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PAIN MANAGEMENT IN SEVERELY BURNED ADULTS:
A TEST OF STRESS INOCULATION

DISSERTATION

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By

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The present investigation sought to explore the efficacy of stress inoculation in the management of pain with severely burned adults. It was noted that the pain experience of burn patients was intense, of long duration, and frequently involved pain-inflicting treatment procedures. In addition, analgesics provided only partial and temporary relief from pain and posed the risk of addiction. Previous research suggested that a cognitive-behavior treatment program should be effective in the management of burn pain.

A manual with detailed instructions for monitoring and treatment was developed by the author and was used to train the nursing staff to implement the study. The nursing staff who carried out the assessment also served as therapists.

Subjects were 16 adult burn patients randomly assigned to either the stress-inoculation or no-treatment comparison group. During the 5-day pretreatment period, the 8 subjects in each group were administered the State-Trait Anxiety Inventory. In addition, daily monitoring was conducted with all subjects and included the following seven measures: unauthorized pain medication requests, physical and emotional self-ratings, subjects and staff tanking ratings, compliance

percent, and nurses' ratings. The same monitoring procedures were used during the 5-day posttreatment period and the 3-day follow-up period.

The three phases of stress-inoculation--education, skills acquisition, and application--were presented to the eight subjects in this group during five 30-40 minute sessions. Coping strategies taught included (a) physical coping skills (deep breathing, autogenic training, and modified muscle relaxation); (b) cognitive strategies (cognitive reappraisal and various forms of attention diversion); and (c) cognitive restructuring. Subjects in the no-treatment group were offered stress inoculation after completion of the post-treatment assessment period.

Overall comparisons between groups were conducted with the Hotelling-Lawley Trace, a multivariate analysis of variance procedure. Univariate comparisons were made on individual variables.

No significant differences were found between groups on any demographic variable (age, education, race, percent of burn, and percent of third-degree burn) or on pretreatment levels of dependent measures. Posttreatment assessment found that the overall comparison between groups approached significance ($p = .10$). Additionally, separate univariate comparisons revealed significant differences on six of the nine dependent measures.

The focus of the analysis was the amount of change or improvement from pretreatment to posttreatment periods.

The stress-inoculation group showed significant improvement on all nine dependent measures, while the no-treatment group improved significantly on only two (physical and emotional self-ratings). The overall comparison of the amount of change between groups revealed that the stress-inoculation group showed significantly greater improvement in pain management than the no-treatment group during this time. It was concluded that stress inoculation, as a flexible treatment package, was efficacious in the management of pain experience of burn patients.

TABLE OF CONTENTS

	Page
LIST OF TABLES	iv
Dissertation	
Introduction	1
Psychological Aspects of Burn Patients	
Cognitive-Behavior Approach to Pain Management	
Rationale and Hypothesis	
Method	20
Subjects	
Instruments	
Procedure	
Results	27
Discussion	32
Appendices	45
References	81

LIST OF TABLES

Table	Page
1. Comparison of Demographic Variables	28
2. Summary of Means and Standard Deviations of Dependent Measures	72
3. Comparison Between Groups on Pretreatment Means .	73
4. Comparison Between Groups on Posttreatment Means	74
5. Mean Change for Pretreatment to Posttreatment for Stress-Inoculation Group	75
6. Mean Change from Pretreatment to Posttreatment for No-Treatment Group	76
7. Comparison of Mean Change Between Groups from Pretreatment to Posttreatment	77
8. Mean Change from Posttreatment to Follow-up for Stress Inoculation Group	78

PAIN MANGEMENT IN SEVERELY BURNED ADULTS:

A TEST OF STRESS INOCULATION

Interest in the psychological aspects of burn patients first arose in response to the Coconut Grove Fire disaster in 1942 (Adler, 1943; Cobb & Lindemann, 1943). These reports, which were primarily based on interviews and observations, represented the first attempts to focus on the psychological reactions of burn victims and marked the beginning of a relatively sparse literature.

Adler (1943) studied 46 Coconut Grove victims for a period of 11 months. Observations and examination were initially conducted during the first 3 weeks of hospitalization and revealed that 26 patients presented psychiatric complications. Nine months after the disaster, all but 14 patients were free of these problems. Cobb and Lindemann, (1943) studied 17 victims and had access to information concerning several others. They attempted to investigate the problems involved in the emotional adjustment of these patients and reported that approximately 50% presented psychiatric problems including organic brain syndrome, psychotic reactions, delirium, anxiety, fear, depression, grief, and bereavement. The findings of these two studies suggested that burn patients were high risks for psychological problems secondary to their injury; however, the long-term prospects

for recovery from the psychological effects of burn trauma appeared to be favorable. Data were absent from these reports concerning demographic and epidemiological factors as well as information regarding the extent and severity of burn injury. Nonetheless, these authors identified some psychological problems commonly encountered by burn patients and were the first to point out that these problems warranted attention.

Hundreds of thousands of people have suffered thermal burns each year in the United States. In spite of the high incidence and prevalence of burn injury, little attention has been given to the psychological aspects of the burn patient (Andreasen & Norris, 1972; Andreasen, Norris, & Hartford, 1971). Reports in the literature have continued to be anecdotal in nature and investigators have relied primarily on data gathered from interviews and observations of patients.

Psychological Aspects of Burn Patients

The burn experience has been described as both physically and emotionally devastating (Davidson & Noyes, 1973). Severe burns have been characterized as a catastrophic illness (Andreason et al., 1971), a physical and mental disaster (Miller, Gardner, & Mlott, 1976), and one of the most severe traumas that human beings can survive (Andreasen, Noyes, Hartford, Brodland, & Proctor, 1972b). This type of injury has been unique in exposing patients first to severe pain,

delirium, and the threat of death--then later to prolonged convalescence and disfigurement. Thus, the adaptive capacities of the individual have been put to a severe test (Noyes, Andreasen, & Hartford, 1971).

Kjaer (1969) has observed, "Psychiatric factors of importance are present in every patient who has suffered a severe burn" (p. 541). Although this would seem to be an extreme generalization, most investigators have found the incidence of psychological difficulties associated with burn trauma to be high. Military personnel and their dependents who had been burned were studied, and the data indicated that at least 58% developed psychological problems secondary to their burn injury--and 60% of those who made good adjustments had brief periods of severe disturbance (Hamburg, Artz, Reiss, Amspacher, & Chambers, 1953a; Hamburg, Hamburg, & deGoza, 1953b). Lewis, Gooishan, Wolf, Lynch, and Blocker (1963) categorized patients based on their behavior and found that only 30% were classified as well-adjusted.

Noyes et al. (1971) observed 11 patients with burns covering an average of 47% of the total body surface. Nearly all patients had some psychological difficulties as a result of their injury. Systematic observation was made of 32 patients with burns covering an average of 29% of the body (Andreasen, Noyes, & Hartford, 1972a). Patients who made a poor adjustment during hospitalization were noted as those who developed psychiatric complications--50% of these patients

adjusted poorly. In addition, three factors were found to be associated with poor adjustment: the presence of (a) premorbid psychopathology, (b) prior physical problems, and (c) burns covering more than 30% of the body.

Although several investigators have focused on the psychological adjustment of burn patients during hospitalization, studies of long-term adjustment have been less common. Early reports (e.g., Adler, 1943) suggested that the long-range prognosis was favorable. Recent studies have generally supported this view. Of 20 patients evaluated from 1 to 5 years postburn ($\bar{X} = 2.3$ years), only 30% were observed to have psychological problems (Andreasen & Norris, 1972; Andreasen et al., 1971). It was noted that these patients were considered to be free of prior psychopathology, and that females were more prone to have difficulty than were males. Change and Herzog (1976) studied 51 patients with an average of 31% burns. The mean duration of follow-up was 25.6 months. They found that 79% of the patients were able to return to work or school, although many required a change in job or class group. Twenty-five patients without premorbid psychopathology were administered the verbal portion of the Wechsler Adult Intelligence Scale (WAIS) and the Minnesota Multiphasic Personality Inventory (MMPI) at discharge and 1 year follow-up (Miller et al., 1976; Mlott, Lira, & Miller, 1977). The results showed general improvement on both measures.

Delirium has been a major problem in burn patients, particularly during the first week or two postinjury (Kjaer, 1969; Noyes et al., 1971; Weisz, 1967). In various studies, delirium has been observed in 20%-72% of burn patients (Andreasen, 1974; Andreasen et al., 1972a, 1972b; Miller et al., 1976; Noyes et al., 1971; Steiner & Clark, 1977). The evidence suggested that the incidence of delirium was positively related to the severity of burn.

A variety of fears has been found to exist in nearly all burn patients. Initially, fears have been centered around the threat of death. Afterward, when survival seemed more likely, fears of deformity, handicap, disfigurement, and rejection were more common. Although they were frequently based on misunderstanding or lack of information, fears were overwhelming at times (Andreasen, 1974; Andreasen & Norris, 1972; Andreasen et al., 1972b; Hamburg et al., 1953a, 1953b; Kjaer, 1969; Noyes et al., 1971; Weisz, 1967).

Anxiety reactions have been cited as a common occurrence in almost all burn patients at some time during hospitalization, as well as after discharge (Andreasen, 1974; Andreasen & Norris, 1972; Andreasen et al., 1971, Hamburg et al., 1953b; Noyes et al., 1971; Steiner & Clark, 1977). Symptoms such as insomnia, nightmares, and emotional lability usually diminished over time, but were known to persist for several years in some cases.

Transient episodes of depressive reactions have been noted in all patients with significant burns. Mild to

moderate depression of relatively short duration has been observed in a majority of burn patients, while severe depression, characterized by apathy, insomnia, lethargy and longer duration, has been noted in approximately 20% of burn patients (Andreasen, 1974; Andreasen & Norris, 1972; Andreasen et al., 1971, 1972a, 1972b; Change & Herzog, 1976; Hamburg et al., 1953b; Noyes et al., 1971).

To various degrees, all burn patients have been placed in a handicapped condition in which they have been unable to perform many ordinary tasks. In turn, several investigators have noted severe regression and marked dependence occurred frequently enough to be considered a major problem (Andreasen, 1974; Andreasen & Norris, 1972; Andreasen et al., 1972a, 1972b; Davidson & Noyes, 1973; Hamburg et al., 1953b; Weisz, 1967).

