gained valuable, useful, and cognitively meaningful personal information concerning their condition. Frequently, this information helps establish a meaningful context for the chronic pain condition, which in and of itself can alleviate some of the physical discomfort. The importance of the meaning attributed to pain appears to make a significant difference in terms of coping behavior, pain levels and the ability to mobilize efforts to minimize pain (Barkwell, 1991).

Once the procedure becomes habitual, it can be used in any setting where relaxation can be achieved. This procedure can also maintain the attention and interest of the person using it since there can be a wide variation of internal imagery and information produced. This technique can be repeated by the subject as often as necessary and can become another useful method of gaining control over a previously unmanageable experience.

This technique has been used successfully as a method of pain control by the primary author on a limited sample of clients on an individual basis. The results have been promising. It is important to test the treatment with a controlled experimental study in order to establish its usefulness on a larger and more diverse population with a variety of chronic pain conditions. In addition, the focus of this study was to determine whether this technique could be administered to a group with the same level of effectiveness that has been observed when it was used by the author with individuals.

The study design involves comparisons between two procedures each with two groups: two relaxation only 'control' groups, and two relaxation combined with visualization treatment groups. Each of the four experimenters was assigned to one group for eight weeks. All four groups were given the relaxation procedure only for the first four weeks. Following this, beginning with the fifth week, two groups began the visualization procedure coupled with the relaxation script while the other two groups continued with the relaxation script only.

Method

Subjects

Subjects were recruited through radio and newspaper advertisements, posters in public places, phone calls, letters to health professionals, and information delivered to various clinics and hospitals in the Thunder Bay area (See Appendix C). There were 32 subjects

selected from the general community that were deemed suitable for the study. Subjects were screened to meet the following criteria: (1) 18 years of age or older; (2) pain duration of 6 months or longer; (3) a medically assessed and diagnosed condition; (4) a stable condition, expected to remain stable for the duration of the study; (5) willingness of subject to maintain their current level of medication and not start any new procedures, medications, or therapy for the duration of the study; and (6) the subject does not have a psychotic or suicidal state. Of that number, 11 were males, and 21 were female, all suffering from chronic pain for a mean duration of 11.05 years (median = 8 years; range = 1 to 59 years). Medical diagnoses were varied and included headache, back pain, fibrositis/fibromyalgia, arthritis, and muscular pain among others. Frequently the primary focus of pain for individual subjects varied over time and included multiple sites. As a result, the subjects were catagorized by their primary diagnosis only. (See Appendix D for a complete list.)

Experimenters

Four experimenters were used to conduct the study to increase the external validity, and to create a managable group size. Each experimenter conducted eight sessions at one week intervals with their group, and were trained to deliver the relaxation and visualization portions of the treatment from a standardized script. Each experimenter also tape recorded the procedures so that each of their subjects could

take an audio copy of the session home to use throughout the eight week treatment period. At the beginning of the fifth week, those subjects who received the visualization protocol received an extended audio tape recording which included both relaxation and visualization scripts.

Measurement Instruments

McGill Pain Questionnaire (MPQ). One scale from the McGill Pain Questionnaire (Melzack, 1975) was used to obtain a subjective measure of the pain, the Pain Rating Index Total (PRI:T). This total was obtained by requiring the subjects to choose one word from each of 20 categories that most clearly describes their pain. Scores were calculated based on the degree of pain each word reflects, with higher scores indicating a higher level of pain. The MPQ serves as a measure of the cognitive-verbal component of pain.

Multidimensional Health Locus of Control (MHLC). The three scales from the Multidimensional Health Locus of Control (Wallston, Wallston, & DeVellis; 1978) were used to determine the extent of internal versus external locus of control for each subject. The 18 statements were answered on a six point Likert-type scale ranging from strongly disagree (1) to strongly agree (6) and the answers were divided into one of three categories: Internal Health Locus of Control (IHLC), Chance Health Locus of Control (CHLC), Powerful Others Health Locus of Control (PHLC).

Profile of Mood State (POMS). Six scales are created from the 65 assessment questions used in the Profile of Mood States (McNair, Lorr, & Droppleman, 1981): Tension (T), Depression (D), Anger (A), Vigor (V), Fatigue (F), and Confusion (C). These were used to assess differences in mood across time.

West Haven-Yale Multidimensional Pain Inventory (WHYMPI). There are 12 scales created from the three sections of questions on the West Haven-Yale Multidimensional Pain Inventory (Kerns, Turk, & Rudy, 1985). This assessment tool is considered particularly useful in determining the behavioral component of an individual's chronic pain. Section 1 investigates the effect pain has on the life of the pain sufferer, and is concerned with the pain experience. Section 1: Pain Experience: Interference (I), Support (S), Pain Severity (PS), Self Control (SC), Negative Mood (NM). Section 2 investigates the responses of a significant other to the person when he/she is in pain. Section 2: Significant Other Responses: Punishing Responses (PR), Solicitious Responses (SR), Distracting Responses (DS). Section 3 documents the levels of daily activities for the chronic pain sufferer. Section 3: Daily Activities: Household Chores (HC), Outdoor Work (OW), Activities Away From Home (AH), and Social Activities (SA). This instrument is used in conjunction with other measurement instruments to gain a more complete profile of the subject in context.

Treatments

Relaxation treatment.

This treatment was designed to lower physical tension, decrease arousal, and increase the comfort of the subjects. All of the subjects received this training for the entire eight weeks regardless of group or experimenter. This was a scripted procedure and was read verbatim at the beginning of each session. Each subject received an audio tape of the relaxation script recorded by their experimentor so that the procedure could be practiced by the participant throughout the week.

Visualization treatment.

This treatment was designed to direct the subject toward a non-avoidant focus on their pain site or sites, and help him/her to create a new and different internal image of their pain. Part of the treatment was also aimed at manipulating this internal image in hopes of eliciting changes in their perception and perceived sense of pain. It was also hypothesized that this might increase their degree of internal locus of control. Those subjects who were in the treatment group received an extended audio tape with the visualization script as well as the relaxation script for practice sessions at home.

Procedure

Before the first treatment session, each of the subjects was individually interviewed for suitability, and each filled out the full set of

measurement instruments: McGill Pain Questionaire (MPQ), Profile of Mood State (POMS), Multidimensional Health Locus of Control (MHLC), and West Haven-Yale Multidimensional Pain Inventory (WHYMPI). At the time of the initial interview, relevant demographic information was also collected. Informed consent forms were reviewed and signed by the subjects. The subjects were sorted by diagnosis and then randomly assigned to one of four treatment groups. This semi-random design was adopted in order to include each represented type of pain in each of the four groups whenever possible.

