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by
Marc Rubin Linzer

A Dissertation Submitted to the Faculty of the DIVISION OF SPECIAL EDUCATION AND REHABILITATION In Partial Fulfillment of the Requirements For the Degree of DOCTOR OF PHILOSOPHY WITH A MAJOR IN REHABILITATION In the Graduate College THE UNIVERSITY OF ARIZONA

1986
As members of the Final Examination Committee, we certify that we have read the dissertation prepared by Marc Rubin Linzer entitled Effectiveness of a Clinical Intervention Program for Reduction of Pain, and Concomitant Symptoms of Anxiety, Depression, and Hostility in Individuals Experiencing Chronic Pain and recommend that it be accepted as fulfilling the dissertation requirement for the Degree of Doctor of Philosophy.

Final approval and acceptance of this dissertation is contingent upon the candidate's submission of the final copy of the dissertation to the Graduate College.

I hereby certify that I have read this dissertation prepared under my direction and recommend that it be accepted as fulfilling the dissertation requirement.

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# TABLE OF CONTENTS

| LIST OF TABLES | vii |
| LIST OF ILLUSTRATIONS | ix |
| ABSTRACT | x |

## 1. INTRODUCTION

- Incidence and Cost of Chronic Pain | 1
- Methodological Considerations | 3
- Purpose and Rationale | 5
- Research Questions | 7

## 2. REVIEW OF THE LITERATURE

- The Nature of Pain | 10
- Potential Effects of Sustained Pain Response | 10
- Acute-Prechronic-Chronic Developmental Perspective of Chronic Pain | 11
- Acute | 11
- Prechronic | 12
- Chronic | 12
- Pain Cycle | 13
- Back Pain Cycle | 14
- Interactive Components | 15
- Psychological Treatment for Chronic Pain | 15
- Cognitive Methods | 15
- Treatment | 16
- Changing Perception of Pain | 16
- Cognitive-Behavioral Methods | 17
- Fostering a Sense of Control | 17
- Physiological Procedures | 19
TABLE OF CONTENTS--continued

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Continued</td>
<td></td>
</tr>
<tr>
<td>Progressive Muscle Relaxation</td>
<td>20</td>
</tr>
<tr>
<td>Biofeedback</td>
<td>21</td>
</tr>
<tr>
<td>Operant Conditioning Approaches</td>
<td>23</td>
</tr>
<tr>
<td>Hypnosis</td>
<td>24</td>
</tr>
<tr>
<td>Group Therapy</td>
<td>25</td>
</tr>
<tr>
<td>Centralist vs. Peripheralist Approaches To Chronic Pain Therapy</td>
<td>27</td>
</tr>
<tr>
<td>3. METHODOLOGY</td>
<td>29</td>
</tr>
<tr>
<td>Research Questions</td>
<td>29</td>
</tr>
<tr>
<td>Experimental Design</td>
<td>30</td>
</tr>
<tr>
<td>Subject Sample</td>
<td>31</td>
</tr>
<tr>
<td>Nature of Clinical Intervention</td>
<td>32</td>
</tr>
<tr>
<td>Group Therapy</td>
<td>32</td>
</tr>
<tr>
<td>Progressive Muscle Relaxation Induced Hypnosis</td>
<td>35</td>
</tr>
<tr>
<td>Instrumentation, Sources of Data and Data Acquisition Techniques</td>
<td>38</td>
</tr>
<tr>
<td>SCL-90-R</td>
<td>39</td>
</tr>
<tr>
<td>Reported Pain Index</td>
<td>40</td>
</tr>
<tr>
<td>4. RESULTS</td>
<td>41</td>
</tr>
<tr>
<td>General Results</td>
<td>42</td>
</tr>
<tr>
<td>Criteria for Qualitative Analysis</td>
<td>47</td>
</tr>
<tr>
<td>Level</td>
<td>47</td>
</tr>
<tr>
<td>Variability</td>
<td>49</td>
</tr>
<tr>
<td>Trend and Slope</td>
<td>49</td>
</tr>
<tr>
<td>Results by Index</td>
<td>50</td>
</tr>
<tr>
<td>Reported Pain Index</td>
<td>50</td>
</tr>
<tr>
<td>Serial Position Curve - Reported Pain Index</td>
<td>50</td>
</tr>
<tr>
<td>Average Magnitude of Reported Pain Index</td>
<td>52</td>
</tr>
<tr>
<td>Celeration: Trend and Slope Reported Pain Index</td>
<td>52</td>
</tr>
</tbody>
</table>
4. Continued

Reported Pain Index: Group Results........ 54
   Individual Results...................... 54
Global Severity Index - SCL-90-R............ 57
   Dimensions of SCL-90-R.................. 58
Mean Summed Distress Scores.................. 58
Average Magnitude of Phase................... 58
Celeration Trend and Slope of Global
   Severity Index SCL-90-R.................. 60
Results..................................... 60
   Global Severity Index - SCL-90-R........ 60
   Treatment Withdrawal..................... 63
Depression - SCL-90-R....................... 63
   Mean Summed Distress Scores
      Depression SCL-90-R..................... 63
Results..................................... 65
   Depression - SCL-90-R.................... 65
Anxiety - SCL-90-R......................... 68
   Mean Summed Distress Scores
      Anxiety.................................. 68
      Celeration: Trend and Slope-
         Anxiety................................ 68
      Anxiety-SCL-90-R Results............... 70
Hostility - SCL-90-R ....................... 70
   Hostility - SCL-90-R Results............. 73
Progressive Muscle Relaxation
   Induced Hypnosis.......................... 77
Summary..................................... 79
   General Results........................... 79

5. SUMMARY AND DISCUSSION........................ 82

   Limitations of the Study................... 84
   Recommendations for Future Research ...... 85

APPENDIX A: INSTRUMENTS...................... 86

REFERENCES.................................. 90
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a</td>
<td>Reported Pain Index: Average magnitude by phase</td>
<td>43</td>
</tr>
<tr>
<td>2a</td>
<td>SCL-90-R Global Severity Index</td>
<td>44</td>
</tr>
<tr>
<td>3a</td>
<td>SCL-90-R Depression Symptom Index</td>
<td>45</td>
</tr>
<tr>
<td>4a</td>
<td>SCL-90-R Anxiety Symptom Index</td>
<td>46</td>
</tr>
<tr>
<td>5a</td>
<td>SCL-90-R Hostility Symptom Index</td>
<td>48</td>
</tr>
<tr>
<td>1b</td>
<td>Reported Pain Index Celeration: Trend and Slope</td>
<td>53</td>
</tr>
<tr>
<td>1c</td>
<td>Reported Pain Index Percentage Change: Average magnitude by phase</td>
<td>55</td>
</tr>
<tr>
<td>2b</td>
<td>SCL-90-R Global Severity Index Celeration: Trend and Slope</td>
<td>61</td>
</tr>
<tr>
<td>2c</td>
<td>SCL-90-R Global Severity Index Percentage change: Average magnitude by phase</td>
<td>62</td>
</tr>
<tr>
<td>3b</td>
<td>SCL-90-R Depression Symptom Index Celeration: Trend and Slope</td>
<td>66</td>
</tr>
<tr>
<td>3c</td>
<td>SCL-90-R Depression Symptom Index Percentage Change: Average Magnitude by Phase</td>
<td>67</td>
</tr>
<tr>
<td>4b</td>
<td>SCL-90-R Anxiety Symptom Index Celeration: Trend and Slope</td>
<td>71</td>
</tr>
<tr>
<td>4c</td>
<td>SCL-90-R Anxiety Symptom Index Percentage change: Average magnitude by phase</td>
<td>72</td>
</tr>
<tr>
<td>Table</td>
<td>Page</td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>------</td>
<td></td>
</tr>
<tr>
<td>5b</td>
<td>SCL-90-R Hostility Symptom Index 75</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Celeration: Trend and slope (+or-)</td>
<td></td>
</tr>
<tr>
<td>5c</td>
<td>SCL-90-R Hostility Symptom Index 76</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Percent change: Average magnitude by phase</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Progressive muscle relaxation induced 78</td>
<td></td>
</tr>
<tr>
<td></td>
<td>hypnosis</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Mean reduction of symptom for group 80</td>
<td></td>
</tr>
<tr>
<td></td>
<td>comparing Phase 1 with Phase 4</td>
<td></td>
</tr>
</tbody>
</table>
## LIST OF ILLUSTRATIONS

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a</td>
<td>Reported Pain Index: Average magnitude by phase</td>
<td>43</td>
</tr>
<tr>
<td>2a</td>
<td>SCL-90-R Depressed Symptom Index - Average magnitude by phase</td>
<td>44</td>
</tr>
<tr>
<td>3a</td>
<td>SCL-90-R Depression Symptom Index - Average magnitude by phase</td>
<td>45</td>
</tr>
<tr>
<td>4a</td>
<td>SCL-90-R Anxiety Symptom Index - Average magnitude by phase</td>
<td>46</td>
</tr>
<tr>
<td>5a</td>
<td>SCL-90-R Hostility Symptom Index - Average magnitude by phase</td>
<td>48</td>
</tr>
<tr>
<td>1b</td>
<td>Reported Pain Index (self-report)</td>
<td>51</td>
</tr>
<tr>
<td>2b</td>
<td>Global Severity Index SCL-90-R - Celeration: Slope and Trend</td>
<td>59</td>
</tr>
<tr>
<td>3b</td>
<td>SCL-90-R Depression Symptom Index - Celeration: Trend and Slope</td>
<td>61</td>
</tr>
<tr>
<td>4b</td>
<td>SCL-90-R Anxiety Symptom Index - Celeration: Trend and Slope</td>
<td>64</td>
</tr>
<tr>
<td>5b</td>
<td>SCL-90-R Hostility Symptom Index - Celeration: Trend and Slope (+ or -)</td>
<td>66</td>
</tr>
</tbody>
</table>

ix
ABSTRACT

This study was designed to determine the effectiveness of a clinical intervention program for reduction of pain and concomitant symptoms of anxiety, depression and hostility in individuals experiencing chronic pain. The program consisted of 36 weeks of supportive group therapy, education and sessions of progressive muscle relaxation induced hypnosis.

Single subject research design was used to analyze the clinical effectiveness of treatment. Data was collected and compiled weekly. Serial position curves were generated for a Reported Pain Index, SCL-90-R Symptom Indicies for Anxiety, Depression, Hostility and the SCL-90-R Global Severity Index. The three subjects were adults whose ages ranged from 39 to 65, with five or more years of chronic pain due to orthopedic or arthritic conditions.