Other problems which have been observed less frequently in burn patients included psychosis, burn encephalopathy, sexual dysfunction, anger and hostility, and problems related to noncompliance with treatment (Aita, 1966; Andreasen et al., 1971, 1972a; Davidson & Noyes, 1973; Hamburg et al., 1953a, 1953b; Kjaer, 1969; Lewis et al., 1963; Quindelen & Abram, 1969; Weisz, 1967). The latter problem has been particularly associated with the existence of premorbid psychopathology (Andreasen et al., 1972a).

Hamburg et al. (1953a) were the first investigators to emphasize the importance of psychological problems in the

clinical management of burn patients. They stressed that the treatment of these problems should be an integral part of the patient's therapy. It has since been observed that psychological difficulties impeded the recovery process and have been associated with a poor prognosis (Andreasen, 1974; Lewis et al., 1963; Morris & McFad, 1978).

In response to this issue, a variety of treatment strategies has been suggested for the psychological problems of burn patients. A fairly standard set of procedures has been described for the management of delirium. These included orienting the patient during each contact, ensuring at least 6 hours of uninterrupted sleep, and treatment with appropriate medications (Andreasen, 1974; Andreasen et al., 1972b; Jorgensen & Brophy, 1975; Kjaer, 1969; Lipowski, 1967; Miller et al., 1976; Noyes et al., 1971; Weisz, 1967).

The importance of a close professional relationship between patient and physician has been noted as a means of providing comfort and support. The establishing of relationships between patients and the reestablishing of relations with family and friends has also been stressed (Andreasen et al., 1972b; Cobb & Lindemann, 1943; Hamburg et al., 1953a, 1953b; Kjaer, 1969; Lewis et al., 1963; Weisz, 1967).

Many patients have been subjected to anxiety and fears based on misunderstanding or ignorance. It has been suggested that much unnecessary suffering could be avoided by providing

accurate and reassuring information to the patient (Andreasen, 1974; Hamburg et al., 1953a; Kjaer, 1969; Noyes et al., 1971; Weisz, 1967). It has also been recommended that individual supportive psychotherapy or group therapy be available to those patients who need to ventilate their feelings (Andreasen, 1974; Andreasen & Norris, 1972; Andreasen et al., 1971, 1972b; Lewis et al., 1963; Mlott et al., 1977; Noyes et al., 1971). Other suggested treatment strategies have included limit setting, encouraging independent behavior, the use of psychotropic medication, requesting psychiatric consultation, and providing boredom-relieving diversions (Andreasen, 1974; Artz, 1965; Cobb & Lindemann, 1943; Hamburg et al., 1953a; Kjaer, 1969; Weisz, 1967).

In recent years, behavioral strategies and techniques have been used with burn patients (Jorgensen & Brophy, 1975; Simons, McFadd, Frank, Green, Malin, & Morris, 1978; Zide & Pardoe, 1976). The primary purpose of behavioral interventions has been to manage maladaptive behavior; however, they have often resulted in increased patient participation in recovery and rehabilitation.

Traditionally, psychological intervention with burn patients has taken the form of individual consultation for specific patient problems. An innovative approach, the multidisciplinary mental health team, has recently been described (Miller et al., 1976; Morris & McFadd, 1978). This approach appeared to be a more effective model for

meeting the psychological needs of the patients, as well as the staff of the burn unit.

The Pain Experience

Weisenberg (1977) noted that pain is a complex phenomenon for which no adequate definition exists. A distinction has been made between pain threshold, the point at which pain is first detected, and pain tolerance, the point at which continued stimulation can no longer be endured (Merskey, 1973; Rybstein-Blinchik & Zaretsky, 1979; Weisenberg, 1977). Threshold has been associated mainly with psychological variables, whereas tolerance has been associated with psychological factors. Murray (1975) was among the first to use the term "pain experience" as an alternative to "pain" because this included the individual's integration of all effects of noxious stimuli. The various components of the subjective pain experience included the physical sensations as well as the cognitive and affective aspects of pain.

Pain has been a daily companion of the burn patient (Andreasen et al., 1972a). Fagerhaugh (1974) noted that the outstanding features of burn pain are its intensity and long duration. Primary pain resulting from the burn itself is not usually relieved until the skin heals or the wounds are completely covered by grafts. Although pain tended to be most severe during the early weeks of hospitalization, intense pain and physical discomfort were present throughout all phases of recovery. Indeed, the results of the pilot study indicated

that the time of hospitalization was identified as the most stressful period by burn patients (Simons, Green, Malin, Suskind, & Frank, 1978).

The most painful experiences of the burn patient often occurred as a result of therapeutic procedures. Suffering was observed to be greatest during "tankings," in which the patient was immersed on a stretcher into a large tub. The old dressings were removed and the patient was scrubbed to remove encrusted medication. Debridement, which was usually necessary during the early weeks of hospitalization, involved the vigorous cutting away of dead tissue in burned areas. The process, which may have lasted for more than an hour and involved several people working on different parts of the body simultaneously, ended when fresh medication and new dressings were applied. Other dressing changes and physical therapy, which occurred daily, also involved the infliction of intense pain (Fagerhaugh, 1974). Some patients who required skin grafts reported severe pain in donor sites (Andreasen et al., 1972b). At these times, analgesics brought only partial and temporary relief (Noyes et al., 1971).

Hamburg et al. (1953a, 1953b) were among the first to observe that while the injuries were quite comparable, the pain experience appeared to be different for each burn patient. They noted that, in general, the physical pain was considerably less severe and the psychological aspects of the pain experience were much more serious than was generally believed. In

addition, patients were frequently unable to distinguish between the two and tended to report all discomfort, regardless of origin, as pain. Subsequent reports have supported these observations (Artz & Moncrief, 1969; Fagerhaugh, 1974; Noyes et al., 1971; Weisz, 1967).

The interpretation or appraisal of pain has been identified as an important aspect of the pain experience of burn patients (Fagerhaugh, 1974; Kjaer, 1969; Noyes et al., 1971). Research in other areas has supported this notion (Beecher, 1959; Melzack, 1973, 1974; Melzack & Wall, 1965, 1975; Schachter, 1966; Schacter & Singer, 1962; Weisenberg, 1977). In a classic study, Beecher (1956) demonstrated that the setting could influence the pain reaction more than the actual tissue destruction. Of 215 men seriously wounded in battle, only 25% wanted medication for pain relief. In contrast, over 80% of a civilian group with similar surgical wounds wanted analgesic relief. The difference in reaction was attributed to the significance assigned to the wound--in battle, the wound meant a ticket to safety; in civilian life, the surgery meant disaster.

The reaction to pain has been shown to vary with many psychological and sociocultural factors. These variables, as well as the physiological mechanisms associated with pain, have been reviewed more thoroughly elsewhere (Joy & Barber, 1977; Liebeskind & Paul, 1977; Weisenberg, 1977; Wise, 1977). In brief, the available evidence has indicated that higher levels of anxiety, fear, fatigue, and neuroticism have been

associated with lower pain tolerance. Pain tolerance has been found to be higher for males, whites, and younger age groups (Bobey & Davidson, 1970; Joy & Barger, 1977; Merskey, 1973; Weisenberg, 1977; Weisenberg, Kreindler, Schachat, & Werboff, 1975; Woodrow, Friedman, Siegelau, & Collen, 1972). Due to the limitations of the research, lack of comparability between studies, contradictory results, and different types of pain stimulation used, it has been difficult to draw definite conclusions from much of the available information (Weisenberg, 1977).

Since pain has been viewed as a complex, subjective experience, its measurement has presented a difficult problem. Although pain threshold and tolerance have been found to be related, it has been observed that measures of pain tolerance had greater clinical utility (Frederiksen, Lynd, & Ross, 1978; Merskey, 1973; Rybstein-Blinchik & Zaretsky, 1979; Weisenberg, 1977; Woodrow et al., 1972).

A wide variety of painful stimuli has been used in experimental situations. These have included cold pressor tasks, mechanical pressure, radiant heat, and electrical stimulation (Bobey & Davidson, 1970; Dougher, 1979; Jaremko, 1978; Spanos, Radtke-Bodorik, Ferguson, & Jones, 1979; Sternback, 1974; Sternback, Murphy, Timmermans, Greenhoot, & Akesson, 1974; Stone, Demchik-Stone, & Horan, 1977; Woodrow et al., 1972). In turn, measurements have primarily taken the form of intensity or duration of painful stimulation, as well as the

observation of pain behaviors, dosage and frequency of analgesics, and self-report ratings of pain. Since anxiety has been associated with the experience of pain, measures of anxiety have also been used (Dougher, 1979; Jaremko, 1978; Merskey, 1973; Spanos et al., 1979; Sternback, 1974; Sternback et al., 1974; Stone et al., 1977; Weisenberg, 1977; Weisenberg et al., 1975). It has been noted that the issue of whether experimental pain could be equated with clinical pain has not been resolved (Weisenberg, 1977; Woodrow et al., 1972).

The question of how to best measure the pain experience has not yet been answered. Several suggestions for improving strategies for measuring pain have been made, including (a) the use of the multimodal approach to pain assessment, employing multiple objective and subjective measures; (b) the development of more objective measures; (c) the standardization of measurement procedures; and (d) the selection of pain parameters relevant to targeted dimensions (Frederiksen et al., 1979; Rybstein-Blinchik & Zaretsky, 1979; Weisenberg, 1977). This has been particularly relevant with burn patients--the literature revealed that the measurement of their pain has involved only analgesic usage, subjective estimates and unsystematic observations.

Suggestions on how to best manage the pain experience of burn patients have been limited in range. Traditionally, the focus has been on the physical sensations, and the most frequently recommended strategy has been the administration

of adequate amounts of analgesics (Andreasen, 1974; Hamburg et al., 1953a; Miller et al., 1976; Noyes et al., 1971).

It has been suggested that caution be exercised in administering analgesics to burn patients due to the long duration of the pain experience and the relatively high risk of dependence and addiction (Artz, 1965; Fagerhaugh, 1974; Weisz, 1967).

Additionally, patients could not be "knocked out," for they have been required to participate and cooperate with treatment procedures. Andreasen (1974) has observed that the effectiveness of analgesics tended to be enhanced by the use of tranquilizers and psychological techniques.

Cognitive-Behavior Approach to Pain Management

The literature reviewed has indicated that analgesics alone provided only partial and temporary relief of the pain experience for burn patients. Andreasen (1974) suggested that psychological techniques offered additional relief. While there have been no reported attempts to systematically study the efficacy of any specific psychological interventions with burn patients, a growing body of research has sought to manage pain, and the stress of the pain experience, in more adaptive ways.