The initial phase of this procedure involved learning a relaxation protocol (see Appendix A). All four groups received the relaxation treatment for the first four sessions. The subjects were not aware of which groups were to receive the visualization protocol (see Appendix B) until after the measurement instruments were filled out at the end of the first four relaxation sessions. Starting with the fifth session, two of the four treatment groups began the visualization part of the study. The relaxation technique was still used at the beginning of the visualization session to lower physical arousal, reduce muscle tension, and produce a focused, receptive state of mind. The other two groups continued to receive the relaxation treatment only. The entire treatment process required eight weeks. At the end of the eighth session, the measurement instruments were again administered.

For the relaxation protocol, all treatments were one week apart and of one half hour duration. When the visualization protocol was

added at the end of the first four weeks, the two visualization protocol groups had sessions which lasted approximately 45 minutes. All four groups were sent home with a relaxation tape and asked to practice the relaxation technique at least once per day. Once the visualization procedure was added to two groups, it was also added to the home relaxation tape for practice between sessions. Following the last experimental session, the two groups that did not receive the visualization condition were offered the opportunity to learn the procedure if they desired and individual sessions with the primary experimentor were set up accordingly.

Results

Subjects were initially sorted by diagnosis to distribute the various types of chronic pain as evenly as possible among the four groups. Subjects' ages were also evenly distributed among the four groups; however, gender was not. The demographic make-up of the groups can be found in Table 1.

At the onset of the experiment, the four groups did not differ significantly on any of the measures except one. The one instance of significant difference occurred on the Confusion-Bewilderment scale of the POMS, $F(3,27) = 3.48$; $p = .03$, before the four groups were combined into two groups, Treatment and Control. After combination, there was no longer a significant difference on this scale, $F(1,29) = 1.20$; $p = .28$. This information can be found in Table 2. Since there were no significant

Table 1. Number of Individuals in Descriptive Categories

	GROUPS				
	Treatment		Control		
	Group 1	Group 3	Group 2	Group 4	
Gender:					Totals
male	6	3	0	2	11
female	3	5	9	4	21
Diagnosis:					Totals
1 Head Pain	2	1	2	1	6
2 Back Pain	2	2	1	2	7
3 Fibrositis	1	1	2	0	4
4 Pancreatitis	0	0	0	1	1
5 Arthritis	2	2	2	1	7
6 Chronic Fatigue	0	0	1	0	1
7 Rheumatism	0	0	0	1	1
8 Joint Pain	0	1	0	0	1
9 Muscular Pain	2	0	1	0	3
10 Internal Pain	0	1	0	0	1
Age:					Totals
18-30	1	2	1	0	4
31-40	2	2	4	4	12
41-50	2	0	0	1	3
51-60	3	2	4	1	10
61+	1	2	0	0	3
Distribution of Subjects in Groups at each Assessment					
Time1	9	8	9	6	32
Time 2	5	5	6	4	20
Time 3	5	5	6	4	20

Table 2. Equivalency of Groups at Onset of Study.

Four Groups:
Two Treatment (T) and Two Control (C)

	1(T)		2(C)		3(T)		4(C)			
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	F	
MPQ:										
PRI:T	32.11	16.89	33.00	15.51	24.50	12.77	24.83	7.63	.82	
MHLC:										
IHLC	27.56	4.16	24.11	5.01	28.00	5.98	26.67	3.83	1.12	
CHLC	18.44	3.40	19.00	6.61	19.38	8.03	17.33	6.95	.13	
PHLC	16.56	7.02	18.67	5.09	13.37	5.07	15.33	4.32	1.32	
POMS:										
T	16.78	7.90	14.44	8.90	12.25	3.20	13.17	6.27	.64	
D	22.33	17.80	16.89	11.67	11.00	3.89	16.67	13.66	1.03	
A	15.67	14.93	12.33	8.93	10.13	6.30	11.83	5.68	.35	
V	12.38	4.98	13.00	6.98	14.13	7.53	17.00	4.29	.72	
F	18.11	6.03	14.44	4.45	12.50	4.66	14.83	4.44	1.67	
C	14.67	7.87	7.78	4.74	6.88	2.29	10.00	5.24	3.48*	.03
WHYMPI:										
I	3.40	2.00	3.99	1.45	3.39	1.48	3.19	.80	.40	
S	3.52	1.72	3.48	1.58	4.53	1.61	4.00	1.69	.55	
P S	3.48	1.48	3.63	1.12	3.58	1.18	3.33	.56	.09	
S C	3.75	1.23	3.72	1.23	3.69	1.75	3.83	1.21	.01	
N M	3.37	1.12	3.11	1.15	3.08	1.60	3.11	1.15	.10	
P R	2.07	1.69	2.07	1.51	1.75	1.17	.70	.63	1.20	
S R	2.19	1.82	2.54	1.68	3.17	1.58	2.58	1.12	.00	
D R	2.46	1.74	2.54	1.68	3.07	1.54	2.58	1.12	.23	
H C	3.70	1.29	4.47	1.75	3.63	1.34	3.77	2.01	.51	
O W	1.69	.97	2.03	1.16	1.34	.84	1.83	1.66	.42	
A H	2.78	1.11	2.64	.72	2.56	1.11	2.71	1.74	.05	
S A	2.44	.93	2.28	.79	2.75	1.21	3.08	1.42	.78	

Table 2. Equivalency of Groups at Onset of Study (con't).

Two Groups:
Total Treatment and Control Populations

	NORMS Mean	Treatment Mean	SD	Control Mean	SD	F
MPQ:						
PRI:T	26.3*	28.53	15.14	29.73	13.24	.06
MHLC:						
IHLC	25.78~	27.76	4.93	25.13	4.61	2.41
CHLC	17.64~	18.88	5.85	18.33	6.55	.06
PHLC	22.54~	15.06	6.21	17.33	4.94	1.29
POMS:						
T	- **	14.65	6.41	13.33	7.73	.08
D	- **	17.00	14.71	16.80	12.02	.00
A	- **	13.06	11.70	12.13	10.71	.05
V	- **	13.25	6.23	14.60	6.21	.36
F	- **	15.47	6.00	14.60	4.94	.20
C	- **	11.00	7.03	8.57	4.85	1.20
WHYMPI:						
I	4.30^	3.39	1.72	3.67	1.26	.26
S	4.28^	3.88	1.70	3.69	1.59	.10
P S	4.40^	3.53	1.31	3.51	.92	.00
S C	3.72^	3.72	1.39	3.77	1.18	.01
N M	3.55^	3.24	1.33	3.11	1.11	.08
P R	1.71^	1.95	1.47	1.50	1.37	.59
S R	3.27^	2.61	1.74	2.56	1.44	.00
D R	2.51^	2.74	1.62	2.56	1.44	.11
H C	2.70^	3.66	1.27	4.19	1.82	.87
O W	1.29^	1.51	.89	1.94	1.36	.94
A H	2.08^	2.67	1.08	2.67	1.18	.00
S A	2.10^	2.59	1.06	2.60	1.12	.00

* - mean Pain Rating Index: Total; for back pain, MPQ.