Qualitative analysis of the data indicated dramatic reductions in pain and secondary symptoms. Reductions in reported pain ranged from 17% to 31% with the mean pain reduction for the group of 20.6%.

Reduction in the SCL-90-R Global Severity Index ranged from 13.1% to 49.4% with the mean reduction for the group of 36.1%.
Reduction in depression ranged from 12.7% to 50% with the mean reduction for the group of 32.6%.

Anxiety was reduced for two subjects with a slight increase of .02% for the third subject. Range of anxiety change was .02% increase to 59% reduction with a group mean reduction of 36.3%.

Reduction in hostility ranged from 29.5% to 54.4% with a group mean reduction of 39.9%.

Progressive muscle relaxation induced hypnosis contributed to further reduction of pain and secondary symptoms with reductions ranging from 4 to 49%.

The results of this study show dramatic reductions in pain, depression, hostility and anxiety in chronic pain patients. These findings are not meant to be generalized to other populations, but may point the way for future research utilizing long-term therapeutic approaches and single subject research design.
CHAPTER 1

INTRODUCTION

Incidence and Cost of Chronic Pain

Chronic pain is a major disabling condition affecting the lives of as many as 86 million Americans (Turner & Chapman, 1982a). Fifty to 60 percent of all adults will have significant back pain limiting their activities at some time in their lives (Brand, Cooper, & Rim, 1979).

It is estimated that the total annual cost of chronic pain in the United States equals 60 billion dollars. This 1980 figure includes the costs of hospitalization, outpatient treatment, medication, surgical costs, loss of work productivity, loss of income, disability payments, and litigation settlements (Bonica, 1980).

Traditional medical and surgical procedures used to relieve pain are frequently unsuccessful and may result in undesirable side effects. Pure somatic treatment of chronic pain offers only a 50% chance of full recovery (Toomey, Ghia, Mao, & Gregg, 1977).

1
Treatment of chronic pain is no longer viewed exclusively from a medical model perspective. Pain is now considered to be a complex phenomenon that is a result of the interaction of sensory, affective and cognitive components (Melzack, 1973).

Chronic pain, regardless of the extent of tissue pathology, is recognized as a physical and psychosocial event. Pain affects and is affected by an individual's thoughts, feelings and behaviors. The chronic pain experience has the potential of permanently changing the lifestyle of the patient's family. In many cases the individual withdraws from a once active lifestyle and has no alternative but to become dependent and depressed.

Psychological approaches to the treatment of chronic pain are based on the theory that pain is a multidimensional problem that may be addressed in a number of alternative ways. Pain clinics use multimodal techniques in the rehabilitation of individuals experiencing chronic pain. These procedures include techniques designed to foster the acquisition of both cognitive and somatic self regulation (DeGood, 1979).

Anxiety and depression are the major affective states treated through application of a combination of biofeedback, muscle relaxation training, hypnosis,
individual and group therapy, vocational counseling, behavior modification, physical therapy, exercise, rest, singing, acupuncture, electrical stimulation, analgesics, psychotropic agents, detoxification, education classes, and a relaxed milieu (Boyd, Mersky, & Nielson, 1980; Gottlieb, Strite, Koller, Modorsky, Hockersmith, Kleeman, & Wagner, 1977; Sternbach, 1977).

**Methodological Considerations**

Multimodel techniques appear to be effective modifiers of pain. It is difficult, however, to determine the contribution of individual components of these multiple treatment programs. Kerns, Turk, and Holzman (1983) express the need for comparison studies of the efficacy of the alternative approaches to modification of chronic pain. They propose studies that compare different treatment techniques to each other, to waiting list and credible attention placebo control groups.

Existing research on the psychological treatment of chronic pain patients frequently lacks control groups, involves treatment approaches that are confounded by a mixture of therapeutic techniques, and cannot be replicated because of a lack of standardization and
inadequate description of the therapeutic techniques used (Turner & Chapman, 1982b).

Turner and Romano (1984) site the need for systematic single subject and control group outcome studies to establish or refute the value of treatment techniques for chronic pain syndromes. Research with patients having protracted histories of pain should focus on evaluating treatment packages. Chronic pain patients with long histories of continuous pain, multiple surgeries, and who receive compensation for disability are more likely to respond to a combination of treatments then to a single treatment method (Keefe, 1982). Despite a well documented need for the use of a combination of procedures for the treatment of pain, such strategies have not been well researched.

Chronic pain is not easily studied using control or between group methodologies. Kazdin (1982) outlines the disadvantages of between group design as they apply to chronic pain. They are: (1) difficulty in obtaining sufficient numbers of subjects to participate in the study, (2) difficulty ensuring homogeneity among group members, (3) demonstration of the intervention effects depends on both the intervention and minimizing sample error, and (4) necessity to create as many groups as the
number of interventions to be tested. Given these methodological problems, a more significant reason for using within group design is the ethical ramification of withholding treatment from chronic pain patients. The unknown consequences of withholding treatment from chronic pain patients necessitates the use of within group methodology where subjects serve as their own controls (Kazdin, 1982). Additional advantages of within group design are the ability to use a limited number of subjects, economy of time and cost, and the ability to assess intragroup as well as intraindividual change (Kazdin, 1982; Herson & Barlow, 1975).

Purpose and Rationale

The purpose of this study was to use within group methodologies to establish the effectiveness of a psychological treatment package consisting of group therapy and progressive muscle relaxation induced hypnosis.

The treatment of chronic pain is frequently encountered by practicing professionals in the field of psychology. No single intervention program seems to produce promising results. The findings of this study will enhance a greater understanding of the contribution
of psychological treatment packages, group therapy and progressive muscle relaxation induced hypnosis in the modification of chronic pain.

Psychologic therapies, whether dealing with observable pain behaviors or subjective pain experiences assume that change is possible (Sternbach, 1984, 1983). Multimodal techniques appear to be effective modifiers of pain. It is difficult to assess the effectiveness of the individual components of multiple treatment packages (Kerns, Turk, & Holzman, 1983).

Determination of the effectiveness of the proposed treatment model will provide a greater understanding of multiple treatment package approaches to chronic pain. The use of within group design allows for an analysis of the effects of variables. Determination of the contribution of each component of the treatment package is possible by comparison of the magnitude of change indicated by observed differences in the data collected throughout the study and subsequent use of dismantling procedures.
Research Questions

1. Will participation in a chronic pain support group reduce patient's reported level of pain?
   1a. If so, was this decrease different in magnitude when patients received progressive muscle relaxation induced hypnosis as additional treatment?

2. Will participation in a chronic pain support group reduce patient's reported level of anxiety?
   2a. If so, was this decrease different in magnitude when patients received progressive muscle relaxation induced hypnosis as additional treatment?

3. Will participation in a chronic pain support group reduce patient's reported level of depression?
   3a. If so, was this decrease different in magnitude when patients received progressive muscle relaxation induced hypnosis as additional treatment?

4. Will participation in a chronic pain support group reduce patient's reported level of hostility?
4a. If so, was this decrease different in magnitude when patients received progressive muscle relaxation induced hypnosis as additional treatment?
CHAPTER 2

REVIEW OF THE LITERATURE

The purpose of this chapter is to review and summarize the relevant literature concerning the psychological treatment of pain and related symptoms in individuals experiencing chronic pain.

For the sake of clarity the content of this chapter will be divided into four parts. First, a brief discussion about the nature of pain will be provided as an appropriate context for the study. Secondly, relevant literature concerning psychological treatment approaches for chronic pain will be discussed. Third, an attempt will be made to provide documentation for the effectiveness of each technique used in the study. Fourth, a review and synthesis of the information in order to again provide the justification of the present study.

Reviews of the literature dealing with the psychological treatment of individuals experiencing chronic pain emphasize cognitive, cognitive-behavioral, physiological, and operant conditioning approaches

The Nature of Pain

There have been discussions concerning the nature of pain throughout recorded history. Attitudes and beliefs about the purpose, origin and mechanics of pain have been influenced by the prevalent ideas of that time in history.

Current multi-modal approaches to the treatment of chronic pain are based upon the belief that pain is a complex phenomenon which is the result of the interaction of sensory, affective and cognitive components (Melzack, 1973; Sternbach, 1977). The following description of pain is based upon this current belief system.

Potential Effects of Sustained Pain Response

Pain is considered to be a signal telling us that something is wrong. Once the signal has been noted, any sustained response to the pain can become maladaptive and detrimental to a total lifestyle (Achterberg & Lawlis, 1980). When pain persists, its potential to influence behavior is great. Through a conditioning process, individuals learn behavior patterns that help them reduce
the pain. The same response patterns that help reduce acute pain may perpetuate chronic pain. Sustained pain responses must be interrupted repeatedly and for longer and longer periods of time if recovery is to occur.

**Acute-Prechronic-Chronic Developmental Perspective of Chronic Pain**

Keefe, Block, and Williams (1980) propose a developmental perspective of chronic pain behavior. They chart three stages of development: acute, prechronic, and chronic.

**Acute**

During the acute stage, which is defined as pain whose duration is from zero to two months, the overt behavior of the individual includes a temporary decrease in activity, temporary reliance on pain medications, and seeking help from health professionals. The cognitive/affective response system includes belief that the pain is controllable through medical treatment. The individual assumes an active coping style and experiences anxiety. The physiological response system includes reactive muscle spasm and autonomic arousal (Keefe, Block & Williams, 1980).
Prechronic

During the prechronic stage, two to six months duration of pain, the individual's overt behavior includes alternating patterns of increasing and decreasing activity, withdrawal from reliance on pain medications, reduced contact with doctors, and an attempt to return to work. The cognitive/affective response system includes the recognition that pain may not be entirely controllable medically. An active coping style alternates with a passive coping style. The individual is involved in the denial of depression while maintaining a focus on physical symptomology. Pain may be variable in intensity as it is reactive to stressors. The physiological response set includes reactive muscle spasm during periods of intense pain and autonomic arousal (Keefe, Block & Williams, 1980).

Chronic

The chronic stage is indicated when duration of pain exceeds six months and may last twenty-four months or more. Overt behavior during the chronic stage includes a long term pattern of decreased activity, addiction to narcotic agents, doctor shopping with numerous treatment failures, and a loss of ability to work often resulting in disability payments.
The cognitive/affective response system of the individual in the chronic pain stage includes belief that the pain is uncontrollable. He assumes a passive coping style, is depressed, has a strong preoccupation with pain and bodily complaints and experiences little variation in pain intensity.