The Schachterian model of emotion (Schachter, 1966) has been offered as a way to conceptualize emotional experiences (Meichenbaum, 1977; Meichenbaum & Turk, 1976). This model involved two major elements: a state of physiological arousal, and cognitions appropriate to this state of arousal. In their early work, Schachter and Singer (1962) observed that all

emotional states were characterized by the same general pattern of arousal. They demonstrated that the cognitions determined how the state of arousal was labeled or interpreted.

Recent psychological and physiological evidence has shown that the pain experience is not simply a function of the amount of bodily damage, but is influenced by attention, anxiety, suggestion, prior conditioning, and other cognitive variables. The gate-control theory has been offered as a model in which cognitive and affective factors were viewed as important mediators of the pain experience (Melzack, 1973, 1974; Melzack & Wall, 1965, 1975). It was suggested that the pain experience consists of the interaction of sensory-discriminative motivational-affective, and cognitive-evaluative components. In many ways, the gate-control theory of pain was compatible with the Schachterian model of emotion.

While these theories have received much support, they have also been subjected to theoretical and empirical criticism. However, it has been noted that the scientific validity of the conceptualization was less essential than its face validity of the criticism did not detract from the usefulness of the theories as a way of conceptualizing stress reactions (Meichenbaum & Turk, 1976).

In recent years, there has been a growing interest in the application of cognitive and behavioral procedures in the modification of a variety of stress-related problems (Gentry

& Bernal, 1977; Jaremko, 1970; Meichenbaum, 1977; Meichenbaum & Turk, 1976; Turk, 1978a, 1978b; Weisenberg, 1977). Various strategies have been found to be effective, including relaxation training (Bobey & Davidson, 1970), reversal of affect, emotive imagery, refocusing of attention, and other forms of distraction (Jaremko, 1978; Spanos, Horton, & Chaves, 1975; Stone et al., 1977; Turk, 1978b), cognitive reappraisal (Meichenbaum & Turk, 1976), and cognitive restructuring (Goldfried, Linehan, & Smith, 1978). Recent evidence has suggested that using multiple strategies was more effective than the use of any one procedure (Jaremko, 1979; Scott & Barber, 1977; Spanos et al., 1979; Turk, 1978a).

Among the various packages of cognitive-behavioral techniques, "stress inoculation" has received the most research attention. Stress inoculation was conceived as a flexible, coping-skills approach for the management of stress-related problems (Meichenbaum, 1975). The stress inoculation package has been found to be effective in the management of anger (Novaco, 1976, 1977), experimentally induced pain (Horan, Hackett, Buchanan, Stone, & Demchik-Stone, 1977) test anxiety (Hussian & Lawrence, 1978), and interpersonal anxiety (Meichenbaum & Turk, 1976).

Meichenbaum (1977) has described stress inoculation as consisting of three phases: education, rehearsal, and application. The aim of the first phase, education, was to provide the subject with a conceptual framework for understanding the

nature of stressful reactions. Both the Schachterian model of emotion and the gate-control theory have been used for this purpose (e.g., Horan et al., 1977; Meichenbaum & Turk, 1976). In an attempt to add more uniformity to the research on stress inoculation, Jaremko (1979) modified the Schachterian model so that stress was viewed as a cycle consisting of physiological arousal, appraisal, and self-statements. Additionally, rather than viewing the stress reaction as one automatic response, Meichenbaum and Turk (1976) have suggested viewing it as a series of four phases: preparing for a stressor, confronting the stressor, coping with the feeling of being overwhelmed, and self-reinforcement.

The second phase, rehearsal or skills training, has been identified as the most important component of stress inoculation (Jaremko, 1979; Novaco, 1976). Subjects were taught to use a variety of behavioral and cognitive coping skills. Most studies have employed strategies categorized as physical coping skills, cognitive strategies, and cognitive restructuring.

Physical coping skills were designed to help subjects achieve a more relaxed state. Suggested strategies included muscle relaxation, controlled deep breathing, and mental relaxation (Jaremko, 1979; Turk, 1973a).

Cognitive coping strategies referred to specified ways of perceiving or dealing with a stressor. Some of the suggested techniques included various modes of attention-diversion (distraction) such as imaginative inattention,

imaginative transformation of pain or context, focusing attention on aspects of the environment, focusing on the pain in a dissociative manner, and mental distraction (Turk, 1978a, 1978b). Various studies have found that some strategies tended to be more effective than others (e.g., Jaremko, 1978; Spanos et al., 1975). It has also been shown that using multiple strategies was more effective than using just one (Scott & Barber, 1977; Spanos et al., 1979). It was noted that distraction strategies have primarily been used with painful stressors (Jaremko, 1979).

The goal of cognitive-restructuring was to modify the subject's internal dialogue about the stressful situation (Meichenbaum & Turk, 1976). The procedure involved collaborating with the subject in identifying specific negative self-statements, then generating positive coping statements in place of the negative ones.

During the third phase, application, subjects were required to practice each coping skill in order to become more proficient in their use, and to discover how well they each worked for them. Practice has taken the form of real, imagined, or analogue stressors. In addition, subjects were instructed to use these strategies in succession or "cafeteria style" (Jaremko, 1979; Meichenbaum & Turk, 1976; Turk, 1978b).

The stress inoculation package was designed to provide a generalizable approach to the self-management of stress-related problems. It has been noted that the goal of stress

inoculation was to teach techniques to facilitate adaptive coping, not to eliminate or cure a problematic stressor. Stress inoculation has been shown to be effective in the management of laboratory-induced pain and the available evidence has suggested that stress inoculation, as a flexible treatment package, should be effective in the management of the pain experience of burn patients (Horan et al., 1977; Turk, 1978b).

Rationale and Hypotheses

The review of the literature on the psychological problems of the burn patient, and the cognitive-behavior approach to pain management suggested (a) burn patients frequently developed psychological problems which have adversely affected their prognosis; (b) the pain experience of burn patients was notable for its intensity, long duration, and frequency of pain-inflicting treatment procedures; (c) the use of analgesics only provided partial and temporary relief from pain and posed the risk of addiction; (d) the pain experience consisted of physical, cognitive, and affective components; and (e) cognitive-behavior treatment approaches have been shown to be effective in the management of the pain experience.

This study proposed to test the effectiveness of stress inoculation in the management of the clinical pain experience of burn patients. Subjects were assigned to either stress inoculation or no-treatment groups. The pain experience was measured in relation to (a) state and trait anxiety,

(b) requests for pain medication, (c) staff observations, (d) staff ratings, and (e) subject self-report ratings.

The following hypotheses were explored:

1. The two groups would not differ significantly in regard to demographic variables (sex, age, race, education, percent of burn, and percent of third-degree burn).

2. There would be no significant differences between groups in their ability to manage pain prior to the treatment period.

3. The stress inoculation group would show a significantly greater ability to manage pain than the no-treatment group at posttreatment assessment.

4. The stress inoculation group would show significantly greater improvement than the no-treatment group in pain management from pre- to posttreatment periods.

5. Improvement in pain management for stress inoculation subjects would maintain at follow-up.

Method

Subjects

Subjects were selected from the Burn Unit of the Medical University of South Carolina. This Unit was a nine-bed, isolated, critical-care facility. Three beds were in the intensive care section and the remaining six beds were housed in three semiprivate rooms. The staff of the Unit consisted of attending physicians, surgery residents, a head nurse, a clinical specialist, registered nurses, a psychologist,

technicians, ward clerks, physical and occupational therapists, and students from several disciplines. Almost all direct patient care was delivered by the nursing staff who, worked 12-hour shifts. Tankings were administered by technicians, nurses, and residents.

Not all patients were eligible for this study. Those with burns to less than 15% of the body, the intellectually impaired (e.g., psychotic, senile, retarded), children, and patients in intensive care were excluded. Patients became eligible when transferred out of intensive care and were dropped when transferred back into intensive care. Varied amounts of time elapsed between admission to the Unit and eligibility as a subject.

Of 37 patients admitted to the Burn Unit between January and August, 1979, 23 were eligible for the study. Three subjects developed complications and were dropped when they were transferred back to intensive care. Four subjects were not hospitalized long enough to complete the study. The remaining 16 subjects (15 male, 1 female; 11 white, 5 black) were randomly assigned to the stress inoculation or no-treatment groups so that eight subjects were in each group.

Instruments

State-Trait Anxiety Inventory. The State-Trait Anxiety Inventory was comprised of separate self-report scales for measuring two distinct anxiety concepts: state anxiety (A-State), and trait anxiety (A-Trait) (Spielberger, Gorsuch,

& Lushene, 1970). The Inventory was originally developed as a research instrument for investigating anxiety phenomena in normal adults. The A-State scale consisted of 20 statements that asked subjects how they felt while completing the items. The A-Trait scale consisted of 20 statements that asked subjects how they generally felt. The A-State scale has been found to be a sensitive measure of transitory anxiety, while the A-Trait scale provided a measure of anxiety proneness.

Assessments and Treatment Manual for the Use of Stress Inoculation with Burn Patients. A manual with detailed, standardized instructions for assessment and treatment strategies has been developed by the author for use in this study (Appendix A). There will follow a brief description of several measures that were obtained by the staff and recorded daily.

1. Pain medication requests. Each request and administration of analgesic medication was recorded. Unauthorized pain medication requests were defined as the number of requests made, minus the number of administrations of analgesics.

2. Self-ratings. All subjects were asked to rate how they felt physically, and how they felt emotionally, three times per 12-hour shift. Both ratings were obtained on a scale from 0 (worst) to 100 (best), with a rating of 50 representing a neutral point. Ratings were at least 1½ hours apart and were not obtained during any procedures.

3. Dressing change ratings. Two ratings were obtained immediately after the tanking or morning dressing change each day. Both employed the same 0 to 100 scale. One rating was the subject's assessment of the level of pain experienced during the tanking. The other rating was a staff member's (nurse and technician) assessment of how well the subject tolerated pain during the procedure.

4. Behavior checklist. Six behaviors which occurred on request by a staff member were monitored. A patient's participation and cooperation with each of these was essential to optimal recovery. Each time a request was made, the subject's response was recorded as compliance, refusal, or delaying. A compliance percentage, defined as the number of compliance responses divided by the total number of responses, was computed to reflect the subject's degree of cooperation with treatment procedures. The six behaviors involved were eating, drinking, wearing splints, physical therapy or exercise, dressing changes, and tankings.

5. Nurses' rating for shift. At the end of each shift, the nurse assigned to the subject made a global rating of how well the individual coped with stress (pain) during that time interval. This rating also employed the 0 to 100 scale.