~ - mean scores for MHLC Scales for Chronic Patients.

** - norms available for college students and psychiatric patients only.

^ - means for patients admitted to Comprehensive Pain Management Program.

differences found among the individual groups at the initial assessment, the groups were combined into Treatment and Control groups for the rest of the statistical procedures.

The findings of the treatment and control groups were generally within the range of scores expected for clinical pain populations for the MPQ, MHLC, and WHYMPI according to the norms supplied with these tests. There was one exception: the mean of all subjects for the Powerful Others scale on the MHLC was much lower (16.13) than the published norms for chronic pain patients (22.54) as reported by Wallston in the test package. The POMS has norms for college students and psychiatric patients, so this measure's observations could not be compared to a chronic pain normative group.

Tables of the means and standard deviations for all groups at each test occasion can be found in Tables 3 through 6. The F values for the treatment and control groups for the second and third assessment are found in Table 7 and 8.

The only significant difference between groups occurred on the Pain Severity scale, $F(1,18) = 6.11$; $p = .02$, of the WHYMPI for the second repetition of the tests using treatment and control groups (Table 7). This significant difference was attributable to the decrease in score by the treatment group over time compared with an increase in score by the control group. Before the groups were combined into treatment and control groups, there were insufficient numbers of subjects to capture this effect, $F(3,16) = 2.54$; $p = .09$. However, with the increased number of

Table 3. McGill Pain Questionnaire: Means and Standard Deviations for Treatment and Control Groups for each time tested

McGill Pain Questionnaire (MPQ) Pain Rating Index : Total Score (PRI:T)	Mean	Std. Dev.
Treatment Groups		
Group 1		
Time 1	32.11	16.89
Time 2	25.40	15.71
Time 3	25.80	19.64
Group 3		
Time 1	24.50	12.77
Time 2	22.43	15.89
Time 3	31.17	20.08
Entire Treatment Population		
Time 1	28.53	15.14
Time 2	23.67	15.16
Time 3	28.73	19.07
Control Groups		
Group 2		
Time 1	33.00	15.51
Time 2	36.67	11.02
Time 3	29.50	23.33
Group 4		
Time 1	24.83	7.63
Time 2	33.25	10.08
Time 3	30.75	12.01
Entire Control Population		
Time 1	29.73	13.24
Time 2	34.71	9.72
Time 3	31.43	13.10

Table 4. Multidemensional Health Locus of Control: Means and Standard Deviations for Treatment and Control Groups for each time tested

	Multidemensional Health Locus of Control (MHLC) Scales					
	Internal Items		Chance Items		Powerful Others	
	Mean	SD	Mean	SD	Mean	SD
Treatment Groups						
Group 1						
Time 1	27.56	4.16	18.44	3.40	16.56	7.02
Time 2	27.80	3.42	16.80	3.56	19.60	3.51
Time 3	28.50	3.11	19.75	3.50	20.75	4.11
Group 3						
Time 1	28.00	5.98	19.38	8.03	13.38	5.07
Time 2	29.33	4.97	16.67	4.93	13.00	3.90
Time 3	28.00	3.67	16.80	7.29	14.40	5.86
Entire Treatment Population						
Time 1	27.76	4.93	18.88	5.85	15.05	6.21
Time 2	28.63	4.20	16.73	4.15	16.00	4.94
Time 3	28.22	3.23	18.11	5.80	17.22	5.89
Control Groups						
Group 2						
Time 1	24.11	5.01	19.00	6.61	18.67	5.10
Time 2	23.60	7.09	16.00	6.40	15.00	6.60
Time 3	26.40	5.08	22.60	6.66	16.60	6.27
Group 4						
Time 1	26.67	3.83	17.33	6.95	15.33	4.32
Time 2	24.50	7.51	21.00	8.25	17.25	7.93
Time 3	26.75	4.86	19.25	4.65	15.75	11.21
Entire Control Population						
Time 1	25.13	4.61	18.33	6.55	17.33	4.94
Time 2	24.00	6.82	18.22	7.28	16.00	6.84
Time 3	26.56	4.67	21.11	5.78	16.22	8.18

Table 5. Profile of Mood States: Means and Standard Deviations for Treatment and Control Groups for each time tested

Profile of Mood States (POMS) : 6 Scales

	Tension		Depression		Anger	
	Mean	SD	Mean	SD	Mean	SD
Treatment Groups						
Group 1						
Time 1	16.78	7.90	22.33	17.80	15.67	14.93
Time 2	4.40	3.78	3.60	3.65	4.67	3.51
Time 3	7.60	3.21	9.20	7.05	3.80	2.39
Group 3						
Time 1	12.25	3.20	11.00	7.40	10.13	6.29
Time 2	14.17	6.59	16.50	11.43	13.50	7.37
Time 3	12.67	6.89	14.83	12.16	12.40	7.02
Entire Treatment Population						
Time 1	14.65	6.41	17.00	14.71	13.06	11.70
Time 2	9.73	7.31	10.64	10.77	10.71	7.32
Time 3	10.36	5.90	11.27	10.12	8.10	6.71
Control Groups						
Group 2						
Time 1	14.44	8.90	16.89	11.67	12.33	8.93
Time 2	12.20	11.73	15.60	17.33	11.20	16.15
Time 3	10.20	6.91	8.00	6.20	4.40	4.22
Group 4						
Time 1	13.17	6.27	16.67	13.66	11.83	13.91
Time 2	13.25	6.40	18.50	17.33	13.00	13.47
Time 3	9.00	8.64	15.00	17.78	10.75	14.98
Entire Control Population						
Time 1	13.93	7.73	16.80	12.02	12.13	10.71
Time 2	12.67	9.12	16.89	16.28	12.00	14.12
Time 3	9.67	7.23	10.63	11.20	7.22	10.21

Table 5. Profile of Mood States: Means and Standard Deviations for Treatment and Control Groups for each time tested (con't)