The physiological response system of the individual in the chronic pain stage includes chronic muscle spasm, the result of guarding and assuming postures unnatural to body alignment. There is a decrease in autonomic arousal. Muscle strength and endurance decline as a result of disuse. The individual may develop other psychophysiologic disorders such as muscle contraction headaches (Keefe, Block & Williams, 1980).

Pain Cycle

The responses present during the acute stage serve important adaptive functions. Anxiety motivates the individual to take appropriate steps to cope with the pain. Most behaviors described result in a decrease in pain and a reinforced behavior pattern. If the individual's pain persists beyond the acute stage, he/she will become involved in alternate active and passive coping periods. During an active period the individual may find himself refusing to give into the pain. He may
push himself to assume a more normal lifestyle and decrease pain medication. If the pain is exacerbated the individual will return to a passive coping style with decreased activity and increased pain medication. As this cycle repeats itself, the individual finds that he/she has little alternative to becoming dependent on pain medication, financial compensation and entry into the chronic stage of pain (Keefe & Blumenthal, 1982).

**Back Pain Cycle**

Bonica (1980) describes the interaction of physiologic and behavioral factors in the development of chronic pain using a back injury as an example. An individual who injures his or her back may become depressed and inactive. The inactivity weakens the muscles supporting the spine, thereby placing more stress on injured tissues which increases pain and further reduces activity. Attempts to surgically remedy pain have iatrogenic effects that further complicate the clinical picture. Scar tissue, resulting from repeated surgeries, may not be easily detected through diagnostic tests and may be an important neurophysiologic factor in the persistence of chronic pain.
Interactive Components

Pain clinics recognize the complex interaction of sensory, affective and cognitive components of chronic pain. It is the pain clinic's charge to provide relief for the individual by whatever combination of therapeutic interventions prove effective. Research, however, must address the effectiveness of the individual components of the multimodal approach to determine the optimum treatment and thus greatest potential for relief.

Psychological Treatment for Chronic Pain


Cognitive Methods

Tan (1982) describes cognitive methods as those which attempt directly to modify thought processes in order to attenuate pain. The assumption is that a person's cognitions of his or her environment are determinants of his other experiences or emotions. Our expectations and ideas can influence what we see or feel.
Treatment

Cognitive methods for pain control include providing information about an upcoming event that may involve discomfort. Cognitive methods also involve teaching individuals to identify maladaptive responses to stress-eliciting situations as well as teaching individuals the use of specific cognitive coping skills like distraction, imagery techniques and calming self statements.

Changing Perception of Pain

It is hypothesized that providing information about an upcoming potentially painful experience enables the individual to perceive the pain as more benign in nature and minimizes the level of pain experienced. Tan (1982) concludes that the equivocal nature of the studies he has examined do not provide evidence of the efficacy of providing preparatory information about an upcoming potentially painful event.

Teaching individuals cognitive coping skills such as imaginative inattention, imaginative transformation of pain, imaginative transformation of context, attention diversion (external), attention diversion (internal), and somatization were examined by Tan (1982). Fifty-six percent of the studies reviewed showed the instructed
coping strategy to be superior to the control group subjects spontaneously generated coping techniques. No definitive statements supporting the consistent efficacy of the cognitive methods of intervention for pain can be made at this time.

**Cognitive-Behavioral Methods**

Cognitive-behavioral methods include cognitive interventions coupled with some behavioral approaches to the management of pain. Tan (1982) includes relaxation, biofeedback, desensitization, external contingency management, modeling and assertion training as possible behavioral components. He reaches the conclusion that no definitive statement concerning the consistent efficacy of the cognitive-behavioral interventions can be made.

**Fostering a Sense of Control**

Kerns, Turk and Holzman (1983) describe the three phase therapeutic regimen developed by Turk and Meichenbaum. The first or conceptualization phase, involves providing the individual with a new perspective for understanding the nature of pain. It emphasizes the influence of thoughts and feelings on perceptions of pain and the amount of suffering one experiences.
The second phase includes the teaching of behavioral and coping skills. Relaxation training, imagery and attention diversion are taught within the framework of Melzack's (1973) gate-control theory. The development of a plan to deal with pain is encouraged. Pain control is conceptualized as consisting of four stages; preparing for pain while sensations are mild, confronting the pain as it becomes more intense, coping with feelings of anxiety, frustration, helplessness and self reinforcement for having tried to cope with the pain and affective experiences.

The third phase provides opportunity to practice and consolidate these coping strategies through imagery, rehearsal and role playing. The belief is that the sense of control given the chronic pain patient is non-compatible with feelings of passivity and helplessness common to chronic pain conditions.

Kerns, Turk and Holzman (1983) conclude that the cognitive-behavioral approach offers promise for chronic pain involved individuals. Turner and Chapman (1982b) conclude in their review that cognitive behavioral treatment packages show potential to alleviate reported pain in a variety of pain syndromes.
The optimistic stance taken by Kerns et al. and Turner and Chapman does not give definitive support to the efficacy of cognitive-behavioral approaches to treatment. The manner in which various behavioral components are included in the definition of cognitive-behavioral approaches may account for the differences with Tan (1982). Muscle relaxation training and biofeedback, which are also considered to be physiological approaches to treatment, are not consistently included or examined as components of the various approaches. Thus the treatment considerations are not easily delineated. This is further confounded when considering the appropriate classification of hypnosis. Turner and Chapman (1982b) briefly allude to inclusion of hypnosis as a cognitive-behavioral intervention. Tan (1982) excludes hypnosis from his review as do Kerns, Turk and Holzman (1983).

**Physiological Procedures**

Progressive Muscle Relaxation

Progressive muscle relaxation training is a widely used technique to relax tense muscles believed to contribute to musculoskeletal pain. In his early investigations, Edmund Jacobson (1934) concluded that tension involved the shortening of muscle fibers and that this tension occurred when a person reported anxiety. Anxiety could be removed by eliminating the muscle tension. Relaxation was seen as the physiological opposite of tension and was a logical treatment for an overly tense or anxious person. By systematically tensing and releasing various muscle groups and by learning to attend to the differences between the sensations of tension and relaxation, a person may eliminate muscle contractions and experience a feeling of deep relaxation (Bernstein & Borkovec, 1975).

Joseph Wolpe's work (1958), in the counter conditioning of fear responses, led to the modification of Jacobson's technique. The prohibitive amount of time involved in Jacobsonian relaxation training was significantly shortened by Wolpe. Wolpe's procedures are similar to Jacobson's in terms of the tensing and releasing of muscle groups to achieve deep relaxation. The therapist directs the procedure through verbal
instructions designed to facilitate awareness of bodily sensations. Wolpe shortened the process and therapy time involved in producing deep relaxation. Trends in the development of relaxation training have included the development of more efficient training conditions, more refined measurement of the physiological effects of relaxation and determination of behavioral problems most suited to treatment by relaxation training (Bernstein & Borkovec, 1975).

Warfield (1985) reports relaxation training to be beneficial for the chronic pain population. In a study conducted at the Lahey Outpatient Pain Management Clinic, 57% of the successful patients rated relaxation training as very helpful. Thirty-three percent offered a somewhat helpful rating. Twenty-five percent of unsuccessful patients rated relaxation as very helpful and 62% thought it was somewhat helpful. "These data support the role of relaxation training as a component of critical and effective treatment for chronic pain patients" (Warfield, 1985, p. 118).

Biofeedback

Biofeedback is often used to assist muscle relaxation. Electromyographic and thermal biofeedback provide individuals with information regarding their
physiological functioning that they would not be able to perceive otherwise. Levels of muscle tension as well as skin temperature can be read through feedback provided by the instruments. The objective is to enable the individual to develop the ability to control the level of muscle tension and peripheral blood flow. Thus, a true indication of the results of an individual to relax various muscle groups is available. Studies have supported the use of biofeedback for the relief of tension headaches.

Kerns et al. (1983), note that treatment studies of relaxation alone or relaxation combined with biofeedback have yielded inconclusive results. Turner and Chapman's (1982a) review acknowledged the efficacy of physiologically focused psychological intervention for headache. Concern seems to revolve about the relative efficacy of biofeedback assisted muscle relaxation to relaxation training alone. Turner and Chapman (1982a) suggest that biofeedback is no more efficacious than muscle relaxation training. Considering the cost and need for specialized equipment, it appears that muscle relaxation training may be favored over biofeedback. This argument may be short sighted in that it is difficult to ascertain measurable levels of muscle relaxation without some sort of feedback.
Biofeedback provides a measurement tool useful for conduction of comparison studies of different tension states within the individual.

**Operant Conditioning Approaches**

Fordyce (1976, 1983) has been a major contributor of operant conditioning techniques used in the treatment of chronic pain. He describes the principle ways which cognitive control processes and learning/conditioning influence pain behaviors. Pain behaviors are defined as all verbal and nonverbal actions of a person that convey or are commonly understood to convey pain or suffering (Fordyce, 1983).

The operant conditioning method of managing patients with chronic pain includes (a) identification and elimination of positive reinforcement of pain behaviors, (b) increased physical activity, and (c) gradual decrease and eventual elimination of analgesics and other drugs (Kerns, Turk & Holzman, 1983). Operant programs rely on management of the patient during hospitalization. Generalization of Fordyce's (1976) findings to outpatient situations is difficult and inappropriate. Addiction and habituation to medications is more difficult to manage with outpatients. Modifying the patient's environment outside of the hospital is important because previous
reinforcers will again have the potential of affecting the patient's behavior.

**Hypnosis**

Perhaps the earliest deliberate use of a psychological technique for pain control was the use of hypnosis (Sternbach, 1984). Hypnotic analgesia was used in a large series of surgical cases before the development of chemical anesthesia (Hilgard & Hilgard, 1975).

The actual mechanism by which hypnosis affects pain is still unclear. Cognitive processes such as mental observations, focusing of attention and increased suggestibility seem to be the major factors in hypnosis and may be the active ingredients in producing hypnotic analgesia (Hilgard & Hilgard, 1975).

Fordyce, a major contributor of peripheralist operant conditioning techniques, writes in Barber and Adrian's (1982) *Psychological Approaches to the Management of Pain*, that the use of hypnosis in the treatment of pain draws heavily on the special training and skills of the person using it. "Here you find artists at work in the important business of reducing or controlling pain and suffering" (Barber & Adrian, 1982, p. vi).
Turner and Romano (1984) indicate systematic single subject and controlled group outcome studies are needed to establish or refute the value of this technique for pain relief.