Monitoring Data Sheet. All assessments were recorded by the Burn Unit staff on the Monitoring Data Sheet (see Appendix B). There was one sheet for each subject per day. The sheet was kept on the subject's clipboard at the nurses station.

Procedure

The staff of the Burn Unit were trained by the author in the assessment procedures with the aid of the manual. A 1-hour session involved a detailed review of ratings, observations, and the use of the Monitoring Data Sheet. The registered nurses were trained as therapists in two 1-hour sessions. The first consisted of a review of the rationale of the study, and instructions for the educational phase and physical coping strategies. The second consisted of procedures for the cognitive coping skills, cognitive restructuring, and the application phase. Additionally, the nurses practiced the treatment regimen with each other via role playing. Each nurse had a copy of a manual and extra copies were kept on the Unit.

Two patients served as pilot subjects to provide the staff with in vivo practice. The author observed the monitoring and treatment sessions, then provided feedback to the staff. An outside observer, familiar with the stress inoculation regimen but blind to the group assignment of subjects, made random observations of monitoring during the first 5 months of the study.

All subjects were asked to sign an Informed Consent Agreement (Appendix C) prior to participating in the study. Whenever possible, a relative or close friend was present and served as a witness when the nature of the study was explained to the subject. Members of the staff also served as witnesses.

All patients on the Unit were routinely evaluated and followed by a member of the Department of Psychiatry Consultation-Liaison Service upon admission. This was not altered for subjects in the study. In addition, physicians' orders for analgesic medication (e.g., 50 mg. of Demerol every 4 hours) were not changed for any subject. Thus, participation did not affect the availability of usual services to any subject.

This study consisted of three assessment periods--pretreatment (5 days), posttreatment (5 days), and follow-up (3 days)--and a 5-day treatment period. Daily monitoring was continuous from pretreatment through follow-up. Follow-up, which was scheduled to take place 4 weeks after the treatment period, consisted of the last 3 days of monitoring for subjects who were transferred or discharged earlier. The same daily monitoring procedures were employed during each assessment period. The State-Trait Anxiety Inventory was administered once during each period by the author.

Several problems were anticipated regarding data collection. There were times when monitoring was interrupted or delayed as a result of emergencies, staffing shortages, or extra demands placed on the staff. Occasionally, they just forgot. These events frequently resulted in missing data. It was observed that when this happened, it occurred for all subjects and was not limited to subjects in either group. Due to the nature of Unit schedules, nurses were rarely assigned to the same patients on consecutive days.

For 5 consecutive days, subjects in the stress-inoculation group received a 30-40-minute session. Treatment, which focused on the management of the pain experience, consisted of three phases: education, skills acquisition, and application (Appendix B). During the first session, subjects were presented with the rationale and goals for treatment, and the education phase was covered. A modified Schachterian model of emotion (Jaremko, 1979) was used to explain the stress cycle. The next session consisted of a review of the education phase and the beginning of the skills acquisition phase. Subjects were taught physical coping strategies at this time: deep breathing, mental relaxation (see Appendix D), and modified muscle relaxation. Cognitive strategies were taught during the third session, which included various forms of attention diversion, such as mental distraction, focusing on environmental aspects, and imaginative transformation of pain or context. Cognitive reappraisal was also taught during this session. The skills acquisition phase was completed and the application phase was begun during the fourth session. At this time, subjects were taught cognitive restructuring and how to combine the techniques. They rehearsed using stress inoculation while imagining themselves being tanked. The application phase was completed during the last session. The therapist served as a coach while the subject used stress inoculation during a tanking.

Subjects in the no-treatment group were not offered any of the stress inoculation treatment components received by

the other group. However, they were not denied the usual services provided to burn patients (e.g., psychiatric consultation, pain medication). In addition, no-treatment subjects were offered stress inoculation treatment after completing the posttreatment assessment period. For this reason, subjects originally in no-treatment were no longer an intact group at follow-up.

Results

Differences between groups with regard to demographic factors were tested with the Hotelling-Lawley Trace, a multivariate analysis of variance (MANOVA) procedure available in the SAS computer system (Barr, Goodnight, Sall, & Helwig, 1976). Since only two groups were involved, this statistic was equivalent to Hotelling's T^2 (Winer, 1971), and an overall significance level was computed for all variables.

A summary of the analysis of demographic variables is presented in Table 1. Means and standard deviations are given for each group, and for the total when the groups are combined. The F and p values represent the comparisons between the two groups on each variable. The results revealed that there was no significant difference between the groups in regard to overall demographic composition (Hotelling-Lawley Trace = 1.16; $F(5, 10) = 2.31$; $p = .12$). In addition, there were no significant differences found between groups on any of the variables when considered separately.

Table 1
Comparison of Demographic Variables

Demographic Variables	Group					
	Combined		Stress-inoculation		No-treatment	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
Age	31.44	11.23	35.25	11.18	27.63	11.27
Education (years)	10.56	2.96	11.13	2.53	10.00	3.34
Percent Burn	39.38	15.54	38.63	18.35	40.13	12.10
Percent Third-degree	15.56	9.54	14.38	10.82	16.75	8.07
Race	1.69	.45	1.50	.53	1.87	.35
					2.74	.12

Note. Hotelling-Lawley Trace = 1.16; $F(5,10) = 2.31$; $p = .12$. Race was computed into MANOVA and was coded as 1 = black, 2 = white.

The monitoring for all subjects in both groups consisted of nine separate measures. During each assessment period, the data for each subject were averaged for each variable; then a group mean was computed. Thus, each group had one mean score derived for every variable during each monitoring period. There was one exception, however: follow-up data for the no-treatment group were not computed as they were no longer intact. The means and standard deviations of dependent measures for both groups are presented in Table 2 (Appendix E).

Table 3 (see Appendix F) presents a summary of the baseline or pretreatment data for each group. Means and standard deviations are given for each variable, as are F and p values representing comparisons between groups. As predicted, there was no overall difference between groups in pain tolerance at the pretreatment period (Hotelling-Lawley Trace = 0.93; $F(9, 6) = 0.62$; $p = .75$). Furthermore, there was no significant differences found on any of the nine dependent measures. Thus, the baseline data clearly indicate that the random assignment to groups resulted in no significant differences between groups in the ability to manage pain prior to intervention.

Following the treatment period, differences between groups on dependent measures were again measured. The analyses of posttreatment measures are presented in Table 4 (see Appendix G). The results of 2-tailed univariate comparisons of each variable revealed significant differences on

six of the measures: unauthorized requests ($p = .02$), staff ratings during tankings ($p = .05$), compliance percent ($p = .001$), nurses' ratings ($p = .01$), state anxiety ($p = .03$), and trait anxiety ($p = .01$). In each case, the stress-inoculation group showed greater ability to manage pain than the no-treatment group. While the overall difference between the two groups was not significant (Hotelling-Lawley Trace = 4.44; $F = 2.96$; $p = .10$), significant differences were found on six of the nine variables when analyzed separately. This included perhaps the most important variable--unauthorized pain medication requests.

As mentioned earlier, the focus of the analyses was the amount of improvement on dependent measures. The amount of change from pretreatment to posttreatment was assessed separately for each group. These data, as well as the comparison of change between groups, are presented in Tables 5-7.

The analysis of the stress-inoculation group is presented in Table 5 (see Appendix H). Means, t scores, and p values are given for each variable. The results reveal that these subjects changed significantly on each of the nine measures, showing increased ability to manage pain from pretreatment to posttreatment periods.

The same analyses were also conducted for the no-treatment group as shown in Table 6 (see Appendix I). The results reveal that subjects who received no treatment showed

significant improvement on only two variables: physical and emotional self-ratings ($p = .05$ and $.02$, respectively). No significant change occurred on any of the other seven measures. It should be noted that the no-treatment group showed slight decreases in ability to manage pain during this time on three measures: unauthorized requests, staff ratings during tankings, and nurses' ratings.

The assessment of change from pretreatment to post-treatment within each group would be relatively meaningless without a comparison of the amount of change between groups. Table 7 (see Appendix J) presents a summary of the analysis of the difference in the amount of change between the stress-inoculation and no-treatment groups. The results reveal that the stress-inoculation group showed significantly greater improvement overall in the ability to manage or tolerate pain than the no-treatment group (Hotelling-Lawley Trace = 6.15; $F(9, 6) = 4.10$; $p = .05$). Separate univariate comparisons (two-tailed on each variable) revealed significantly greater improvement for the stress-inoculation group on five measures: unauthorized requests ($p = .01$), staff ratings during tankings ($p = .003$), compliance percent ($p = .001$), nurses' rating ($p = .01$), and state anxiety ($p = .01$).

Since the no-treatment group was no longer intact at follow-up, comparisons between groups could not be made beyond the posttreatment period. However, analyses of change from posttreatment to follow-up for the stress-inoculation

groups were conducted to determine whether treatment effects were maintained. These results, presented in Table 8 (see Appendix K), reveal that significant improvement continued to occur from posttreatment to follow-up on four variables: physical and emotional self-ratings ($p = .003$ and $.004$, respectively), and subject and staff ratings during tankings ($p = .003$ and $.02$, respectively). Scores on four other dependent measures, while only approaching significance, showed continued change in the direction indicating improved ability to manage pain: compliance percent ($p = .12$, nurses' ratings ($p = .11$), A-State ($p = .08$), and A-Trait ($p = .10$). The remaining variables, unauthorized requests, showed no significant change ($p = .36$). The change that occurred resulted from only one request by one subject. It should also be noted that the analyses of change from pretreatment to follow-up reveal that stress-inoculation subjects improved significantly on all nine variables.

Discussion

The experience of being severely burned includes many stressful aspects which test the adaptive capacities of the individual. Foremost among these is the pain experience. Previous research has shown that levels of pain tolerance are quite variable and are associated with several psychological factors. Hence, the primary focus of this study was the management of the pain experience via the modification of pain tolerance.

In general, the results of this investigation support the efficacy of stress inoculation for the management of clinical pain with burn patients. The data indicate that the stress inoculation group showed significantly greater increases in their ability to tolerate and control pain than the no-treatment group. When compared at posttreatment, significant differences were found on six of nine dependent measures (unauthorized requests, staff tanking rating, compliance percent, nurses' rating, A-State, and A-Trait), reflecting greater pain tolerance by stress-inoculation subjects. More importantly, comparisons of the amount of change from pretreatment to posttreatment revealed that the stress-inoculation group showed significantly greater overall improvement than the no-treatment group. In addition, significant differences were found on five of the nine dependent measures when analyzed separately (unauthorized requests, staff tanking rating, compliance percent, nurses' rating, and A-State). These treatment effects for the stress-inoculation group either were maintained, or showed continued improvement at follow-up.