	Vigor		Fatigue		Confusion	
	Mean	SD	Mean	SD	Mean	SD
Treatment Groups						
Group 1						
Time 1	12.38	4.98	18.11	6.03	14.67	7.87
Time 2	16.60	7.23	11.25	4.35	4.60	3.44
Time 3	14.80	5.63	12.40	4.22	7.20	3.03
Group 3						
Time 1	14.13	7.53	12.50	4.66	6.88	2.30
Time 2	11.50	9.57	11.50	8.64	9.00	3.90
Time 3	11.17	10.65	13.33	6.44	9.00	5.33
Entire Treatment Population						
Time 1	13.25	6.23	15.47	6.00	11.00	7.03
Time 2	13.82	8.59	13.80	7.25	7.00	4.20
Time 3	12.82	8.54	12.91	5.30	8.18	4.33
Control Groups						
Group 2						
Time 1	13.00	6.98	14.44	5.00	7.78	4.73
Time 2	9.60	6.27	10.20	7.12	9.40	5.46
Time 3	15.40	3.85	12.00	4.30	8.00	2.92
Group 4						
Time 1	17.00	4.29	14.83	4.45	10.00	5.24
Time 2	14.75	9.22	14.00	6.98	11.00	9.38
Time 3	16.25	9.46	18.00	7.55	9.25	7.89
Entire Control Population						
Time 1	14.60	6.21	14.60	4.94	8.57	4.85
Time 2	11.89	7.67	11.89	6.90	10.11	6.97
Time 3	15.78	6.42	14.25	6.04	8.56	5.29

Table 6. West Haven-Yale Multidemensional Pain Inventory: Means and Standard Deviations for Treatment and Control Groups for each time tested

	WHYMPI Scales					
	Interference		Support		Pain Severity	
	Mean	SD	Mean	SD	Mean	SD
Treatment Groups						
Group 1						
Time 1	3.40	2.00	3.52	1.72	3.48	1.48
Time 2	2.61	1.48	4.00	1.11	2.20	1.39
Time 3	2.42	2.03	4.00	.97	2.47	2.02
Group 3						
Time 1	3.39	1.48	4.53	1.61	3.58	1.18
Time 2	3.35	1.82	3.58	1.42	3.00	.97
Time 3	3.83	1.47	2.80	1.59	3.33	1.38
Entire Treatment Population						
Time 1	3.39	1.72	3.88	1.70	3.53	1.31
Time 2	3.06	1.65	3.81	1.19	2.64	1.19
Time 3	3.19	1.81	3.40	1.39	2.94	1.67
Control Groups						
Group 2						
Time 1	3.99	1.45	3.48	1.58	3.63	1.12
Time 2	3.67	1.82	3.53	1.39	3.80	.99
Time 3	3.62	1.61	3.53	1.95	3.40	1.52
Group 4						
Time 1	3.19	.80	4.00	1.69	3.33	.56
Time 2	3.22	1.10	4.67	.38	3.75	.57
Time 3	3.00	1.19	5.17	.69	3.75	.83
Entire Control Population						
Time 1	3.67	1.26	3.69	1.59	3.51	.92
Time 2	3.47	1.47	4.04	1.17	3.78	.78
Time 3	3.35	1.39	4.26	1.68	3.56	1.20

Table 6. West Haven-Yale Multidemensional Pain Inventory: Means and Standard Deviations for Treatment and Control Groups for each time tested (con't)

	WHYMPI Scales					
	SelfControl		NegMood		PunishResponse	
	Mean	SD	Mean	SD	Mean	SD
Treatment Groups						
Group 1						
Time 1	3.75	1.04	3.37	1.12	2.07	1.69
Time 2	4.70	1.15	2.07	1.09	1.75	2.12
Time 3	4.30	1.04	2.47	.93	1.83	1.38
Group 3						
Time 1	3.69	1.75	3.08	1.60	1.75	1.17
Time 2	4.17	1.51	2.89	1.88	1.55	1.32
Time 3	3.00	1.95	3.28	1.84	1.44	1.39
Entire Treatment Population						
Time 1	3.72	1.39	3.24	1.33	1.95	1.47
Time 2	4.41	1.32	2.52	1.56	1.60	1.38
Time 3	3.59	1.67	2.91	1.49	1.61	1.28
Control Groups						
Group 2						
Time 1	3.72	1.23	3.11	1.15	2.07	1.51
Time 2	3.10	1.64	3.40	.86	1.94	1.57
Time 3	4.40	.89	2.13	1.17	1.50	1.70
Group 4						
Time 1	3.83	1.21	3.11	1.15	.70	.62
Time 2	3.25	1.50	3.17	1.48	1.33	1.04
Time 3	4.25	.96	1.75	.88	2.13	1.59
Entire Control Population						
Time 1	3.77	1.18	3.11	1.11	1.50	1.37
Time 2	3.17	1.48	3.30	1.10	1.68	1.30
Time 3	4.33	.87	1.96	1.01	1.71	1.53

Table 6. West Haven-Yale Multidemensional Pain Inventory: Means and Standard Deviations for Treatment and Control Groups for each time tested (con't)

	WHYMPI Scales					
	SolicitousR		DistractR		HouseChores	
	Means	SD	Means	SD	Mean	SD
Treatment Groups						
Group 1						
Time 1	2.19	1.82	2.46	1.74	3.70	1.29
Time 2	2.92	1.89	2.92	1.89	4.40	1.21
Time 3	2.50	1.50	2.50	1.50	4.24	1.43
Group 3						
Time 1	3.17	1.58	3.07	1.54	3.63	1.34
Time 2	3.37	1.83	3.36	1.83	3.73	1.42
Time 3	3.50	1.25	2.50	1.25	2.90	1.36
Entire Treatment Population						
Time 1	2.61	1.74	2.74	1.62	3.66	1.27
Time 2	3.17	1.75	3.17	1.75	4.04	1.31
Time 3	2.50	1.30	2.50	1.30	3.51	1.50
Control Groups						
Group 2						
Time 1	2.54	1.68	2.53	1.68	4.47	1.75
Time 2	2.40	.75	2.40	.75	4.84	1.99
Time 3	2.70	1.90	2.70	1.90	4.32	2.41
Group 4						
Time 1	2.58	1.12	2.58	1.12	3.77	2.01
Time 2	3.29	.94	3.29	.94	3.00	2.10
Time 3	3.17	.58	3.17	.58	3.40	1.88
Entire Control Population						
Time 1	2.56	1.44	2.56	1.44	4.19	1.82
Time 2	2.80	.91	2.80	.91	4.02	2.14
Time 3	2.91	1.41	2.91	1.41	3.91	2.11

Table 6. West Haven-Yale Multidemensional Pain Inventory: Means and Standard Deviations for Treatment and Control Groups for each time tested (con't)