Sacerdote (1978) states that about one in every five patients with chronic pain is responsive to hypnosis for reduction of pain. Crasilneck (1979) reports 20 of 24 subjects with constant back pain due to ruptured discs showed dramatic reduction in the subjective perception of pain after six sessions of hypnosis. Sachs (1982) reports that chronic pain patients achieved improvement in sleep patterns, social relationships, somatic preoccupations and need for less medication with hypnosis.

Rogers and Reich (1986) assume that patients have different degrees of hypnotic suggestibility and demonstrate varying capacities to respond to hypnosis for pain control.

**Group Therapy**

Group identification of pain behaviors, support or reinforcement by peers for non-pain behaviors, and suggestion of alternative behaviors by peers are important advantages of group therapy (Kerns, Turk & Holzman, 1983; Silverman, 1978).
Grouping of chronic pain patients eases the way toward psychotherapy. The group format gives each member a secure feeling that their pain is taken seriously and that they are not being accused of having imaginary pain (Pinsky, 1978).

Acceptance by the pain patient of the realness of psychological events has a better chance of occurring within a group situation. People tend to construct their world through interactions with others and have a strong need to check the validity of their perceptions and feelings against others (Stein, 1983).

Patients with chronic pain and suffering have the same general difficulties establishing a relationship with the therapist as do psychosomatic patients (Pinsky, 1978). The therapeutic relationship in group psychotherapy is less intense because the therapist is shared by the members of the group. In a group, the therapist becomes less threatening and is experienced in a much more realistic fashion than in individual therapy. The group therapist becomes less of an object for gratification and more an idealized figure with whom the members can identify (Stein, 1983).

Chronic pain patients' overly intense reactions have a wider field for expression and examination in
group therapy. The group process, in contrast to individual therapy, more readily focuses on maladaptive patterns of interrelating with others. Chronic pain patients are more accepting and reflective about peer confrontations, advice, or interpretations without the child-parent conflict interfering as much as it does with the psychotherapist (Pinsky, 1978).

Centralist vs. Peripheralist Approaches To Chronic Pain Therapy

Psychologic therapies assume that pain behavior can be changed. The approach to change varies between the centralist and peripheralists schools. Centralists attempt to alter the subjective experience of the person in pain. Alter the perception of the event and behavior change will follow. Hypnosis and psychodynamic therapies focus on inner events. Suggestion in hypnosis that the pain is another sensation, that time course is different, or that pain is in another part of the body adjusts the patient's perception of pain. The patient's demeanor and bearing change, the patient's voice, speech and other behaviors reflect the altered central state. Psychodynamic therapies assume that as inner conflicts or coping problems are resolved, defenses relax, psychogenic pain evaporates and the use of somatogenic pain as a defense becomes unnecessary (Sternbach, 1984).
The peripheralist school emphasizes direct alteration of outward behavior. Operant conditioning shapes pain behaviors to normal healthy standards (Fordyce, 1976). Patients become indistinguishable from normals and simultaneously experience less subjective pain.

Cognitive-behavioral therapy attempts to combine centralist and peripheralist approaches in a systematic way. An operant conditioning framework is used for the purpose of gradually extinguishing pain behaviors and substituting healthy behaviors. In addition, patients are taught mental strategies for dealing with pain (Sternbach, 1983, 1984).

This study was designed to determine the clinical effectiveness of a psychological treatment program consisting of longterm supportive group therapy (Hendler, Vierstein, Shallenberger, & Long, 1981), and progressive muscle relaxation induced hypnosis (Finer, 1983; Sachs, 1982). The program is designed to meet the apparent need of patients who have protracted histories of pain and are more likely to respond to a combination of treatments than a single treatment method (Keefe, 1982).
CHAPTER 3

METHODOLOGY

This chapter includes research questions, experimental design, descriptions of sample, nature of clinical intervention, instrumentation, and the procedures used to institute clinical intervention and collect data.

Research Questions

The present study is designed to investigate the following questions:

1. Will participation in a chronic pain support group reduce patient's reported level of pain?
   1a. If so, was this decrease different in magnitude when patients received progressive muscle relaxation induced hypnosis as additional treatment?

2. Will participation in a chronic pain support group reduce patient's reported level of anxiety?
   2a. If so, was this decrease different in magnitude when patients received progressive muscle relaxation induced hypnosis as additional treatment?
3. Will participation in a chronic pain support group reduce patient's reported level of depression?
   3a. If so, was this decrease different in magnitude when patients received progressive muscle relaxation induced hypnosis as additional treatment.

4. Will participation in a chronic pain support group reduce patient's reported level of hostility?
   4a. If so, was this decrease different in magnitude when patients received progressive muscle relaxation induced hypnosis as additional treatment?

**Experimental Design**

An alternating treatment design (Ottenbacher, 1986) was used in this study. Ottenbacher describes the alternating treatment design as particularly well suited for comparison of the relative merits of two treatments or different versions of the same treatment. This design has also been referred to as multiple schedule design (Leitenberg, 1973; Kratochwill, 1978) and as a simultaneous treatment design (Kazdin & Hartman, 1978; Baer, Wolf & Risley, 1968; Risley, 1970).
In the alternating treatment design, the subject is exposed to baseline and alternating treatment conditions throughout the evaluation period. Baseline is not an absolute requirement although it is useful.

Treatment of the subjects in this study was divided into four nine-week phases. Each phase introduced and recycled didactic material and allowed for therapeutic interaction with a supportive and inspirational theme. Treatment was withdrawn and returned during each phase. During phase four, progressive muscle relaxation induced hypnosis was added in sessions 32 through 35.

**Subject Sample**

The study was conducted in conjunction with Psychiatric Services Center and Psychological and Biofeedback Services Center, Tucson, Arizona. The medical director of this facility, a psychiatrist, and the psychological director, a rehabilitation psychologist, have a pool of clients experiencing chronic pain. They assisted in the identification and recruitment of subjects. In addition, other health care professionals providing services for individuals experiencing chronic pain were notified of the study and were invited to refer subjects.

Subjects were considered eligible if the duration of pain experience had exceeded six months or if other
indications, i.e., multiple surgical interventions were noted with physician recommendation. Origin of pain was orthopedic, arthritic or of other benign nature.

**Nature of Clinical Intervention**

Clinical intervention consisted of participation in an ongoing group therapy program. Group sessions 32-35 included progressive relaxation induced hypnosis as described by Finer (1980, 1983) and Sachs (1982).

**Group Therapy**

Group therapy consisted of an ongoing counseling, education and support group procedure. The group had the qualities of a supportive, inspirational free interaction group (Hendler, Viernstein, Shallenberger, & Long, 1981), as well as an educational component considered essential to change. Sessions were conducted by the researcher and were held once each week for two hours, allowing for a break at mid-session. All sessions were held at The Psychiatric Services Center, Tucson, Arizona.

The group leader assumed a flexible and supportive role to encourage mutual support and interaction considered important for the psychotherapeutic process.
Education was provided each week based on a curriculum developed prior to treatment. One fourth of each session was devoted to direct discussion of specific topics related to chronic pain. Individual members were encouraged to apply the information provided to their own experience with chronic pain.

Educational components of each session revolved around the specific topic areas outlined below. The topic areas continued to be subject matter throughout the ongoing sessions. Topics were not limited to a specific session although introduction of each topic occurred on a systematic basis.

**Session 1:** Rapport building; introduction and expectations of group members and therapist; overview of chronic pain, definition, incidence, knowledge related to physical, emotional and rational components of pain; discussion of personal experience with chronic pain and impact of chronic pain on the individual.

**Session 2:** Continuation of rapport building, discussion of issues related to previous week's educational materials; pain and stress; adaptive purposes of pain; acute, prechronic and chronic pain; experiences with medical intervention.
Session 3: Psychosocial impact of chronic pain on patient, spouse, children, family, and friends; effects on interpersonal relations, withdrawal from physical and social activity; dependency and anger; medications.

Session 4: Behavioral conditioning concepts of chronic pain (Fordyce, 1983); reinforcement of dependency and pain; development of positive coping mechanisms.

Session 5: Group identification of pain behaviors; anxiety, depression and activity levels; reactions to visible and non-visible disabilities; grimacing, gate and other pain behaviors.

Session 6: Identification, support and reinforcement of non-pain behaviors; traditional interventions for treatment of chronic pain, relaxation, hypnosis, distraction, exercise, diet, work, stress reduction techniques.

Session 7: Information related to facilities providing opportunity for alternate treatment of chronic pain, use of therapy pools, exercise and conditioning concepts to increase activity level and reduce sensation.

Session 8: Recycling of issues discussed during previous groups enhancing deeper understanding of issues related to chronic pain.
Session 9: Summarization of current treatment cycle, introduction to next phase of treatment, recycling and deepening of participant's experience.

The ongoing nature of the group provided opportunity for discussion of the areas suggested in each week's format.

Progressive Muscle Relaxation
Induced Hypnosis

Rationale for use of progressive muscle relaxation induced hypnosis is based on the need for psychologic self-regulation in individuals experiencing chronic pain (De Good, 1983, 1979). The clinical sequence for pain patients has been presented by Sachs (1982) as a pathway that begins with assessment, proceeds through relaxation and hypnotic exercises and ends in generalization training. Relaxation and hypnotic training both involve centering experiences of levels of consciousness. Separation between relaxation and hypnotic procedures are not clearly defined and dysfunctional boundaries vary with the individual characteristics of the patient (Sachs, 1982; Sachs, Feinstein, & Vitale, 1977).

Relaxation was taught to the group through a modification of Jacobsonian techniques. Relaxation was produced by alternately tensing and relaxing muscle groups.
and focusing on the sensation produced as the contractions are released.

First the feet are maximally dorsiflexed, tension in the feet and lower legs experienced and then given up. The feet are then plantarflexed, tension experienced in the feet and lower legs and then given up. The knees are then pressed down, tension experienced on the lower legs and thighs and then given up. The feet are lifted together a few centimeters in the air, tension experienced in the abdomen, back and feet are allowed to fall comfortably apart. The hands, elbows and shoulders are pressed down, tension experienced in arms and shoulders are given up. The chest and abdomen are tensed, the back is arched, the tension experienced all the way from the back of the head to the pelvis and given up. The head is pushed down, tension experienced in the back of the neck and given up. The face is screwed up tight, tension experienced around the jaws, eyes and forehead and then given up. Finally, the eyes are gently closed (Finer, 1980, p. 38).

Incorporation of autogenic phrases during the induction phase potentiate the relaxation produced.

The benefits of the relaxed state include reduced muscle spasms and the reduction of sympathetic hyperactivity. The reduction of autonomic arousal accompanies the alteration of tensing and relaxing specific muscle groups, making mental contact with body areas, and experiencing the natural feelings of heaviness, warmth and calm associated with relaxation (Sachs, 1982, p. 90).