While subjects were not asked to reduce their use of pain medications, it was anticipated that those who were better able to manage their pain would request them less frequently, especially at times when medication was not available to them. This measure, unauthorized requests, is considered one of the more important dependent variables

in this study. Although both groups were about equal in unauthorized requests at pretreatment, the stress-inoculation group showed significant decreases at posttreatment while, the no-treatment group nearly doubled during this time. Furthermore, decreases in unauthorized requests were found for all stress-inoculation subjects, but only two no-treatment subjects had reduced levels. This variable clearly differentiated the two groups and appears to be a valuable measure of general pain tolerance.

Subjects were asked to describe how they felt, both physically and emotionally, several times each day using a scale from 0 to 100. These self-report measures were designed to be general assessments of subjects' perception of the physical and affective components of their pain experience. Both groups showed significant improvement on each self-rating measure from baseline to posttreatment periods. Significant differences between groups were not found for either variable. It should be noted that all subjects, except one in the no-treatment group, improved on both of these measures. Since these ratings were obtained at times when all patients were likely to be most comfortable (i.e., not during painful procedures), it is possible that they reflect a variety of nonspecific factors in addition to aspects of the pain experience. Thus, these measures were not effective in discriminating between groups.

Tankings are considered the most painful event in the daily lives of burn patients. The primary focus of stress

inoculation was the management of pain during a tanking procedure, and thus, the tanking ratings (subject and staff) were particularly relevant measures of pain experience. The stress-inoculation group showed significant improvement on both ratings while the no-treatment group did not. Differences in the amount of improvement between groups were significant for the staff rating, but only approached significance for the subject rating. However, the stress-inoculation group showed twice the amount of improvement as the no-treatment group on the latter. These findings offer direct and relevant support for the efficacy of stress inoculation in the management of the clinical pain of burn patients.

The compliance percent was intended to measure the relative degree to which subjects cooperated with essential aspects of their treatment on the Burn Unit. Noncompliance in these areas can ultimately prolong hospitalization, limit recovery of functioning, and render subjects more susceptible to lethal infection. Since patients often identify pain and discomfort as reasons for noncompliance, it was anticipated those who were better able to manage their pain would be more compliant. Only the stress-inoculation group showed significant increases on this measure and the difference between the groups was highly significant. Furthermore, all eight stress-inoculation subjects improved while only four no-treatment subjects increased in compliance. This result seems to indicate that stress-inoculation subjects were, indeed, better able to manage their pain.

Nurses assigned to each subject were asked to give a general rating based on observations of adaptive and maladaptive behavior. While ratings from pretreatment to post-treatment increased significantly for the stress-inoculation group, there was a slight, but nonsignificant, decrease in this rating for the no-treatment group. The difference between the groups was also significant. All stress-inoculation subjects improved on this measure; only four of the no-treatment subjects improved. Again, evidence is provided for the efficacy of stress-inoculation.

Since previous research had consistently identified anxiety as a major component of the pain experience, the State-Trait Anxiety Inventory was administered once during each assessment period of measure levels of anxiety. Significant improvement was found only for the stress-inoculation group on both A-State and A-Trait. Differences in the amount of improvement between groups were significant for A-State, but not for A-Trait. While all stress-inoculation subjects had diminished scores on both measures, only five no-treatment subjects had lower levels of anxiety on each variable. A decrease in A-State was expected as a result of the subject's gaining more control over his or her pain; however, the decrease in A-Trait was not anticipated and the reasons for this finding are not readily apparent.

The specific focus of the stress inoculation intervention was the management of painful stressors, especially during tankings. While the pain experience is perhaps the

most prominent stressor for burn patients during their hospitalization, it is only one aspect of a situation that is, in general, extremely stressful. Several of the dependent measures attempted to assess the pain experience in more global ways and could also be considered as measures of treatment generalization. For example, unauthorized requests could be considered a measure of general pain management, while the State-Trait Anxiety Inventory could be considered a measure of general anxiety. In addition, the nurses' overall rating was a global assessment of adaptive behavior and the compliance percent reflected the general degree to which subjects actively participated with essential components of their treatment program on the Unit. These results can be interpreted as providing evidence for the generalization of treatment effects beyond specific pain situations.

Although the results of this study provide support for the major hypotheses, there were a few unexpected findings that warrant additional comment. Firstly, it was expected that some positive change would occur for all subjects on each variable from pretreatment to posttreatment. During this 2-week period, patients are able to notice visible signs of recovery. All subjects receiving stress inoculation showed significant improvement on all variables. On the other hand, the no-treatment group made at least some positive change on six measures, and showed nonsignificant negative change on three. Requests for analgesics when unauthorized

nearly doubled, while scores on staff tanking ratings and nurses' ratings decreased slightly. In addition, visual examination of the data for individuals revealed that there was no variable on which all subjects in this group improved. These findings suggest that improvement does not automatically occur for all patients as a function of time. On the contrary, the adaptive functioning of some patients is likely to diminish.

It was also expected that the comparison between groups at the posttreatment period (see Table 4, Appendix G) would reveal an overall significant difference, reflecting greater pain tolerance by the stress-inoculation group. This did not occur, even though significant differences were found on six of the nine individual measures. This may, in part, be due to the small number of subjects in this study.

Although the pain experience varies considerably, it was expected that subject self-ratings (physical and emotional) would be consistent with other measures and reflect differences between the groups in the ability to manage pain. However, each group showed significant improvement on both of these variables and differences between the groups were not significant. It is possible that nonspecific factors, such as an expectancy effect (i.e., subjects expected that their ratings should increase) were operating, especially since ratings were not obtained during painful or stressful procedures. It is also possible that these ratings are not particularly relevant to the pain experience.

In summary, the results of this study provide strong support for the major hypotheses explored. Previous investigations have found stress inoculation to be effective in the management of laboratory-induced pain and a variety of stress related problems. The outcome of this test of stress inoculation provides additional evidence for its efficacy in fostering self-control over clinical pain. In addition, the results suggest that treatment effects may generalize to other stressors.

Several questions can be raised regarding some of the procedures of this study. It has already been noted that no attempt was made to control the analgesic regimen of any subject. All subjects were prescribed medication for pain (usually Demerol, Percodan, or Stadol). Medication was usually available to patients once every 4 hours and dose levels for different analgesics were generally equivalent. While it was anticipated that stress inoculation subjects would be better able to manage their pain and would request analgesics less frequently, no subjects were asked to limit their medication use. It was observed that the general pain medication regimen for subjects in each group was equivalent.

An attempt was made to incorporate some of the suggestions that have been made for improving strategies of pain measurement (Frederiksen et al., 1978; Rybstein-Blinchik & Zarestsky, 1979; Weisenberg, 1977). In this regard, multiple

methods, including objective and subjective measures, were used to assess various aspects of the pain experience. Both the unauthorized requests and compliance percent measures involved the observation of behavior and can be considered as objective measures. The State-Trait Anxiety Inventory, although based on self-report, is a standardized instrument purported to be an objective measure of anxiety. The staff ratings, although based on observation, remain primarily subjective measures, as are the ratings by the subjects themselves. It was believed that the use of these multiple measures provided an adequate assessment of the pain experience.

The nursing staff of the Burn Unit played a dual role in this study--they had primary responsibility for data collection and also served as therapists. They were trained in procedures for both roles by the author, who remained available for consultation throughout the study. Neither the nursing staff nor the author were blind to subject group assignment. These factors were not controllable, and thus represent potential confounds to the study. Questions can be raised regarding the possibility of experimenter bias, suggestion effects, and interaction effects between therapists and subjects. It is not possible to determine the extent to which these factors may have influenced the outcome of this investigation.

There may also be some positive aspects to the dual role of the nurses. Interactions between patients and staff

frequently center around painful procedures (e.g., dressing changes) or control issues (e.g., "I need something for pain now!"). It was felt that the dual role had the potential to improve the quality of relationships between nurses and subjects by providing opportunities for interaction in a context that would be neither painful nor threatening. Positive effects, while not directly assessed, were observed to occur with several subjects. The potential for these benefits suggests that it may be worthwhile to incorporate this role for the staff into the routine of the Unit.

The use of the multiple strategies in the skills acquisition phase has been noted to be an extremely important and effective component of stress inoculation (Jaremko, 1979). There are several possible explanations for the effectiveness of multiple, rather than single, strategy presentation. Since all strategies are unlikely to be equally effective for everyone in all situations, this would allow subjects to discover which ones will work best for them. If some techniques are actually more helpful than others, presenting several increases the likelihood that the effective ones will be included. It is also possible that the effectiveness is due to an additive or interaction effect between methods, situations, and subjects. Since stress inoculation was designed to be pragmatic and flexible, the presentation of multiple strategies should be retained as an integral part of the treatment package unless subsequent research shows this to be unnecessary.

Stress-inoculation subjects were interviewed to obtain feedback on the use of the various components in the package. Although data were not tabulated, subjects tended to make similar reports. Most subjects found the physical coping skills to be most useful in preparing for painful procedures, and in trying to get comfortable before going to sleep. Cognitive strategies were reported to be most helpful in getting through painful procedures. Cognitive restructuring seemed to be used less frequently than other strategies and was employed by some subjects to deal with the anxiety associated with the anticipation of painful procedures.

One final procedures issue warrants comment--the use of the no-treatment group. In reality, this was not a no-treatment group since routine services (e.g., psychiatric consultation) were still available to this group. It was also possible for no-treatment subjects to learn some of the treatment strategies from stress-inoculation subjects. In addition, those subjects were offered stress inoculation after the posttreatment period, and therefore the no-treatment group was no longer intact at follow-up. The main purpose of the no-treatment group was to provide some baseline and comparative data regarding the course of burn patients over time without the additional intervention of an organized and structured treatment package.

As is often the case in clinical research, it was not possible to control all factors that might influence the study. The degree to which this sample represented the

general adult burn patient population is not known. Females (only on in this study) and older subjects were under-represented. Subjects were also screened for intellectual impairment and none were found to have significant premorbid psychopathology. Other subject variables (e.g., nature or type of burn injury) may have also rendered this a biased sample. It would be important to explore these factors in future investigations.

Several factors have been noted which raise questions about the reliability of the dependent measures in this study: (a) the measures were not independent of each other, (b) the raters were not blind as to subject group assignment, (c) different people conducted the monitoring each day, and (d) subjects may have expected that their ratings should increase. Future research might consider using raters who are blind to group assignment and who are not involved in other aspects of the study.