	WHYMPI Scales					
	OutdoorWork		Away-Home		SocialAct	
	Mean	SD	Mean	SD	Mean	SD
Treatment Groups						
Group 1						
Time 1	1.69	.97	2.78	1.11	2.44	.93
Time 2	2.84	1.24	3.00	1.51	2.05	.74
Time 3	3.16	1.42	3.05	1.34	1.55	.41
Group 3						
Time 1	1.34	.84	2.56	1.11	2.75	1.21
Time 2	1.36	1.14	2.79	.91	2.50	.77
Time 3	1.55	.72	1.63	.80	2.33	1.25
Entire Treatment Population						
Time 1	1.51	.89	2.67	1.08	2.59	1.06
Time 2	2.10	1.37	2.89	1.16	2.30	.76
Time 3	2.44	1.38	2.27	1.26	1.98	1.01
Control Groups						
Group 2						
Time 1	2.03	1.16	2.64	.72	2.28	.79
Time 2	1.80	1.35	1.80	.97	2.35	.76
Time 3	2.10	1.23	2.25	1.20	2.35	1.15
Group 4						
Time 1	1.83	1.66	2.71	1.74	3.08	1.42
Time 2	1.80	1.35	2.38	2.03	2.06	.97
Time 3	2.35	1.38	2.88	1.61	2.81	1.25
Entire Control Population						
Time 1	1.94	1.35	2.67	1.18	2.60	1.12
Time 2	1.76	1.20	2.06	1.44	2.22	.81
Time 3	2.23	1.22	2.53	1.34	2.56	1.14

subjects in the combined groups, the decrease in scores for both treatment groups and the increased scores in both control groups caused a significant difference to emerge. This difference did not occur at the third repetition. In fact, the control group returned to mean scores which closely matched their original means (Time 1: 3.51; Time 3: 3.56) while the treatment group remained non-significantly improved (Time 1: 3.53; Time 3: 2.94).

An Analyses of Variance (ANOVA) was used to explore the repeated measures and to check for significance between test administrations. The Internal Items (IHLC) scale of the MHLC shows a difference between treatment and control groups across repetitions one and two, $F(2,48) = 6.27$; $p = .016$, and across repetitions two and three, $F(2,34) = 3.95$; $p = .055$. When an ANOVA was run across all repetitions, IHLC remained significant between groups, $F(3,64) = 6.22$; $p = .015$. The means show that the treatment group had higher scores on the IHLC scale throughout the experiment, there being no overlap with the lower means of the control group for any repetition.

Across the second and third repetition, the Pain Severity scale on the WHYMPI shows a significant difference between treatment and control groups as well, $F(2,36) = 4.70$; $p = .04$. This difference remains significant across all three repetitions, $F(3,66) = 3.85$; $p = .05$, and seems to be a reflection of the drop in score for the treatment group at the second test time as compared to the control group's slight increase at that same repetition.

Table 7. F Values Across Groups for Assessment 2.

Two Groups:
Total Treatment and Control Populations

	Treatment		Control			
	Mean	SD	Mean	SD	F	
MPQ:						
PRI:T	23.67	15.16	34.71	9.72	2.96	
MHLC:						
IHLC	28.64	4.20	24.00	6.82	3.49	
CHLC	16.73	4.15	18.22	7.28	.33	
PHLC	16.00	4.94	16.00	6.84	.00	
POMS:						
T	9.73	7.31	12.67	9.19	.64	
D	10.64	10.77	16.89	16,28	1.06	
A	9.71	7.32	12.00	14.12	.15	
V	13.82	8.59	11.89	7.67	.27	
F	13.80	7.25	11.89	6.90	.34	
C	7.00	4.20	10.11	6.97	1.53	
WHYMPI:						
I	3.06	1.65	3.47	1.47	.33	
S	3.81	1.19	4.04	1.17	.16	
P S	2.64	1.19	3.78	.78	6.11*	p=.02
S C	4.41	1.32	3.17	1.48	3.94	
N M	2.52	1.56	3.30	1.10	1.60	
P R	1.61	1.38	1.68	1.30	.01	
S R	3.17	1.75	2.78	.91	.35	
D R	3.17	1.75	2.79	.91	.32	
H C	4.04	1.31	4.02	2.14	.00	
O W	2.10	1.37	1.76	1.20	.34	
A H	2.89	1.16	2.06	1.45	2.03	
S A	2.30	.76	2.22	.81	.04	

Table 8. F Values Across Groups for Assessment 3.

Two Groups:
Total Treatment and Control Populations

	Treatment		Control		
	Mean	SD	Mean	SD	F
MPQ:					
PRI:T	28.73	19.07	31.43	13.10	.11
MHLC:					
IHLC	28.22	3.23	26.56	4.67	.78
CHLC	18.11	5.80	21.11	5.78	1.21
PHLC	17.22	5.89	16.22	8.18	.09
POMS:					
T	10.36	5.90	9.67	7.23	.06
D	12.27	10.12	10.63	11.20	.11
A	8.10	6.17	7.22	10.21	.05
V	12.82	8.54	15.78	6.42	.74
F	12.91	5.30	6.04	2.14	.26
C	8.18	4.33	8.56	5.29	.03
WHYMPI:					
I	3.19	1.81	3.35	1.39	.04
S	3.40	1.39	4.26	1.68	1.48
P S	2.94	1.67	3.56	1.20	.86
S C	3.59	1.67	4.33	.87	1.45
N M	2.91	1.49	1.96	1.01	2.63
P R	1.61	1.28	1.71	1.53	.02
S R	2.15	1.17	2.71	1.00	1.00
D R	2.50	1.30	2.91	1.41	.43
H C	3.51	1.50	3.91	2.11	.25
O W	2.44	1.38	2.23	1.22	.12
A H	2.27	1.26	2.53	1.34	.19
S A	1.98	1.01	2.56	1.14	1.44

Both Self Control, $F(2,36) = 5.10$; $p = .03$, and Negative Mood, $F(2,36) = 7.38$; $p = .05$, scales on the WHYMPI showed a significant 2-way interaction in relationship to repetition and groups for the ANOVA comparing the second and third repetition. The interaction on the Self Control scale shows that the treatment and control groups changed scores in opposite directions at the second and third repetition. Although all scores were equivalent at onset, the treatment group increased their mean score at Time 2, and the control group's mean score decreased. At Time 3 treatment means dropped back to levels at onset whereas controls mean score increased to above onset levels. The interaction on the Negative Mood scale indicates a similar interaction, with the treatment group means decreasing at Time 2 followed by an increase to their original level at Time 3; the control group remains fairly even at Time 2 and then dropping sharply at Time 3. These means can be found in Table 6.