Concentration on breathing providing the ability to maintain focused attention on subtle sensations is the focus of this relaxation training stage.
Using breathing as the target of concentration provides the opportunity for patients to further increase the clarity of their awareness and duration of their attention span. Patients can learn to use each distraction as a cue to refocus their attention on the sensations of breathing. The ability to function at this level maximizes the effectiveness of subsequent hypnotic training. Further, the acquisition of deep relaxation can reduce or eliminate pains that have significant vascular or muscular components (Sachs, 1982, p. 90).

Finer (1983, 1982, 1980) uses progressive muscle relaxation as an induction technique for hypnosis:

The patients learn progressive relaxation, experience their bodies as warm, heavy, tired, and numb; imagine a sponge in their head, which sucks in all their inner disturbances both bodily and mental, the sponge being squeezed empty when full and used again, leaving body and mind calm and peaceful. They concentrate on simple, positive happenings in the here and now at the same time feeling greater self esteem, an improved quality of life, courage, and endurance to be able to keep symptoms and all negative happenings at bay. They imagine that they can relax regularly every day, feeling strong, calm and relaxed, and able to prevent and treat their own stress. They aim to feel good, during the day and sleep well at night and keep their symptoms at bay; and, finally to see their symptoms getting less and less every day, week, month, and year that goes by (Finer, 1983, pp. 195-196).

Pain alteration training isolates a single dimension of the pain from the complex physical sensations the subject is experiencing. The subject can separately rate the intensity of each pain and then select one aspect at a time for alteration. The intensity of each
sensation can serve as a base to evaluate changes produced by the hypnotic training.

The subject may initially select a pain with a rating of six on a ten point scale. Training continues as the subject learns thoughts, feelings and sensations that are incompatible with the full intensity of the selected dimension of pain. Subjects are encouraged to experiment with images that will result in alteration of the experienced pain. Such pain altering activity, for example, imagining the intensity rating reducing as the subject visualizes the intensity rating of six rolling backwards to 5 1/2 and then 5 and so on, teach that the pain is alterable (Sachs, 1982).

The sessions of progressive muscle relaxation induced hypnosis incorporated the techniques described above modified by the needs of the subjects.

**Instrumentation, Sources of Data and Data Acquisition Techniques**

Weekly completion of the SCL/90-R and self-report ratings on pain drawing are the source of data for evaluation of treatment. Participants completed the instruments immediately prior to each treatment.
SCL/90-R

The SCL/90-R is a ninety item self-report inventory with normative data reflecting the psychological symptom patterns of psychiatric outpatients, adult non-patients, psychiatric inpatients and adolescent non-patients (Derogatis, 1983).

The profiles generated describe nine symptom dimensions; somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. Additional items of clinical importance that overlap the primary symptom dimensions and are included are; poor appetite, overeating, trouble falling asleep, awakening in the early morning, sleep that is restless or disturbed, thoughts of death or dying, and feelings of guilt.

Intra-individual comparison of depression, anxiety and hostility symptom profiles and the Global Severity Index, form the basis for analysis of treatment effectiveness.

The SCL/90-R has been recommended by Waslow and Parloff (1975) and De Good (1983) as the instrument of choice in assessing psychological change during treatment. De Good (1983) prefers the short length, short administration time, and high face validity of this instrument. Derogatis, Rickels and Rock (1973) report a
high degree of convergent validity with the MMPI on appropriate symptom constructs. Duckro, Margolis & Tait (1985) consider SCL-90-R anxiety and depression symptom indexes to offer relevant and efficient data in assessment of pain patients.

Reported Pain Index

A pain drawing asks the patient to show where they hurt by marking the outline figures with symbols indicating intensity of numbness, pins and needles, burning, stabbing, spasms, and ache (White, 1981). The sum of the total number of strikes yields a weekly reported pain index.

Graphical observations of changes in magnitude on symptom scales and the reported pain index were utilized to determine the results of the study (Kazdin, 1982).
CHAPTER 4

RESULTS

This study was designed to determine the effectiveness of a clinical intervention program for reduction of pain and concomitant symptoms of anxiety, depression and hostility in individuals experiencing chronic pain.

The clinical intervention program consisted of thirty-six weeks of treatment comprised of supportive group therapy, education and progressive muscle relaxation induced hypnosis.

Results are discussed in two major sections, reported pain index and SCL-90-R results. Pain was measured by completion of a reported pain index each week. The index was composed of the sum of the number of strikes reported by the subject on a pain mannequin (White, 1981). Anxiety, depression and hostility were measured by completion of the SCL-90-R (Derogatis, 1983). The global severity index and individual symptom indices for anxiety, depression and hostility are examined.

The examination of data involved qualitative analysis of information collected from three subjects as
they participated in treatment. Data from the subjects was compiled and serial position curves were generated for the reported pain index and SCL-90-R indices.

**General Results**

Participation in treatment resulted in a reduction of reported pain and SCL-90-R indicies for each subject. Subject S reduced his pain level by 17%, Subject F by 14% and Subject C by 31% when comparing mean pain levels at beginning (Phase I) and close (Phase IV) of treatment. The mean pain reduction for the group was 20.6% (See Table 1a, Figure 1a).

The global severity index was reduced for each subject. Subject S reduced global severity index scores 49.4%, Subject F reduced 45.9% and Subject C 13.1% when comparing global severity index scores for Phase I with Phase 4. The mean reduction for the group was 36.1% (See Table 2a, Figure 2a).

Depression was reduced for each subject. Subject S showed a 50% reduction, Subject F a 35.2% reduction and Subject C a 12.7% reduction in depression. The mean reduction for the group was 32.6% (See Table 3a, Figure 3a).

Anxiety was reduced for Subject S by 59% and for Subject F by 50%. Subject C resulted in a .02% increase in anxiety. The average reduction of anxiety for the group was 36.3% (See Table 4a, Figure 4a).
Table 1a. Reported Pain Index:
Average magnitude by phase.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
<th>Phase 4</th>
<th>Phase 1/Phase 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>83.1</td>
<td>60.4</td>
<td>49</td>
<td>69.2</td>
<td>-17%</td>
</tr>
<tr>
<td>F</td>
<td>75.9</td>
<td>94.8</td>
<td>90.1</td>
<td>65.4</td>
<td>-14%</td>
</tr>
<tr>
<td>C</td>
<td>94.6</td>
<td>79.6</td>
<td>65.7</td>
<td></td>
<td>-31%</td>
</tr>
</tbody>
</table>

Mean reduction for group 20.6%

Figure 1a. Reported Pain Index:
Average magnitude by phase.
Table 2a. SCL-90-R
Global Severity Index.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
<th>Phase 4</th>
<th>Phase 1 % Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>2.67</td>
<td>1.45</td>
<td>1.22</td>
<td>1.35</td>
<td>-49.4%</td>
</tr>
<tr>
<td>F</td>
<td>1.35</td>
<td>1.12</td>
<td>.61</td>
<td>.73</td>
<td>-45.9%</td>
</tr>
<tr>
<td>C</td>
<td></td>
<td>.61</td>
<td>.64</td>
<td>.53</td>
<td>-13.1%</td>
</tr>
</tbody>
</table>

Mean reduction for group: -36.1%

Figure 2a. SCL-90-R
Global Severity Index
Average magnitude by phase.
Table 3a. SCL-90-R
Depression Symptom Index
Average magnitude by phase.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
<th>Phase 4</th>
<th>Phase 4/Phase 1 % Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>2.72</td>
<td>1.36</td>
<td>1.08</td>
<td>1.36</td>
<td>-50 %</td>
</tr>
<tr>
<td>F</td>
<td>2.50</td>
<td>2.26</td>
<td>1.08</td>
<td>1.62</td>
<td>-35.2%</td>
</tr>
<tr>
<td>C</td>
<td>.94</td>
<td>1.06</td>
<td>.82</td>
<td></td>
<td>-12.7%</td>
</tr>
</tbody>
</table>

Mean reduction for group: -32.6%

Figure 3a. SCL-90-R
Depression Symptom Index
Average magnitude by phase.
Table 4a. SCL-90-R
Anxiety Symptom Index
Average magnitude by phase.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
<th>Phase 4</th>
<th>% Reduction Phase 1 to Phase 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>2.2</td>
<td>.91</td>
<td>.60</td>
<td>.90</td>
<td>-59%</td>
</tr>
<tr>
<td>F</td>
<td>2.18</td>
<td>1.71</td>
<td>.83</td>
<td>1.08</td>
<td>-50%</td>
</tr>
<tr>
<td>C</td>
<td>.82</td>
<td>.83</td>
<td>.84</td>
<td></td>
<td>+.02%*</td>
</tr>
</tbody>
</table>

Mean reduction for group -36.3%

*increase

Figure 4a. SCL-90-R
Anxiety Symptom Index
Average magnitude by phase.
Hostility was reduced for Subject S by 54.4%, Subject F by 29.5% and Subject C by 35.9%. The mean reduction for the group was 39.9% (See Table 5a, Figure 5a).

Criteria for Qualitative Analysis

Experimental and therapeutic criteria are used to evaluate data in single subject research (Kazden, 1982). The experimental criterion refers to the manner in which data are evaluated to determine if the intervention had an effect. The primary method of data evaluation in single case research is based on visual inspection and qualitative analysis of a graphic display of the data. The therapeutic criterion is concerned with the clinical or applied significance of the effects (Kazden, 1982). The major variations in graphic analysis, which a therapist should look for, are changes in level, mean, variability, trend, and slope (Ottenbacher, 1986).

Level

Level refers to changes in the magnitude of the data. A change in level refers to the shift or discontinuity of client performance from the end of one phase to the beginning of the next phase. Change in the magnitude of the data may be conveyed by a change in the mean level across two or more phases (Ottenbacher, 1986, p. 148).
Variability

Variability refers to the amount of fluctuation of data points in a series. Excessive variability in data may indicate that the data are unstable and prevent meaningful conclusions from being drawn regarding the intervention effectiveness" (Ottenbacher, 1986, p. 150).

Calculation and comparison of mean values for data can be used to reduce the confounding effects of variability (Kazdin, 1982).

Trend and Slope

"Trend or slope refers to the tendency for the data to show systematic increases or decreases over time" (Kazdin, 1982, p. 235). Calculation of the celeration line as a data response pattern, provides a visual means to assess trend and slope. When systematically increasing it is described as an accelerating trend. A celeration line that is consistently decreasing suggests a decelerating trend. The slope refers to the steepness of the trend (celeration) line and indicates the rate of change (Ottenbacher, 1986).