The positive results obtained in this study raise several questions which cannot be answered by the present research. Although the manual attempted to standardize the stress inoculation procedures, there were no controls for nonspecific treatment effects such as therapist bias, suggestion effects, and the extra attention received by the stress-inoculation subjects. This study was also limited in that no attempt was made to control or modify the pain medication regimen of any subject.

An additional limitation concerned the availability of follow-up data. The use of the follow-up data for the stress-inoculation group was limited to comparisons with pretreatment and posttreatment data. Statements could only be made regarding the maintenance of treatment effects. Since the no-treatment group was no longer intact, data regarding the course of burn patients, without intervention, could not be collected and comparisons between groups could not be made. Future studies, using longer follow-up periods with intact comparison groups, could investigate the effects of treatment on other factors such as the length and cost of hospitalization.

In conclusion, the results of this study provide support for previous research with stress inoculation. This investigation found that a standardized stress inoculation program, administered by the nursing staff, was effective in helping burn patients manage their pain.

Appendix A

Assessments and Treatment Manual for the Use of Stress Inoculation with Burn Patients

Introduction to Staff

The purpose of this manual is threefold:

1. To present a general description and rationale for this research project.
2. To provide information on assessment--what is to be monitored and how it is to be done.
3. To provide instructions for implementing the treatment program.

All burn patients have experienced a sudden and unanticipated trauma. We call this "stress." The term stress is used generically and includes such experiences as pain, anxiety, and fear. Stress inoculation, a cognitive-behavior approach, is a treatment package which has been shown to be effective in the management of a variety of problems related to stress. Most studies to date have used stress inoculation with fairly circumscribed problems or analogue situations (e.g., laboratory-induced pain). Thus far, stress inoculation has not been used with burn patients. The evidence suggests that it should be effective.

The primary goal of the project will be to increase the stress tolerance of severely burned patients via an organized and structured package of stress coping techniques.

The major target behaviors will be a reduced rate of maladaptive behaviors (as monitored by nursing staff) and increased ability for stress tolerance (by self-report). While we are using the term stress in a generic fashion, pain (and its management) will represent the main focus of attention. It is important to note that our goal is not to eliminate pain. This would be unrealistic. However, it is realistic to expect that burn patients can learn to manage their pain in more adaptive ways.

In order to test our hypothesis, we will work with two groups. One group will receive stress inoculation and the other group will receive no treatment. It is very important that the staff know which patient is in which group in order to keep treatment standardized. Patients should not be told about the research design. Monitoring will be the same for all patients.

Monitoring Procedures

Monitoring will be on-going throughout the baseline, treatment, posttreatment, and follow-up phases of the project. As mentioned before, monitoring will be the same for all subjects. A Monitoring Data Sheet will be provided daily for each subject and will be kept on his/her clipboard. Each sheet will have the patient's name and the date at the top. The data will be that of the day shift.

While monitoring will basically be the same for both shifts, differences will be explained below.

1. Pain Medication Requests. The monitoring of pain medication will involve keeping a tally of the number of times the subject requests pain medication as well as the number of times he/she receives medication for pain. The requests should be recorded by whichever staff member is asked for pain medication.

2. Self-ratings. All subjects will be asked to give two ratings of how they feel, three times per shift. The timing of the ratings is flexible, but it is important that all three ratings not be done within a short period of time. Ratings should be obtained at least 1½ hours apart. Naturally, this will be done at the nurse's convenience. Ratings should not be obtained during tankings, dressing changes, or physical therapy.

Both ratings will be on a scale of 0 (worst) to 100 (best), with a rating of 50 representing a neutral point. The time of the rating should also be reached. It is important to make sure that the subject understands the rating scale before giving a rating. It may be necessary to explain the scale to the subject the first few times that a rating is obtained.

2A. Physically--The question asked is, "How do you feel physically at this time?" Rate yourself on a scale from 0 to 100. A rating of zero (0) would indicate that

verbal and nonverbal behavior during the dressing change. Behaviors that indicate low tolerance and poor coping include such things as screaming, yelling, moaning, groaning, wincing, resistance to procedures, requests for rest periods or breaks, or fast and shallow breathing. The rating scale will be the same as that described in the previous section, from 0 to 100.

Subjects will be asked to rate their level of pain during the dressing change. This rating will be obtained immediately after the dressing change is completed. The question asked is, "How painful was this dressing change?" Again, the same rating scale will be used.

4. Behavior Checklist. Burn patients are expected to comply with several different requests in the course of their daily treatment. These include eating, drinking fluids, wearing splints, physical therapy and exercise, dressing changes, and tankings. The subject's response to each individual request can be categorized as: (a) Compliance--cooperating with the request at the time it is made; (b) Refusal--refusing to cooperate with the request; or (c) Delaying--refusing to cooperate with the request at the time it is made while indicating that he/she will soon comply. Each time a request is made of a subject, the response should be tallied in the appropriate column. If the initial response is a delay attempt, the outcome of the delay (either compliance or refusal) should also be recorded.

5. Rating for Shift. At the end of each shift, the nurse will be required to make a global rating of how well the subject was able to cope with his/her stress (pain) during that shift. Again, this will be done on a scale from 0 to 100 and will be based on observations of the subject's behavior during the shift. A rating of zero (0) would indicate that the nurse felt that the subject coped in such a maladaptive way that no appropriate behavior was observed and many signs of pain, discomfort, and anxiety were in evidence. In this case, the subject might have been observed engaging in the following types of behavior: moaning, groaning, crying, complaining about various aspects of his/her treatment, negativistic interactions with other patients and staff, withdrawal, refusing to comply with treatment requests, use of delaying tactics, setting unrealistic goals, and making unrealistic demands of the staff. A rating of 50 would reflect a balance between adaptive and maladaptive behaviors observed. A rating of 100 would indicate that the nurse felt that the subject coped in such an adaptive way that there were virtually no signs of pain, discomfort, or anxiety. In this case, subjects might have been observed engaging in the following types of behavior: initiating or participating in conversations with patients and staff, watching television, listening to the radio, reading, writing letters, exercising

asking questions about their treatment and progress, setting realistic goals, complying with requests, and sleeping at night.

Treatment Instructions for Stress-Inoculation

The treatment phase will last 5 days. All treatment sessions will last about 30-40 minutes. It is very important that the sessions be conducted in some degree of privacy and without interruption whenever possible. The best times for the session may be early or midafternoon.

The instructions for each day of treatment for this group are specified below. It is crucial that the procedure for each session be completed that day.

Session One. During this session, the subject will be presented with the rationale and the goals for treatment. A contract will be established with the subject in which he/she, once again, agrees to follow instructions. The first phase of the treatment program (educational phase) will also be presented during this session.

Rationale, Goals, and Contract. The subject should be told or read the followin: All burn patients experience pain. The severity of injury, or the perce-t of your body which is burned is only one of the factors involved in the experience of pain. Other factors include a person's ability to relax, past experiences of pain, what he/she says to him/herself about the experience and the person's

ability to tolerate painful sensations. In other words, two people with the same degree of burn will have a different perception of their pain.

You are receiving all of the pain medication that your system can tolerate. Additional medication would be dangerous. We know that it is a bad feeling to have little or no control over your pain and to have to depend on others to take care of you. Therefore, the purpose of this treatment is to teach you additional ways to cope with your stress in general, and particularly with your pain. The goal is for you to achieve a greater degree of control over your pain and to increase your ability to cope with stress.

To accomplish this, we will need to meet with you for about 30 minutes each day this week. Your nurse for the day will be working with you. During these meetings we will teach you some techniques, help you practice using them and teach you when to use them. The name of the treatment is Stress Inoculation and the reason for the name is important. You will be taught a variety of skills which can be used to cope with stress--any stress, but mainly pain. We believe this approach will be helpful. We do not expect to eliminate your pain, but we do expect to be able to decrease the severity of your pain. In order to accomplish this, we much have your full cooperation.

Educational Phase. The subject should be handed a copy of the diagram (Figure 1), which illustrates the stress cycle. This diagram should be available to the subject throughout each session. In presenting the stress cycle, the therapist will point out the three phases and then ask the subject for his/her own instances of each phase. The therapist should also be prepared to provide one or two additional examples for the subject.

Stress can be viewed as a 3-phase cycle. Look at this diagram. The stressor in this case is pain. The first phase is physical arousal and represents what you feel. The second phase is appraisal and represents the way you evaluate the physical sensations. The third phase is called self-statements and represents the specific things you think or say to yourself about the situation. This usually serves to keep the cycle going.

Let's go through this cycle again, but this time I want you to tell me what each of these phases is like for you. Think about how you feel when your pain is intense. Describe the sensations you have when in pain. What does your pain feel like? (The subject may need prompting to describe the pain. You may need to ask about the intensity, location, consistency, frequency, and/or qualities of the physical sensations.)

The second phase is where you would appraise the physical sensations you've just described. How do you evaluate

Figure 1: Modified Schachterian Model of Emotion

the sensations? If the subject is not aware of actually appraising the situation, the therapist should explain that this appraisal, or evaluation, often takes place automatically, that is, without awareness. The subject detects the pain and it hurts. Little or no time is spent trying to decide whether the experience is unpleasant.

The third phase involves what you think or say to yourself while in pain. What kind of statements do you think or say to yourself? (If subjects have difficulty responding, let them know that it is very common for burn patients to think or say things that they may not really mean. You understand this and would like them to tell you what they think. You may prompt subjects by asking if they think about the pain, how long they can stand it, or if they also think about other times they were in pain.)

After the subject has described his self-statements, you may ask, "What happens next?" The point is that the cycle keeps going. Once the subject sees this, ask how the cycle gets broken. The responses will generally be one indicating avoidance behavior (e.g., crying or asking for more pain medication). The treatment involves breaking the cycle by using any technique that works.

Before ending the session, the subject should be asked to explain the cycle to the therapist. The subject is then told that the remainder of the week will be spent learning

and practicing a variety of skills to manage the pain in better ways.

Session Two

During this session, the subject will review the stress cycle that was presented in the education phase on the previous day. In addition, the skills acquisition phase will begin with the teaching of physical coping skills. Once again, the subject will be asked to take an active part in the treatment session.

Review. The diagram used in the first session should be available for the subject. The subject is asked to explain the stress cycle and to give examples for each phase. Prompting is permitted if the subject has difficulty but do not explain the whole cycle for him/her. The subject is then asked how the cycle gets broken.

Skills Acquisition Phase. The subject is told that he/she will be taught a variety of coping techniques to use at each of the various phases of the coping process. This will include both direct action and cognitive coping strategies.