One of the hypotheses for this study was that those subjects with high internal locus of control would show more positive change with treatment. Therefore, the initial scores on the Internal Items of the MHLC for all subjects were split at the median into a high and a low group. Each of the dependent variables was compared to this new independent variable for each repetition to check for significance. In all repetitions, IHLC and Chance Items (CHLC) were significantly related (Time 1: $F(1,30) = 4.91$; $p = .03$; Time 2: $F(1,18) = 10.64$; $p = .004$; Time 3: $F(1,16) = 6.23$; $p = .02$) in the sense that the high IHLC group had lower scores on

the CHLC scale. This means the more a subject agreed with a statement that assessed a high level of internality, the more the subject disagreed with a statement relegating their state of health to chance, and vice versa.

It should be noted that there were also significant positive relationships between high levels of Social Activitiy (Time 1: $F(1,29) = 5.60$; $p = .02$; Time 2: $F(1,18) = 4.69$; $p = .04$) and high levels of Activity Away from Home (Time 1: $F(1,29 = 5.94$: $p = .02$; Time 2: $F(1,18) = 9.59$; $p = .01$) with high IHLC. These levels of significance disappeared for Time 3.

Discussion

There were few statistically significant results. Even though there was a positive trend towards a decrease in Pain Severity during the first four weeks of the experiment for the subjects in the treatment groups, and the subjects in the control groups were slightly higher on the Pain Severity scale of the WHYMPI, there were no similar findings on other scales. In fact the reverse was true for the WHYMPI scales of Self Control and Negative Mood as noted in the results section. The treatment group means changed in the expected direction for both measures at repetition two, however this trend was reversed at repetition three. At the last repetition, the control group had higher means on Self Control and lower means on Negative Mood; whereas the treatment group's means returned to the levels present at onset. These findings

may suggest that the actual treatment had a negative effect; whereas relaxation alone became more effective over time.

It is to be noted that the treatment groups were composed of 2/3 high internal locus of control subjects, 1/3 low internal locus of control subjects with the control groups having the opposite configuration. If the results observed on Pain Severity were attributable to the relaxation protocol combined with high internal locus of control, the group differences exhibited in the first four weeks of the experiment would have been expected to be maintained during the second four weeks as well. However, most of those gains were lost by the third assessment. Therefore, these results are considered to have little meaning and are possibly chance observations.

It was considered reasonable at first to consider the possibility that since more high locus of control subjects were in the treatment groups, and the IHLC scale showed consistant significance between treatment and control groups across time, there might be a relationship with other test scores. However, the significance was limited to an inverse relationship with CHLC, and a positive relationship with the WHYMPI scales of Social Activity and Activity Away from Home. Contrary to expectations, IHLC had no relationship to any of the direct measures of the pain experience.

From the results, it cannot be said that relaxation coupled with the visualization procedure is more effective than relaxation alone. In fact, it cannot be said that relaxation alone is significantly effective in reducing

chronic pain on this sample of subjects. The hypothesis that high internal locus of control would lead to effectiveness of treatment was also unsubstantiated by the results of this experiment .

There are a number of reasons for the failure to find significant benefits for visualization. The high dropout rate (45%) leading to a reduced number of subjects in the last two repetitions, as well as the failure of certain subjects to complete the entire questionnaire, created a situation with too few results to achieve meaningful statistical information. It is difficult to generate significant results with this small a subject pool. Another point for consideration is that the visualization procedure may not be adaptable for group learning. The experiences of internally generated images are so varied and individual that it might be more suitable as a one-on-one experience only, instead of a confusing distraction for a group. The reasons for this may be: pacing - different people need differing amounts of time with each segment of the protocol; image building - it may be important to follow the image building process with individual subjects and modify the script accordingly, in order that it fit with the individual's internal image; encouragement and validation - it may be important that there be individual feedback tailored to the subject's experience, since it is such a varied experience, and this feedback needs to validate and authenticate the experience as appropriate for the subject. Reading a preplanned script to a group seemed to be the most efficient method of carrying out the experiment.

However this may have seriously confounded the results by not allowing for individual differences.

In conclusion, the most important benefits of this experiment emerge as a learning experience for the primary author. Had the results clearly pointed in the direction hoped for, they would not have generated the amount of thoughtful consideration required by the actual obtained results. The logical next step in this process would be to contact each of the original experimental subjects, and take them through the steps of the visualization procedure individually, comparing the results of this to the results of the original experiment. This experiment could be seen as the first step toward creating an effective experiment which more clearly tests whether subject generated internal imagery can be successfully used as another method of controlling chronic pain, and further, whether or not high levels of internal locus of control are helpful in increasing the success rate.

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Appendix A

Relaxation Procedure

[Instructions for the experimenters: three periods (...) indicates a pause; a comma (,) indicates a natural mid-sentence pause; please read the script in a slow, even, and relaxed manner. Instructions in *italics* are for the experimenter only, and not to be read aloud.]

Script:

Please get into a comfortable position where you feel supported and can relax...Now take three deep breaths and just let the exhale go...(*Do this with them*)...Continue to breath in a slow, deep, regular manner, and allow the breath to fill your upper chest easily and completely...Feel your shoulders and your ribcage gently rise and fall with the breath...And allow your breath to fill your abdomen as well...Feel your abdomen and ribcage gently rise and fall with your breath...Continue to breath deeply and gently...the inhale and the exhale are connected together, without stopping or holding your breath at the end of the inhale or the exhale...There is no right way or wrong way to breath, there is just the body breathing...in and out, in and out (*draw the last statement out to mimic the breathing*)...

While you continue slow, gentle breathing, focus your attention on your toes...breath into them, and allow them to relax...and relax even more...With each exhale any remaining tension dissolves and

disappears...Now focus your attention on your feet...and give each muscle permission to relax...As you exhale all the tension in your feet dissolves and disappears...Now focus your attention on your ankles... and give each muscle permission to relax...As you exhale all the tension in your ankles dissolves and disappears...It is easier and easier to breath gently and fully and slowly...It is easier and easier to relax each and every muscle...You are safe and supported completely...Now focus your attention on your calves...and give each muscle permission to relax...As you exhale all the tension in your calves dissolves and disappears...Now focus your attention on your shins... and give each muscle permission to relax...As you exhale all the tension in your shins dissolves and disappears...Now focus your attention on your knees... and give each muscle permission to relax...As you exhale all the tension in your knees dissolves and disappears...It is easier and easier to breath gently and fully and slowly...It is easier and easier to relax each and every muscle...You are safe and supported completely...Now focus your attention on your thighs... and give each muscle permission to relax...As you exhale all the tension in your thighs dissolves and disappears...Now focus your attention on your hips... and give each muscle permission to relax...As you exhale all the tension in your hips dissolves and disappears...Now focus your attention on your pelvic area... and give each muscle permission to relax...As you exhale all the tension in your pelvic area dissolves and disappears...Now focus your attention on your buttocks... and give each muscle permission to relax...As you exhale all