Graphic presentation and qualitative analysis involves judging the extent to which changes in response patterns for a particular client are evident across phases within a design. With repeated measures over time, the effects of a particular intervention are evaluated at different times. Qualitative analysis
allows the therapist to make judgments based on the overall pattern of the data (Ottenbacher, 1986).

**Results by Index**

Reported Pain Index

The reported pain index is composed of the number of strikes reported by the subject on a pain mannequin (White, 1981). Instructions were:

Show me where it hurts, mark these drawings according to where you hurt. (If the back of your neck hurts, mark the drawing on the back of the neck, etc.). If you feel any of the following symptoms please indicate where you feel them by placing the marks shown on the diagram.

- **Numbness**: = = = =
- **Pins & Needles**: 0 0 0 0 0
- **Burning**: X X X X
- **Stabbing**: / / / /
- **Ache**: ^ ^ ^ ^

Reported pain is the sum of the number of strikes the patient marked each week.

**Serial Position Curve - Reported Pain Index**

Figure 1 shows data for three subjects compiled and serially positioned over session and phase of treatment. Withdrawal of treatment occurred after
(SELF REPORT)
REPORTED PAIN INDEX

SUMMED DISTRESS SCORES

<table>
<thead>
<tr>
<th>PHASE</th>
<th>SESSIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>S</td>
</tr>
<tr>
<td>2</td>
<td>F</td>
</tr>
<tr>
<td>3</td>
<td>C</td>
</tr>
<tr>
<td>4</td>
<td>PHR</td>
</tr>
</tbody>
</table>

Treatment Phase
Treatment Withdrawal
PMR Hypnosis

*Subject C began treatment in Phase 2

Figure 1
weeks 3, 16, 19, and 28. Progressive muscle relaxation induced hypnosis was utilized in weeks 32, 33, 34, and 35.

Average Magnitude of Reported Pain Index

Figure 1a shows the reported pain index with bar graphs of the average magnitude of reported pain by subject and phase of treatment. The mean level of pain for each phase was calculated by adding all the values on the axis for a phase and dividing by the number of the data points. Changes in level refer to the difference or discontinuity in reported pain by phase of treatment (Ottenbacher, 1986).

Table 1a lists the average magnitude of the reported pain index by phase and subject.

Celeration: Trend and Slope
Reported Pain Index

Figure 1b celeration: trend and slope of the reported pain index by subject and phase of treatment. Figure 1b shows the direction (trend + or -) and rate of change (slope) in each phase of treatment for each subject. Table 1b lists the trend (+ or -) and slope of the reported pain index by phase of treatment. Trend and slope were calculated using the celeration line approach presented by Ottenbacher, 1986, pp. 156-160.
Table 1b. Reported Pain Index
Celeration: Trend and Slope.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
<th>Phase 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>+.74</td>
<td>-1.11</td>
<td>-1.54</td>
<td>-1.33</td>
</tr>
<tr>
<td>F</td>
<td>+.95</td>
<td>+.94</td>
<td>-1.12</td>
<td>-1.18</td>
</tr>
<tr>
<td>C</td>
<td>+.85</td>
<td>-1.38</td>
<td>-1.24</td>
<td></td>
</tr>
</tbody>
</table>

Figure 1b. Reported Pain Index
Celeration: Trend and Slope.
Table 1c reports percent change of average magnitude by phase of the reported pain index by subject and group.

Reported Pain Index: Group Results

Table 1c shows a reduction in mean level of pain for the group in each phase of treatment. When comparing the average magnitude for Phase 1 with Phase 4 there is reduction in 100% of subjects ranging from 14% to 31% with a mean reduction for the group of 20.6%.

Figure 1b, Table 1b shows a decelerating trend in Phases 3 and 4 for all subjects.

Individual Results

Treatment withdrawal in Phase 1, 3, and 4 resulted in a marked elevation in Subject F during the week immediately following withdrawal (See Figure 1). Subject S reported a dramatic increase in magnitude of pain one week following withdrawal in Phase 1. Reactions to treatment withdrawal were less dramatic for Subject S during Phases 2, 3, and 4.

Subject C reports a mild increase in pain at treatment withdrawal in Phase 2 with less reactivity to withdrawal in Phases 3 and 4.

The average magnitude of pain in Phase 2 (Figure 1a, Table 1a) for Subject S decreased from 83.1 to
Table 1c. Reported Pain Index
Percentage Change: Average magnitude by phase.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Phase 2</th>
<th>Phase 3</th>
<th>Phase 4</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 2</td>
<td>Phase 3</td>
<td>Phase 3</td>
<td>Phase 4</td>
<td>Total</td>
</tr>
<tr>
<td>Phase 1</td>
<td>Phase 2</td>
<td>Phase 2</td>
<td>Phase 1</td>
<td></td>
</tr>
<tr>
<td>Phase 1</td>
<td>Phase 2</td>
<td>Phase 3</td>
<td>Phase 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>-27.3%</td>
<td>-18.8%</td>
<td>+41.2%</td>
<td>-17%</td>
</tr>
<tr>
<td>F</td>
<td>+24.9%</td>
<td>-4.9%</td>
<td>-27.4%</td>
<td>-14%</td>
</tr>
<tr>
<td>C</td>
<td>-15.8%</td>
<td>-17.4%</td>
<td>-31%</td>
<td></td>
</tr>
<tr>
<td>Mean group change</td>
<td>-1.2%</td>
<td>-13.2%</td>
<td>-1.26%</td>
<td>-20.6%</td>
</tr>
</tbody>
</table>
a 27.3% (Table lc) reduction with a reversal trend (Figure lb, Table lb) deceleration at a rate of -1.11.

Subject F reports an increase in average magnitude of pain for Phase 2 of (see Table lc) 24.9% and a continuing acceleration at a rate of +.94 (See Table lb). Subject C reports a pain level of 94.6 and acceleration of +.85 in this her first phase of treatment.

In Phase 3, Subject S reports a reduction in pain of 19% when comparing mean level of Phase 2 with Phase 3 (Table lc). Subject F reports a reduction of 4.9% with a decelerating trend of -1.12. Subject C reports a reduction in mean level of pain of 17.4%.

When examining weeks 32, 33, 34, and 35, the addition of progressive muscle relaxation induced hypnosis produced a dramatic drop in reported pain for Subject F (an individual well trained in hypnosis). Subjects S and C reported mixed results with pain increasing for Subjects C and S at the close of the hypnosis sessions.

Comparisons of the mean pain level for sessions utilizing progressive muscle relaxation induced hypnosis with the mean for Phase 4 sessions indicate reductions of 4% for Subject S, 49% for Subject F and 32% for Subject C.

When comparing the average magnitude of pain in Phase 1 (beginning of study) with Phase 4 there appears
to be reduction in global reported pain for all subjects (See Table 1a). The mean reduction of reported pain for the group was 20.6% with a Phase 4 decelerating trend in all subjects. Subject C reports a reduction of 16% in pain with a decelerating trend of -1.38. Treatment withdrawal in Phase 3 showed a dramatic increase for Subject F with mild increase for Subject C and a level reaction for Subject S.

In Phase 4, treatment withdrawal yielded a dramatic increase in pain level for Subject F, with Subjects S and C having minor reductions. When comparing average magnitude of Phases 4 with Phase 3 there is a 41% increase in reported pain for Subject S with a deceleration of -1.33.

Subject F reports a 27% reduction in pain in Phase 4 when comparing average level with Phase 3. She has a highly decelerating trend of -1.8 in Phase 4.

**Global Severity Index - SCL-90-R**

The function of these global measures is to communicate in a single score the level or depth of the individual's psychopathology. The GSI represents the best single indicator of the current level or depth of the disorder, and should be utilized in most instances where a single summary measure is required. The GSI combines information on numbers of symptoms and intensity of perceived distress (Derogates, 1983, p. 11).
Dimensions of SCL-90-R

The nine primary symptom dimensions of the SCL-90-R are: Somatization, Obsessive-Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, and Psychoticism. A tenth grouping, additional items, contains seven items which are not included under any of the primary symptom dimensions. These items are clinically important and contribute to the global scores of the SCL-90-R configurally (Derogatis, 1983).

Mean Summed Distress Scores

Figure 2, Global Severity Index - SCL-90-R, shows the mean summed distress scores for the subjects compiled and serially positioned for each session and phase of treatment. Withdrawal of treatment occurred after weeks 3, 16, 19, and 28. Progressive muscle relaxation induced hypnosis was utilized in weeks 32, 33, 34, and 35.

Average Magnitude of Phase

Figure 2a shows the average magnitude by phase of the SCL-90-R Global Severity Index. The bar graph shows the mean level of global scores computed by adding the values of the y axis for a phase and dividing by the number of sessions in the phase. Changes in level refer to the
SCL-90
GLOBAL SCORES

Treatment Phase
Treatment Withdrawal
PMR Hypnosis

*Subject C began treatment in Phase 2

Figure 2
difference or discontinuity in Global Severity Index scores by phase of treatment (Ottenbacher, 1986).

Table 2a - Average magnitude of Global Severity Index SCL-90-R scores by phase lists the mean level scores across phases by subjects.

Celeration Trend and Slope of Global Severity Index SCL-90-R

Figure 2b. Celeration trend and slope of the Global Severity Index SCL-90-R shows the direction (trend + or -) and rate of change (slope) in each phase of treatment for each subject. Table 2b lists the trend (+ or -) and slope of the global by phase of treatment.

Table 2c presents the percentage change of average magnitude by phase for Global Severity Index scores.

Results

Global Severity Index - SCL-90-R

When comparing Phase 1 with Phase 4 (Table 2c) there is a reduction in 100% of the subjects ranging from 13.1 to 49.4%. The mean reduction for the group is 36.1%. There is a decelerating trend (Figure 2b) for all subjects in Phase 4.
Table 2b. Global Severity Index SCL-90-R
Celeration: Trend and Slope.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
<th>Phase 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>+.87</td>
<td>-1.33</td>
<td>+.88</td>
<td>-1.04</td>
</tr>
<tr>
<td>F</td>
<td>+.81</td>
<td>-1.06</td>
<td>-1.34</td>
<td>-1.19</td>
</tr>
<tr>
<td>C</td>
<td>+.67</td>
<td>+.59</td>
<td></td>
<td>-2.2</td>
</tr>
</tbody>
</table>

Figure 2b. Global Severity Index SCL-90-R
Celeration: Trend and Slope.
Table 2c. SCL-90-R
Global Severity Index
Percentage change: Average magnitude by phase.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
<th>Phase 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>-45.6%</td>
<td>-15.8%</td>
<td>+10.6%</td>
<td>-49.4%</td>
</tr>
<tr>
<td>F</td>
<td>-17.0%</td>
<td>-45.5%</td>
<td>+16.4%</td>
<td>-45.9%</td>
</tr>
<tr>
<td>C</td>
<td>+4.9%</td>
<td>-17.1%</td>
<td>-13.1%</td>
<td></td>
</tr>
</tbody>
</table>

Mean Group Change
-31.3% -18.8% +3.3% -36.1%
Treatment Withdrawal

Figure 2 demonstrates a dramatic increase in scores when treatment was withdrawn in Phase 1 for Subjects S and F. Treatment withdrawal in Phases 2, 3, and 4 had much less effect.