It is important to find out how subjects have attempted to cope with stress (pain) in the past. This should be elicited by asking direct questions such as: "What do you do to relax or make stress (pain) more bearable when you are tense, anxious, upset, or in pain?" "What kind of things do you say or think to yourself that make you feel

better?" It is very important to listen for any adaptive strategies that subjects have used. Some of these are likely to be similar to those you will be teaching. If this occurs, let the subject know that is one of the strategies to be taught.

Physical Coping Skills. Tell the subject that physical coping strategies are designed to be used at point A, in response to the physical arousal associated with stress or pain. The primary purpose of these skills is for the individual to be able to get relaxed. However, there are individual preferences involved. The subject is unlikely to find all of the techniques equally effective. It is only by learning the techniques and trying them out that the subject will know which skills are helpful for him/her. As you proceed through the list of coping skills, point out and label those that are similar to strategies the subject already uses.

1. Deep Breathing. The first technique only takes a minute or two to learn and can be taught while sitting or lying down. Ask the subject to close his/her eyes and get as comfortable as possible. Tell the subject to take a slow, deep breath through the mouth and then exhale it slowly. Tell him/her to concentrate on breathing. This should be repeated 6-8 times. It is important to tell the subject not to take more than 10 deep breaths to avoid hyperventilation.

2. Autogenic Training. Autogenic training is a form of "mental relaxation". The instructions are on a cassette and will take 10-15 minutes. It is preferred that the subject be lying down. If this is not feasible, he/she should be made as comfortable as possible in a chair. The subject should be told to close his/her eyes and to do exactly as the voice on the tape tells him/her to do.

3. Muscle Relaxation. Many people, when stressed, notice that certain muscles become tense. Since burn patients will not be able to use complete progressive relaxation, we will use a modified and abbreviated form of muscle tension/relaxation. The subject may find this technique useful in relaxing muscles that were still tense after practicing autogenic training.

Have the subject identify the muscles (or body area) where he/she is tense. The subject is then instructed to tighten that muscle so that tension is increased and exaggerated. The tension is held for 10 seconds before the subject is told to release the tension. He/she should then be instructed to focus his/her attention on the feeling of relaxation. This should be done three times for each identified area.

Homework. The subject should be told to practice each technique three times before the next session. The cassette should be left for the subject to practice the autogenic training. Instruct the subject to practice autogenic

training at least once without the tape. This homework is important and cannot be turned in late.

Session Three

The subject was asked to practice deep breathing, autogenic training and muscle relaxation for homework. It is important to find out how well the patient was able to do without a therapist present. While discussing the homework, the subject should comment on how often he/she practiced and whether he/she was able to get relaxed. If the subject was not able to get relaxed with any of these techniques, it will be necessary to review the procedures again, perhaps paying more attention to his/her own procedures.

Cognitive Strategies. Cognitive strategies are designed to be used at point B, in response to the appraisal of pain and the focusing of attention on the painful situation. Again, the subject is unlikely to find each technique equally effective. He/she will know which are most helpful by learning the various techniques and practicing them. As you proceed through the list of cognitive strategies, identify and label those that are similar to strategies the subject already uses.

1. Attention Diversion (Distraction). Most subjects already use distraction in one form or another. Therefore, the therapist should ask the subject how he/she distracts

him/herself. If the subject denies using distraction at the present time, inquire about how he/she has used it in the past. If necessary, provide an example.

The purpose of distraction is to divert attention from the painful experience. This can be accomplished either by thinking about other things (e.g., daydreaming, fantasizing) or by doing other things (activity). After the subject says how he/she already uses distraction, the subject and therapist can expand the list by discussing other ways to divert attention.

Focusing on environmental aspects. The subject can focus on the physical characteristics of the room. For example, he/she might count ceiling tiles, study a fixture or piece of furniture, or take inventory of visible objects.

Mental distractions. This involves focusing attention on various thoughts. For example, one can engage in mental arithmetic, make plans for an outing or trip, sing songs, or recite poems to oneself (or aloud if others don't mind).

Somatization. This involves focusing on bodily sensations in painful or non-painful areas. One may watch and analyze changes in the sensations, comparing them to sensations in other parts of the body.

Imaginative inattention. With this technique, the subject tries to ignore the pain by engaging in a mental image or goal-directed fantasy, which, if real, would be incompatible with the experience of pain. The subject

should have the details of this fantasy prepared in advance so that the images can be produced on cue. For example, the subject might fantasize about spending a pleasant day on the beach. In this case, the subject would prepare details such as who he/she is with, what the weather is like, the color of the blanket, and what the surroundings look like, such that he/she has "written a script". It is important that the subject select a fantasy that he/she finds pleasurable.

Imaginative transformation of pain. In this strategy, the subject includes the experience of pain in the fantasy, but transforms the sensations. For example, the subject can imagine that a limb is made of rubber or is numb, and thus, is unable to feel the hurt.

Imaginative transformation of context. This technique includes the experience of pain in the fantasy, but transforms the context or situation. For example, the subject might imagine that he/she is no longer a burn patient in the tank, but is a spy being tortured, a soldier who has been wounded while saving his/her buddies, an injured performer who must "go on", or a mother injured in an auto accident who must get help for her child.

Activity may present more of a problem for the subject. Ask them what they do on the unit when not occupied with treatment (keep real limitations in mind). A variety of activities are available, including: TV, reading, talking

with other patients and staff, playing games, writing letters, exercising, phone calls, occupational therapy, and visiting with friends or relatives. The subject should be encouraged to think about using distraction as an adaptive coping mechanism.

Cognitive Reappraisal. This technique involves teaching the subject to view the stress (pain) reaction as a series of four phases, rather than as one massive panic reaction. Instead of seeing him/herself as helpless and having no control, the subject learns to "get ready", to prepare for the pain, confront it and handle it. The subject is taught positive and realistic statements to use for each phase in order to "make it through the stressor." While the statements listed for each phase below are geared toward pain, similar kinds of statements can be used for other kinds of stressful situations.

Phase 1 - Preparing for the Painful Stressor

What is it you have to do?

You can develop a plan to deal with it.

Just think about what you have to do.

Just think about what you can do about it.

Don't worry; worrying won't help anything.

You have lots of different strategies you can use.

Phase 2 - Confronting and Handling the Pain

You can meet the challenge.

One step at a time; you can handle the situations.

Just relax; breathe deeply and use one of the strategies.
Don't think about the pain, just what you have to do.
The tenseness can be an ally, a cue to cope.
Relax. You're in control; take a slow deep breath, good.
The anxiety is a reminder to use your coping skills.

Phase 3 - Coping with Feelings at Critical Moments

When pain comes just pause; focus on what you have to do.
What is it you have to do?
Don't try to eliminate the pain totally; just keep it
manageable.
You were supposed to expect the pain to rise; just keep it
under control.
Remember, there are different strategies; they'll help you
stay in control.
When the pain mounts you can switch to a different strategy;
you're in control.

Phase 4 - Reinforcing self-statements for Having Coped

Good, you did it.
You handled it pretty well.
You knew you would do it!
Wait until you tell the therapist about which procedures
worked best.
It wasn't nearly as bad as it could have been and that's
because I was able to control the pain.
The pain didn't get the best of me this time.

God damn, I'm glad that's over, as though you're saying it to the world.

Homework. Ask the subject to continue practicing the physical coping skills. In addition, the subject should spend some time practicing the cognitive strategies taught today.

Session Four

This session will include a brief review of the homework, teaching cognitive restructuring, and combining the techniques. In addition, the application phase will be started and the subject will be prepared for putting what he/she has learned to use the next day.

Again, it is important to find out how well the subject was able to use the skills without the therapist present. Of particular concern is the subject's ability to reappraise the stressor as a series of four phases. The subject should be asked to explain this to the therapist.

Cognitive Restructuring. Cognitive restructuring is designed to be used at point C, in response to the negative self-statements generated by the subject. This technique involves the subject looking at the positive aspects of a threatening (painful) situation. In general, the subject will replace negative self-statements with positive coping statements.

The first step is for the subject to identify the specific negative self-statements he/she emits when in pain.

If the subject responds that he/she is always in pain, he/she should be asked to focus on the self-statements that he/she emits during a tanking. At least two or three specific negative self-statements should be elicited and written down. (e.g., "I can't bear this any longer." or "I think I'm going to die." or "I wish they would just kill me and get it over with!")

Next, the subject and the therapist together will generate positive coping statements for each of the negative self-statements. It is important that the positive statements that are generated be specific and realistic. (e.g., In response to the negative self-statement, "I think I'm going to die", a specific and realistic positive statement might be, "I know I won't die - it hurts, but I'll live." or "This isn't the first time I've had my dressing changed; I'll make it this time too.") These statements should also be written down.

After the positive statements have been generated, the subject is instructed to imagine feeling the pain while having his/her dressing changed. At the same time, he/she is instructed to imagine saying the negative self-statement, and then replacing it with the positive coping statement. (The subject can do this aloud at first if he/she wishes.) This should be repeated 10 to 20 times for each negative self-statement.

Combining the Techniques. The subject has now been taught a variety of techniques and skills with which to cope with stress in general and pain in particular. These can be used in a "cafeteria-style" format; that is, different techniques can be used in succession to "make it through" the stressful (painful) situation. He/she merely uses one strategy until it stops working and then switches to another. He/she continues to switch to another strategy as each one loses its effectiveness until the stressful event is over.

Application Phase. The subject is told that the rest of this session will be spent practicing SI. The subject is told to imagine that it is time for his/her morning dressing change. At this point, the subject should be preparing for this stressful event. The therapist can act as a "coach" during the rehearsal. As the subject imagines the beginning of the dressing change, he/she should start to use the coping strategies. As the rehearsal continues, the subject should use the coping skills in a "cafeteria-style" format, as described above.

At the end of this session, the subject is told that the next session will take place during his/her tanking the next morning. The subject is told to practice cognitive restructuring and to prepare a plan of action for coping with the pain during the morning dressing change.

Session Five

This session is to begin just prior to the time when the subject is to have his/her tanking in the morning. The subject is asked about his/her practicing and plan for the dressing change.

The therapist will serve as a "coach" during this tanking. As the tanking begins, the therapist should suggest that the subject try to relax. The therapist should also remind the subject to view the tanking as a series of four phases and to use the coping strategies in "cafeteria-style". If the subject appears to have difficulty coping with the pain at any point during the tanking, the therapist should suggest that the subject use another coping technique. At the end of the tanking, the therapist, as well as the subject, should reinforce the subject for having coped.