the tension in your buttocks dissolves and disappears...And you notice that your whole lower body feels warm and relaxed and comfortable...As you continue breathing slowly, deeply, and gently, you continue to relax even more...Now focus your attention on your abdomen... and give each muscle permission to relax...As you exhale all the tension in your abdomen dissolves and disappears...Now focus your attention on your chest... and give each muscle permission to relax...As you exhale all the tension in your chest dissolves and disappears...Now focus your attention on your back... and give each muscle permission to relax...As you exhale all the tension in your back dissolves and disappears...Now focus your attention on your whole torso... and give each muscle permission to relax...As you exhale all the tension in your whole torso dissolves and disappears...And you notice that your whole torso feels warm and relaxed and comfortable..As you continue breathing slowly, deeply, and gently, you continue to relax even more...Now focus your attention on your shoulders... and give each muscle permission to relax...As you exhale all the tension in your shoulders dissolves and disappears...Now focus your attention on your upper arm.. and give each muscle permission to relax...As you exhale all the tension in your upper arm dissolves and disappears...Now focus your attention on your elbows... and give each muscle permission to relax...As you exhale all the tension in your elbows dissolves and disappears...It is easier and easier to breath gently and fully and slowly...It is easier and easier to relax each and every muscle...You are safe and supported

completely...Now focus your attention on your forearms... and give each muscle permission to relax...As you exhale all the tension in your forearms dissolves and disappears...Now focus your attention on your wrists... and give each muscle permission to relax...As you exhale all the tension in your wrists dissolves and disappears...Now focus your attention on your hands... and give each muscle permission to relax...As you exhale all the tension in your hands dissolves and disappears...Now focus your attention on your fingers.. and give each muscle permission to relax...As you exhale all the tension in your fingers dissolves and disappears...And you notice that your arms and hands feel warm and relaxed and comfortable...As you continue breathing slowly, deeply, and gently, you continue to relax even more...Now focus your attention on your neck... and give each muscle permission to relax...As you exhale all the tension in your neck dissolves and disappears...Now focus your attention on your chin and jaw... and give each muscle permission to relax...As you exhale all the tension in your chin and jaw dissolves and disappears...Now focus your attention on your face.. and give each muscle permission to relax...As you exhale all the tension in your face dissolves and disappears...Now focus your attention on your scalp... and give each muscle permission to relax...As you exhale all the tension in your scalp dissolves and disappears...Now focus your attention on the back of your head.. and give each muscle permission to relax...As you exhale all the tension in the back of your head dissolves and disappears...And you notice that your whole body feels warm and

relaxed and comfortable...As you continue breathing slowly, deeply, and gently, you continue to relax even more...

[*At this point, allow from one to five minutes for the relaxation to deepen, accompanied by quiet nonspecific music.* Then begin speaking in a quiet, even tone to bring them back to alert awareness.*]

In just a few minutes, the relaxation session will be ending. As you continue breathing quietly, each inhale fills you with energy and aliveness...you are gradually becoming more aware of your surroundings here at (*fill in name of building*), on (*fill in the date*) at (*fill in the time of day*)...And now take a few deep breaths, and as you do you will become alert, and aware of feeling relaxed and refreshed.

[* *-At this point, at the end of the fifth relaxation session with the visualization groups, start the visualization procedure.*]

Appendix B

Visualization Procedure

[*To be used after the * in the relaxation procedure, and before rousing the subject to an aware and alert state.*]

Spript:

Now imagine that you can observe the pain you feel most often in a calm, detached way...Imagine that it has a color...What color most easily comes to mind?...(*the next instruction is for **individual sessions only***)...You will easily be able to answer me while staying completely relaxed...(*if there is no answer in a second or two, or the person says "No color", say* "If the pain had a color what would it be?") ...Okay, good... Now if the pain had a shape, imagine what shape it would be...(*Again prompt if necessary*)...Excellent...And what size would the pain be...Very good...Now, staying very relaxed, just accept the pain as it is in this moment...Release all efforts to restrain the pain in any way, and just watch it...Simply let go and accept it as your pain...What color is it now?...And what shape is it?...And what size is it?...(*Allow enough time between questions for the person to answer as fully as they want to*)...Continue to relax and simply allow the pain to do what ever it wants to do...Just accept it and allow it to change even more if it wants to...Sometimes pain has something to tell you...Listen to the pain and ask it if it has some information for you...(*this might be a longer pause, and*

the person may want to tell you what , if anything, the message is)...Continue to observe the color... and size...and shape...of the pain...Continue to allow it to change if it wants to...And tell me what it is like for you now...

(*At this point, allow from one to five minutes for the visualization to end, accompanied by quiet nonspecific music. Then begin speaking in a quiet, even tone to bring them back to alert awareness.. See below.*)

[N.B.: The experimenter is monitoring the verbal responses during the individual sessions for several reasons: to keep the person focused and on track; to assess what is happening and pace reading the script accordingly; and to repeat the suggestions for color, size and shape as change takes place until a natural stopping place occurs. This is important as it gives the person a successful first time experience.**]**

In just a few minutes, the visualization session will be ending. As you continue breathing quietly, each inhale fills you with energy and aliveness...you are gradually becoming more aware of your surroundings here at (*fill in name of building*), on (*fill in the date*) at (*fill in the time of day*)...And now take a few deep breaths, and as you do you will become alert, and aware of feeling relaxed and refreshed.

[*You will need to ask the subjects for feedback and comments after the initial session, and if the subjects report that nothing happened, reassure the person that this is a technique which takes practice.* **]**

Appendix C:

Letters of Information, Intent & Consent

Dear _____,

I am interested in testing a new treatment for chronic pain as part of the requirements for a Masters Degree Thesis in Clinical Psychology at Lakehead University. The study is titled: "Subject Generated Internal Imagery Coupled With Relaxation As A Treatment For Chronic Pain". This is a non-invasive imaging technique that is coupled with a scripted relaxation technique. It has been shown to be an effective method of controlling pain on a small sample group of chronic pain sufferers. The purpose of the study is to test the effectiveness of this technique on a diverse sample of persons with chronic pain, in a controlled manner.

I am looking for volunteers for a three month study who meet the following criteria:

a) 18 years of age or older;

b) the chronic pain condition has lasted 6 months or longer;

c) the condition has been assessed and diagnosed by a medical team, doctor, and/or hospital;

d) the subject is in a stable condition and would be expected to remain in a stable condition for the duration of the study;

e) the subject is willing to agree to maintain their current level of medication, or less, for the duration of the study;

f) the subject does not have a psychotic or suicidal state; and

g) the subject has written consent from any caregiver or treatment specialist with whom they are currently in therapy (if any).