**Depression = SCL-90-R**

The symptoms of the depression dimension of the SCL-90-R reflect a broad range of the manifestations of clinical depression. Symptoms of dysphoric mood and affect are represented, as are signs of withdrawal of life interest, lack of motivation, and loss of vital energy. In addition, feelings of hopelessness, thoughts of suicide, and other cognitive and somatic correlates of depression are included (Derogatis, 1983, p. 8).

**Mean Summed Distress Scores**

**Depression SCL-90-R**

Figure 3 shows the mean summed distress scores for the three subjects compiled and serially positioned for each session and phase of treatment. Withdrawal of treatment occurred after weeks 3, 16, 19, and 28. Progressive muscle relaxation induced hypnosis was utilized in weeks 32, 33, 34, and 35.

Figure 3a reports the average magnitude of depression by phase of treatment. The bar graph shows the mean level of depression computed in the same manner as Figure 2a. Changes in level refer to the difference or
SYMPTOMS OF DEPRESSION

MEAN SUMMED DISTRESS SCORES

SESSIONS

Treatment Phase
Treatment Withdrawal
PMR Hypnosis

Subject C began treatment in Phase 2

Figure 3
discontinuity in depression scores by phase of treatment (Ottenbacher, 1986). Table 3a - SCL-90-R, average magnitude by phase lists the mean level scores of depression across phases by subjects.

Figure 3b: Depression - SCL-90-R Celeration: Trend and Slope shows the direction (trend) and rate of change (slope) of depression in each phase of treatment for each subject.

Table 3b. Depression SCL-90-R. Celeration: Trend and slope lists the direction (trend + or -), and rate of change (slope) of depression scores by subject and phase of treatment.

Results

Depression - SCL-90-R

When comparing Phase 1 with Phase 4 (Table 3c) the average magnitude of depression is reduced in 100% of the subjects with reduction ranging from 12.7% to 50% and a mean reduction for the group of 32.6%. Figure 3b indicates a decelerating trend for Subjects S and C in Phase 4.

Figure 3 exhibits an increase in depression for Subjects S and F when treatment is withdrawn in Phase 1. Subject C reports a dramatic increase in depression with withdrawal in Phase 3.
Table 3b. SCL-90-R
Depression Symptom Index
Celeration Trend and Slope.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
<th>Phase 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>+.75</td>
<td>-2.0</td>
<td>+.82</td>
<td>-1.09</td>
</tr>
<tr>
<td>F</td>
<td>+.70</td>
<td>-1.19</td>
<td>-1.23</td>
<td>+.99</td>
</tr>
<tr>
<td>C</td>
<td>+.56</td>
<td>+.23</td>
<td></td>
<td>-4.62</td>
</tr>
</tbody>
</table>

Figure 3b. SCL-90-R
Depression Symptom Index
Celeration: Trend and Slope.
Table 3c. SCL-90-R
Depression Symptom Index
Percentage Change: Average Magnitude
by Phase.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Phase 2</th>
<th>Phase 3</th>
<th>Phase 4</th>
<th>% Change</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>-50.0%</td>
<td>-20.5%</td>
<td>+25.9%</td>
<td>-50.0%</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>-9.6%</td>
<td>-52.2%</td>
<td>+33.0%</td>
<td>-35.2%</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>+12.7%</td>
<td>-22.6%</td>
<td>-</td>
<td>-12.7%</td>
<td></td>
</tr>
<tr>
<td>Mean Group chang</td>
<td>-29.8%</td>
<td>-20.0%</td>
<td>+12.1%</td>
<td>-32.6%</td>
<td></td>
</tr>
</tbody>
</table>
Anxiety - SCL-90-R

The anxiety dimension of the SCL-90-R is composed of a set of symptoms and signs that are associated with high levels of manifest anxiety. General signs such as nervousness, tension and trembling are included in the definition, as are panic attacks and feelings of terror. Cognitive components involving feelings of apprehension and dread and some of the somatic correlates of anxiety are also included (Derogatis, 1983, p. 18).

Mean Summed Distress Scores - Anxiety

Figure 4 Symptoms of Anxiety SCL-90-R shows the mean summed distress scores for the three subjects compiled and serially positioned for each session and phase of treatment. Withdrawal and progressive muscle relaxation induced hypnosis occurred as in Figure 3.

Figure 4a Symptoms of Anxiety, SCL-90-R reports the average magnitude of anxiety by phase of treatment. The bar graph shows the mean level of anxiety computed in the same manner as Figure 2a. Changes in level refer to differences or discontinuity in anxiety scores by phase of treatment (Ottenbacher, 1983).

Table 4a Anxiety - SCL-90-R reports average magnitude of anxiety by phase of treatment.

Celeration: Trend and Slope-Anxiety

Figure 4b: Anxiety SCL-90-R, Celeration: Trend and Slope shows the direction (trend) and rate of change
Figure 4

Symptoms of Anxiety

Treatment Phase
Treatment Withdrawal
PMR Hypnosis

*Subject C began treatment in Phase 2
(slope) of anxiety in each phase of treatment for each subject.

Table 4b Anxiety SCL-90-R, Celeration: Trend and Slope lists the direction (trend + or -) and rate of change (slope) of anxiety scores by subject and phase of treatment.

Anxiety-SCL-90-R Results

When comparing Phase 1 with Phase 4 (Table 4c) the average magnitude of anxiety is reduced in 2 of 3 subjects with reduction of 59% and 50%. There is an increase in Subject C of .02%. Mean reduction for the group is 36.3%. There is a decelerating trend for all subjects in Phase 4 of treatment.

Figure 4 reveals a dramatic increase in anxiety when treatment was withdrawn in Phase 1. There is an apparent increase in Subject F's anxiety when treatment is withdrawn in Phase 3.

Hostility = SCL-90-R

The hostility dimension of the SCL-90-R reflects thoughts, feelings or actions that are characteristics of the negative affect state of anger. The selection of items includes all three modes of manifestation and reflects qualities such as aggression, irritability, rage and resentment (Derogatis, 1983, p. 9).
Table 4b. SCL-90-R.
Anxiety Symptom Index
Celeration: Trend and Slope.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
<th>Phase 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>+.82</td>
<td>-1.71</td>
<td>-.9</td>
<td>-1.8</td>
</tr>
<tr>
<td>F</td>
<td>+.46</td>
<td>-1.17</td>
<td>-1.3</td>
<td>-1.26</td>
</tr>
<tr>
<td>C</td>
<td>+.14</td>
<td>+.6</td>
<td>-.2</td>
<td></td>
</tr>
</tbody>
</table>

Figure 4b. SCL-90-R
Anxiety Symptom Index
Celeration: Trend and Slope.
Table 4c. SCL-90-R
Anxiety Symptom Index
Percentage change: Average magnitude by phase.

<table>
<thead>
<tr>
<th></th>
<th>Phase 2</th>
<th>Phase 3</th>
<th>Phase 4</th>
<th>Total % Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 2 -</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subject</td>
<td>Phase 1</td>
<td>Phase 2</td>
<td>Phase 3</td>
<td>Phase 1</td>
</tr>
<tr>
<td>S</td>
<td>-58.6%</td>
<td>-34.0%</td>
<td>+50.0%</td>
<td>-59.0%</td>
</tr>
<tr>
<td>F</td>
<td>-21.5%</td>
<td>-51.4%</td>
<td>+30.1%</td>
<td>-50.4%</td>
</tr>
<tr>
<td>C</td>
<td>+ 1.2%</td>
<td>+ 1.2%</td>
<td>+ 1.2%</td>
<td>+ .02%</td>
</tr>
<tr>
<td>Mean Group Change</td>
<td>-40.05</td>
<td>-28.06</td>
<td>+27.1</td>
<td>-36.3%</td>
</tr>
</tbody>
</table>

---
Figure 5: Symptoms of Hostility - SCL-90-R shows the mean summed distress scores for the three subjects compiled and serially positioned for each session and phase of treatment. Withdrawal and progressive muscle relaxation induced hypnosis occurred as in Figure 3.

Figure 5a: Hostility SCL-90-R reports average magnitude of hostility by phase of treatment. The bar graph shows the mean level of hostility computed in the same manner as Figure 2a. Changes in level again refer to differences or discontinuity in hostility scores by phase of treatment (Ottenbacher, 1986). Table 5a Hostility - SCL-90-R reports average magnitude of hostility by phase of treatment.

Figure 5b: Hostility SCL-90-R, Celeration: Trend and Slope shows the direction (trend) and rate of change (slope) of symptoms of hostility for each subject by phase of treatment. Table 5b Hostility - SCL-90-R Celeration: Trend and Slope lists the direction (trend + or -) and rate of change (slope) of hostility scores by subject and phase of treatment.

Hostility - SCL-90-R Results

When comparing Phase 1 with Phase 4 (Table 5c) there is a reduction of hostility in 100% of subjects with reduction ranging from 54.4% to 29.5% and a mean reduction for the group of 39.9%. 
Subject C began treatment in Phase 2.

Figure 5
Table 5a. SCL-90-R
Hostility Symptom Index
Average magnitude by phase.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
<th>Phase 4</th>
<th>Phase 1/Phase 4 % reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>2.7</td>
<td>1.08</td>
<td>1.07</td>
<td>1.23</td>
<td>-54.4%</td>
</tr>
<tr>
<td>F</td>
<td>.61</td>
<td>.33</td>
<td>.39</td>
<td>.43</td>
<td>-29.5%</td>
</tr>
<tr>
<td>C</td>
<td>.78</td>
<td>.70</td>
<td>.50</td>
<td></td>
<td>-35.9%</td>
</tr>
</tbody>
</table>

Mean reduction for group -39.9%

Figure 5a. SCL-90-R
Hostility Symptom Index
Average magnitude by phase.
Table 5b. SCL-90-R Hostility Symptom Index
Celeration: Trend and slope (+ or -).