Appendix B
MONITORING DATA SHEET

NAME _____	DATE _____					
1. <u>Pain Medication (tally)</u> times requested times received	7am-7pm			7pm-7am		
2. <u>Self Ratings</u> (0 to 100) (over) A. Physically B. Emotionally	<u>Rating</u>	<u>Time</u>	<u>Rating</u>	<u>Time</u>		
3. <u>Dressing Change</u> (0 to 100) (over) A. Subject B. Staff	_____			_____		
	_____			_____		
4. <u>Behavior Checklist</u> A. eating B. drinking C. splints D. PT/exercise E. dressings F. tanking	<u>comply</u>	<u>delay</u>	<u>refuse</u>	<u>comply</u>	<u>delay</u>	
5. <u>Nurses' Rating for shift (over)</u> (0 to 100)	_____			_____		
	_____			_____		

MONITORING DATA SHEET

Using Scale from 0 to 100

0	10	20	30	40	50	60	70	80	90	100
---	----	----	----	----	----	----	----	----	----	-----

Worst

Neutral

Best

- 2A. Physically -- Includes pain and discomfort.
- 2B. Emotionally -- Includes mood, spirit, attitude, and levels of anxiety, depression, anger, fear, and guilt.
- 3A. Subject's rating -- Level of pain during dressing change.
- 3B. Staff rating -- Level of subject's pain tolerance should be rated according to behavior observed. These include verbal indices of pain and discomfort, use of delay tactics, physical signs of stress (e.g. change in breathing), initiation of conversation with staff and other overt signs of either adaptive (e.g. distraction) or maladaptive (e.g. muscle tension) coping behavior.
5. Nurse's rating for shift -- Adaptive behaviors include conversations, watching TV, reading, writing, playing games, exercising, asking questions about their condition, setting realistic goals, phone calls, complying with treatment, and sleeping during the night. Maladaptive behaviors include complaining, negative interactions with others, withdrawal, moaning, groaning, crying, delaying, refusing to comply with treatment, setting unrealistic goals, and making unrealistic demands.

Appendix C

INFORMED CONSENT AGREEMENT (H.R. #1,012)

I, _____, do hereby consent to participate in an experimental research project aimed at helping me to cope with stress. I understand that my participation will coincide with my stay as a patient on the Burn and Trauma Unit here at MUSC. I further understand that other patients on the Unit will also be participating in this research project and that not all patients will be receiving the same treatment.

I understand that the treatment procedures involved in this project will in no way alter the medical treatment I receive. I agree to follow the instructions of my nurse and understand that while the experimental procedures are designed to have therapeutic effects, no guarantee of this is made. Doctor Taylor and/or his associates have agreed to answer any inquiries that I may have concerning these procedures and has informed me that I may also contact the Medical University of S.C. Institutional Review Board for Human Research (803/792-4148) directly. This Board administers the agreement with the United States Department of Health, Education and Welfare covering protection of human subjects. I also understand that I am free to withdraw my consent and discontinue participation at any time. My decision to participate or not to participate or to withdraw my

participation will have no effect on the availability of services to me or treatment from the Medical University of S.C. now or in the future.

SIGNATURE OF PATIENT

WITNESS

PERSON OBTAINING CONSENT
(Principal Investigator)

DATE

WITNESS

Appendix D

AUTOGENIC TRAINING INSTRUCTIONS

Subjects were taught autogenic training as a form of mental relaxation. Instructions were presented via an audio cassette. Subjects were instructed to focus their attention on various parts of their body in sequence. They were told to notice feelings of warmth and heaviness, and to associate the word "calm" with these sensations.

Copies of the taped autogenic training instructions are on file in the library of the institutions listed below.

Department of Psychology
North Texas State University
Denton, TX 76203

Department of Psychiatry and Behavioral Sciences
Medical University of South Carolina
Charleston, South Carolina 29403

Appendix E

Table 2

Summary of Means and Standard Deviations of Dependent Measures

Variable	<u>Pretreatment</u>		<u>Posttreatment</u>		<u>Follow-up</u>	
	<u>Stress- inoculation</u>	<u>No-treatment</u>	<u>Stress- inoculation</u>	<u>No-treatment</u>	<u>Stress- inoculation</u>	<u>No-treatment</u>
	<u>M(SD)</u>	<u>M(SD)</u>	<u>M(SD)</u>	<u>M(SD)</u>	<u>M(SD)</u>	<u>M(SD)</u>
	N = 8		N = 8		N = 6	
Unauthorized Requests	.90(.94)	.88(1.17)	.00(.00)	1.68(1.83)	.05(.12)	
Self-rating						
Physical	51.05(14.71)	48.14(12.55)	67.67(12.40)	59.37(22.37)	74.83(14.84)	
Emotional	57.95(18.51)	48.96(15.18)	74.64(10.67)	61.08(21.19)	83.37(11.36)	
Tanking Rating						
Subject	39.60(14.19)	40.40(21.50)	70.70(10.93)	55.42(29.16)	87.50(7.59)	
Staff	53.41(22.71)	67.56(16.11)	82.09(8.15)	62.98(24.33)	90.44(5.25)	
Compliance (%)	79.84(9.68)	79.50(11.83)	98.18(2.90)	79.79(12.48)	100.00(.00)	
Nurses' Rating	70.53(17.01)	74.51(9.70)	87.59(7.62)	71.12(14.80)	89.55(8.87)	
A-State	44.13(8.03)	43.63(10.45)	31.13(6.56)	41.25(9.85)	26.67(6.94)	
A-Trait	40.38(6.55)	42.50(11.38)	30.25(6.71)	40.37(6.98)	28.83(6.27)	

Appendix F

Table 3

Comparison Between Groups on Pretreatment Means

Variable	Stress-inoculation	No-treatment	$\bar{F}(1, 14)$	$\bar{p}$
Unauthorized requests	.90	.88	.00	.96
Self-rating				
Physical	51.05	48.14	.18	.68
Emotional	57.95	48.96	1.29	.28
Tanking Rating				
Subject	39.60	40.40	.01	.93
Staff	53.41	67.56	2.07	.17
Compliance (%)	79.84	79.50	.00	.95
Nurses' Rating	70.53	74.51	.33	.57
A-State	44.13	43.63	.01	.92
A-Trait	40.38	42.50	.21	.05

Note. Hotelling-Lawley Trace = .93; $\bar{F}(9, 6) = .62$; $\bar{p} = .75$.

Appendix G

Table 4

Comparison Between Groups on Posttreatment Means

Variable	Stress-inoculation	No-treatment	$\underline{F}(1, 14)$	$\underline{p}$
Unauthorized requests	.00	1.68	6.70	.02
Self-ratings				
Physical	67.67	59.37	.84	.37
Emotional	74.54	61.08	2.61	.13
Tanking Rating				
Subject	70.70	55.43	1.93	.19
Staff	82.09	62.88	4.49	.05
Compliance (%)	98.18	79.79	16.47	.001
Nurses' Rating	87.59	71.12	7.83	.01
A-State	31.13	41.25	5.88	.03
A-Trait	30.25	40.38	8.73	.01

Note. Hotelling-Lawley Trace = 4.44; $\underline{F}(9, 6) = 2.96$; $\underline{p} = .10$.

Appendix H

Table 5

Mean Change from Pretreatment to Posttreatment
for Stress-Inoculation Group

Variable	Pretreatment Mean	Posttreatment Mean	Mean Change	t	p
Unauthorized requests	.90	.00	- .90	-2.71	.03
Self-rating					
Physical	51.05	67.67	16.62	6.30	.001
Emotional	57.95	74.63	18.68	5.70	.001
Tanking Rating					
Subject	39.60	70.70	31.10	8.25	.0001
Staff	53.40	82.09	28.69	3.34	.01
Compliance (%)	79.84	98.18	18.34	5.52	.001
Nurses' Rating	70.53	87.59	17.06	3.02	.02
A-State	44.12	31.12	-13.00	-5.69	.001
A-Trait	40.37	30.25	-10.12	-5.27	.001

Appendix I

Table 6

Mean Change from Pretreatment to Posttreatment
for No-Treatment Group

Variable	Pretreatment Mean	Posttreatment Mean	Mean Change	t	p
Unauthorized requests	.88	1.68	.80	1.70	.13
Self-rating					
Physical	48.13	59.36	11.23	2.39	.05
Emotional	48.96	61.08	12.12	2.96	.02
Tanking Rating					
Subject	40.40	55.42	15.02	1.77	.12
Staff	67.56	62.87	- 4.69	-1.21	.27
Compliance (%)	79.50	79.79	.29	.11	.92
Nurses' Rating	74.51	71.12	-3.39	- .91	.40
A-State	43.63	41.25	-2.38	- .95	.37
A-Trait	42.50	40.37	-2.13	- .57	.59

Appendix J

Table 7

Comparison of Mean Change Between Groups
from Pretreatment to Posttreatment

Variable	Stress-inoculation Mean Change	No-treatment Mean Change	$\underline{F}(1, 14)$	$\underline{p}$
Unauthorized requests	- .90	.80	8.72	.01
Self-rating				
Physical	16.62	11.23	1.00	.33
Emotional	16.68	12.12	.82	.38
Tanking Rating				
Subject	31.10	15.02	2.99	.11
Staff	28.69	- 4.69	12.58	.003
Compliance (%)	18.34	.29	17.91	.001
Nurses' Rating	17.06	- 3.39	9.12	.01
A-State	-13.00	- 2.38	9.88	.01
A-Trait	-10.12	- 2.13	3.60	.08

Note. Hotelling-Lawley Trace = 6.15; $\underline{F}(9, 6) = 4.10$; $\underline{p} = .05$.

Appendix K

Table 8

Mean Change from Posttreatment to Follow-up
for Stress Inoculation Group

Variable	Posttreatment Mean (N = 8)	Follow-up Mean (N = 6)	Mean Change (N = 6)	t	p
Unauthorized requests	.00	.05	.05	1.00	.36
Self-rating					
Physical	67.67	74.83	9.91	5.45	.003
Emotional	74.63	83.37	9.46	5.17	.004
Tanking Rating					
Subject	70.70	87.50	17.78	6.62	.003
Staff	82.09	90.44	9.82	3.33	.02
Compliance (%)	98.18	100.00	2.43	1.88	.12
Nurses' Rating	87.59	89.55	4.00	1.95	.11
A-State	31.12	26.67	- 3.67	-2.23	.08
A-Trait	30.29	28.83	- 2.33	-2.04	.10

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