The subjects will be semi-randomly divided into three groups: Control group, Relaxation group, and Treatment group. There will be 20 subjects in each group. All subjects will be assessed three times: once at the beginning; once in the middle (approx. one to one and one-half months later); and once at the end of the study (at approx. three months). The assessment will include: the McGill Pain Questionnaire, the Profile of Mood State, the Health Locus of Control Index, and the West Haven-Yale Multidimensional Pain Inventory. It will take approximately one hour to administer. This is all that is planned for the Control group.

The Relaxation group and the Treatment group will be taught a scripted relaxation procedure in four half-hour sessions spaced one week apart. They will receive an audio tape to practice with at home, and a personal log sheet to record the number of times relaxation was practiced, as well as their subjective reactions.

The Treatment group will then receive four one hour sessions, one week apart. Each session will start with the relaxation procedure after which the subjects will be taught an imaging technique for pain control. This group will also be furnished with a personal log to record daily practice sessions and subjective comments.

At the end of the relaxation and treatment sessions, the interview and test instruments will again be administered to the entire group. After the data has been analysed, if it is found that the imaging technique does significantly reduce pain, all of the remaining subjects in the study will be taught this technique. In any case, the Control group will be taught the relaxation technique at the end of the study.

All of the information will be kept in strict confidence and each participant will be issued an identification number for their files. All participation is voluntary and the subject has the right to withdraw at any time.

I have included a copy of the information letter for prospective subjects and a copy of the consent form for your information. If you are willing to refer any patients or clients to me for this study, or have any questions or comments, please feel free to contact me at Lakehead University, Psychology department: 343-8441, or the Psychology Graduate Students Lounge: 343-8476. My advisor is Dr. Charles Netley.

Thank you for your time.

Sincerely,

Katharine A. Farmer, H.B.A., Psychology

To Prospective Volunteers,

I am interested in testing a new treatment for chronic pain as part of the requirements for a Masters Degree Thesis in Clinical Psychology at Lakehead University. The study is titled: "Subject Generated Internal Imagery Coupled With Relaxation As A Treatment For Chronic Pain". It is a non-invasive imaging technique that is coupled with a scripted relaxation technique. It has been shown to be an effective method of controlling pain on a small sample group of chronic pain sufferers. The purpose of the study is to test the effectiveness of this technique on a diverse sample of persons with chronic pain, in a controlled manner.

I am looking for volunteers for a three month study who meet the following criteria:

a) 18 years of age or older;

b) the chronic pain condition has lasted 6 months or longer;

c) the condition has been assessed and diagnosed by a medical team, doctor, and/or hospital;

d) the subject is in a stable condition and would be expected to remain in a stable condition for the duration of the study;

e) the subject is willing to agree to maintain their current level of medication, or less, for the duration of the study;

f) the subject does not have a psychotic or suicidal state; and

g) the subject has written consent from any caregiver or treatment specialist with whom they are currently in therapy (if any).

The subjects will be divided semi-randomly into three groups: Control group, Relaxation group, and Treatment group. There will be 20 subjects in each group. All subjects will be assessed three times: once at the beginning; once in the middle (approx. one to one and one-half months later); and once at the end of the study (at approx. three months). The assessment will include: the McGill Pain Questionnaire, the Profile of Mood State, the Health Locus of Control Index, and the West Haven-Yale Multidimensional Pain Inventory. These will take approximately one hour to administer. This is all that is planned for the Control group.

The Relaxation group and the Treatment group will be taught a scripted relaxation procedure in four half-hour sessions spaced one week apart. You will receive an audio tape to practice with at home, and a personal log sheet to record the number of times relaxation was practiced, and for your subjective reactions.

The Treatment group will then receive four one hour sessions, one week apart. Each session will start with the relaxation procedure after which you will be taught an imaging technique for pain control. This group will also be furnished with a personal log to record daily practice sessions and subjective comments.

At the end of the relaxation and the treatment sessions, the interview and test instruments will again be administered to the entire group. After the data has been analysed, if it is found that the imaging technique does significantly reduce pain, all of the remaining subjects in

the study will be taught this technique. In any case, the Control group will be taught the relaxation technique at the end of the study.

All of the information will be kept in strict confidence and each participant will be issued an identification number for their files. All participation is voluntary and the subject has the right to withdraw at any time.

I have included a copy of the consent form for your information. If you have any questions or comments, please feel free to contact me at Lakehead University, Psychology department: 343-8441, or the Psychology Graduate Students Lounge: 343-8476. My advisor is Dr. Charles Netley.

Thank you for your time.

Sincerely,

Katharine A. Farmer, H.B.A., Psychology

I _____ am a person who has chronic pain, and I meet the criteria as stated. I have read and understood the cover letter of the study entitled "Subject Generated Internal Imagery Coupled With Relaxation As A Treatment For Chronic Pain", by Katharine A. Farmer, HBA, and I agree to participate.

I can commit to the amount of time indicated in the cover letter. I realize that I am a volunteer and may withdraw from this study at any time. I have also consulted with my primary health caregiver if I am currently in any form of treatment. I understand there is no known risk of physical or psychological harm. I agree to report immediately any unusual increase in level of discomfort I may experience. I understand I will be taught the procedure with the highest benefit to me after the results are known.

All of the data I provide will be kept confidential and if the results are published, I will not be identified in any way. I will receive a summary of the results, upon request, following completion of the study. I have been given the chance to ask any questions I may have before signing this.

_____ _____

Signature of participant Date

_____ _____

(optional)
Signature of Health Professional Date

_____ _____

Signature of experimenter Date

A STUDY OF A NEW TECHNIQUE

FOR CHRONIC PAIN MANAGEMENT

If you have been suffering from chronic pain for six months or longer and are willing to participate in a study of an experimental non-invasive treatment for chronic pain management, a masters student in clinical psychology at Lakehead University is looking for 60 volunteers over age 18. This will involve no more than one (1) hour per week for eleven (11) weeks, and may only involve one (1) hour per month for three(3) months depending on the experimental group.

There will be three groups: A control group, a relaxation group, and a visualization group. The experimental technique for coping with chronic pain will be taught to the third group. If it proves effective, all of the rest of the subjects will also be taught this technique at the end of the experiment.

If you would like to have an information letter sent to you, please contact Kate Farmer at 343-8476, or 343-8441.

Appendix D

Explaination of Age Group and Diagnosis

AGE GROUPS

1	18-30
2	31-40
3	41-50
4	51-60
5	61-89

DIAGNOSIS

1 head pain	6 chronic fatigue
2 back pain	7 rheumatism
3 fibrositis / fibromyalgia	8 joint pain
4 pancreatitis	9 muscular pain
5 arthritis	10 internal pain