<table>
<thead>
<tr>
<th>Subject</th>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
<th>Phase 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>-1.08</td>
<td>-1.17</td>
<td>-1.15</td>
<td>-1.37</td>
</tr>
<tr>
<td>F</td>
<td>-2.50</td>
<td>+0.10</td>
<td>+0.81</td>
<td>+0.98</td>
</tr>
<tr>
<td>C</td>
<td>+0.11</td>
<td>+1.00</td>
<td></td>
<td>-2.03</td>
</tr>
</tbody>
</table>

Figure 5b. SCL-90-R Hostility Symptom Index
Celeration: Trend and Slope (+ or -)
Table 5c. SCL-90-R Hostility Symptom Index
Percent change: Average magnitude by phase.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Phase 2</th>
<th>Phase 3</th>
<th>Phase 4</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>2 - 1</td>
<td>3 - 2</td>
<td>4 - 3</td>
<td>4 - 1</td>
</tr>
<tr>
<td>F</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>C</td>
<td>-60.0%</td>
<td>-1.00%</td>
<td>+14.9%</td>
<td>-54.4%</td>
</tr>
<tr>
<td></td>
<td>-45.9%</td>
<td>+18.00%</td>
<td>+10.2%</td>
<td>-29.5%</td>
</tr>
<tr>
<td></td>
<td>-28.0%</td>
<td>-25.8%</td>
<td>-35.9%</td>
<td></td>
</tr>
</tbody>
</table>

Mean Group Change
-52.9%  +2.3%  -9.6%  -39.9%
Table 5b reports a decelerating trend for Subjects S and C in Phase 4.

Figure 5 reports a dramatic increase in hostility for Subjects S and F when treatment is withdrawn in Phase 1. Reaction to withdrawal of treatment is less dramatic for all subjects in Phases 2, 3, and 4.

**Progressive Muscle Relaxation Induced Hypnosis**

Table B reports the percentage difference between all sessions in Phase 4 and those sessions utilizing progressive muscle relaxation induced hypnosis. There is a reduction in symptoms during Phase 4 hypnosis sessions for 14 of 15 conditions.

Subject S indicates a 4% reduction for pain and a 5% reduction for global severity index, a 4% reduction in depression, a 16% reduction in hostility and a 26% reduction in anxiety.

Subject F indicates a 49% reduction in pain, 14% reduction in anxiety, 7% reduction in global severity index and a 3% reduction in depression. Subject F also reports a 16% increase in hostility for hypnosis sessions.

Subject C reports a 32% reduction for pain, 23% reduction for global severity index, 56% reduction for depression, 57% reduction for anxiety and a 36% reduction in hostility.
Table B. Progressive muscle relaxation induced hypnosis.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Phase 4 Mean of Hypnosis Sessions</th>
<th>Phase 4 Total Mean Sessions</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain</td>
<td>66.75</td>
<td>69.2</td>
<td>- 4%</td>
</tr>
<tr>
<td>Global</td>
<td>1.28</td>
<td>1.35</td>
<td>- 5%</td>
</tr>
<tr>
<td>Depression</td>
<td>1.30</td>
<td>1.36</td>
<td>- 4%</td>
</tr>
<tr>
<td>Anxiety</td>
<td>.67</td>
<td>.90</td>
<td>-26%</td>
</tr>
<tr>
<td>Hostility</td>
<td>1.07</td>
<td>1.23</td>
<td>-16%</td>
</tr>
<tr>
<td>F</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain</td>
<td>33.5</td>
<td>65.4</td>
<td>-49%</td>
</tr>
<tr>
<td>Global</td>
<td>.68</td>
<td>.73</td>
<td>- 7%</td>
</tr>
<tr>
<td>Depression</td>
<td>1.57</td>
<td>1.62</td>
<td>- 3%</td>
</tr>
<tr>
<td>Anxiety</td>
<td>.93</td>
<td>1.08</td>
<td>-14%</td>
</tr>
<tr>
<td>Hostility</td>
<td>.50</td>
<td>.43</td>
<td>+16%</td>
</tr>
<tr>
<td>C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain</td>
<td>44.5</td>
<td>65.4</td>
<td>-32%</td>
</tr>
<tr>
<td>Global</td>
<td>.41</td>
<td>.53</td>
<td>-23%</td>
</tr>
<tr>
<td>Depression</td>
<td>.36</td>
<td>.82</td>
<td>-56%</td>
</tr>
<tr>
<td>Anxiety</td>
<td>.42</td>
<td>.84</td>
<td>-57%</td>
</tr>
<tr>
<td>Hostility</td>
<td>.32</td>
<td>.50</td>
<td>-36%</td>
</tr>
</tbody>
</table>
Summary

General Results

When comparing the average magnitude of Phase 1 with the average magnitude of Phase 4 for each symptom and subject, there appears to be reduction in all symptoms for all subjects.

Participation in treatment resulted in a reduction of reported pain and SCL-90-R indicies for each subject. Subject S reported a 17% reduction in pain, Subject F 14% and Subject C 31% when comparing mean pain levels by phase at beginning and close of treatment. The mean pain reduction for the group was 20.6%.

The global severity index was reduced for each subject. Subject S reduced global severity index scores 49.4%, Subject F reduced 45.9% and Subject C 13.1% when comparing mean scores for Phase 1 with Phase 4. The mean reduction for the group was 36.1%.

Depression was reduced for each subject. Subject S showed a 50% reduction, Subject F a 35.2% reduction and Subject C a 12.7% reduction in depression. The mean reduction for the group was 32.6%.

Anxiety was reduced for Subject S by 59% and for Subject F by 50%. Subject C resulted in a .02% increase
in anxiety. The average reduction of anxiety for the group was 36.3%.

Hostility was reduced for Subject S by 54.4%, Subject F by 29.5% and Subject C by 35.9%. The mean reduction for the group was 39.9%.

There is a group mean reduction in all five symptoms. Table C outlines these reductions by symptom.

Table C. Mean reduction of symptom for group comparing Phase 1 with Phase 4.

<table>
<thead>
<tr>
<th>Symptom Index</th>
<th>% Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Phase 4-1</td>
</tr>
<tr>
<td></td>
<td>Phase 1</td>
</tr>
<tr>
<td>Reported Pain</td>
<td>20.6%</td>
</tr>
<tr>
<td>Global Severity Index SCL-90-R</td>
<td>36.1%</td>
</tr>
<tr>
<td>Depression SCL-90-R</td>
<td>32.6%</td>
</tr>
<tr>
<td>Anxiety SCL-90-R</td>
<td>36.3%</td>
</tr>
<tr>
<td>Hostility SCL-90-R</td>
<td>39.9%</td>
</tr>
</tbody>
</table>

The therapeutic criterion desired is a reduction in the symptom indices. It would appear that this has occurred in all subjects and for all indices.

Progressive muscle relaxation induced hypnosis appears to
have further reduced symptoms in 14 of 15 possible situations.

There is a decelerating or negative slope evident in 13 of 15 possible conditions in Phase 4. This negative slope or decelerating trend may indicate the potential for further reduction of symptoms had treatment continued.
The results of this study clearly demonstrate that long term supportive group psychotherapy has the potential to reduce pain and symptoms of anxiety, depression and hostility in individuals experiencing chronic pain. The results also suggest that the addition of progressive muscle relaxation induced hypnosis may augment the positive effects of the supportive group psychotherapy process.

The study demonstrates the use of single subject (within group) methodology, to provide a means for assessing the effectiveness of a clinical intervention program composed of more than one treatment. The intervention program appears to have contributed to reduction of pain, and concomitant symptoms of depression, anxiety and hostility in the participants. These results are encouraging. There is good reason to suggest that chronic pain patients may benefit from participation in long term supportive group psychotherapy. Mersky (1984), advocates supportive psychotherapy for chronic pain patients, but reports concern about the lack of published formal evidence to suggest its usefulness. This study
begins to provide the needed evidence supporting the efficacy of long term supportive group psychotherapy for chronic pain patients.

Gamsa, Braha and Catchlove (1985) reported the use of structured group therapy sessions in treatment of chronic pain patients, but had no formal assessment of the effects of the therapy. The assessment approach used in this study provides a means of evaluating treatment. The results of this study would seem to support Pinsky's (1978) belief that grouping chronic pain patients eases the way towards psychotherapy. Each member is secure in feeling that his or her pain problems are taken seriously. The group make-up in this study fostered acceptance by the pain patient of the realness of psychological events and their contribution to pain.

When support group members also have chronic pain, there is less chance for withdrawal based on the patients' belief that others cannot understand their experience. This understanding fosters communication and networking of individuals who finally believe they have found others who understand their condition.

It would appear that the results of this study support the findings of Subramanian (1985) who used group therapy and relaxation training to treat 21 chronic pain patients.
Use of the SCL-90-R symptom indices in this study was supported by Kabat-Zinn, Lepworth and Burney (1985) in their study of meditation for self-regulation of chronic pain. Duckro, Margolis and Tait (1985) state that "The SCL-90-R appeared to offer the best combination of relevant data and efficient assessment of anxiety and depression in pain patients."

Limitations of the Study

Treatment groups were conducted by the author who has a personal history of chronic pain and successful adjustment to disability. Effects of modeling may confound the treatment results.

Generalization of the results is limited due to the use of single subject research design, voluntary participation of subject, use of self-report measures, lack of controls for age, degree of disability, or type of chronic pain. Test-retest, instrumentation, statistical regression and selection bias may influence the study's results.

History and maturation color any longitudinal study. Family crises including the suicide of one subject's spouse and serious illness of another subject's spouse, occurred during Phase Three of treatment and may account for some confounding of results.
Recommendations for Future Research

The results of the study must be regarded tentatively. These findings are not meant to be generalized to other populations. Generalization would be possible if there was systematic replication varying subjects, therapies, treatment settings, and instrumentation (Kazdin, 1982; Kratochwill, 1978).

The results of the current study show dramatic reductions in pain, and concomitant symptoms of depression, anxiety, and hostility. Future research should use alternate instrumentation to attempt to replicate these results. Use of a control group, waiting list or otherwise, would further validate the results of this study. The use of relaxation procedures earlier in the treatment may produce greater reduction of symptoms. Examination of somatization indices of SCL-90-R would contribute to a greater understanding of treatment effects. Future studies should attempt to integrate one or more of the suggestions to strengthen the validity of these findings.
APPENDIX A

INSTRUMENTS
PLEASE NOTE:

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These consist of pages:

87-89, The SCL-90-R
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