PROGRESSIVE RELAXATION AS A NURSING INTERVENTION: A METHOD OF CONTROLLING PAIN IN THE OPEN HEART SURGERY PATIENT

by

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CHAPTER I

INTRODUCTION

In Paradise Lost, Milton referred to pain as "perfect misery, the worst of all evils." (55) The relief of this worst of all evils, of pain, has been the object of medical procedures as long as medicine has existed. (12) In hospitals during the postoperative period, it is the nurse who implements pain relieving measures, administers analgesics, and evaluates pain relief. Quite understandably, therefore, the relief of postoperative pain has been the subject of several nursing studies. (13, 26, 44, 45, 47, 56) In most of these studies nurses have used comfort giving measures and anxiety reducing techniques to relieve pain. One such anxiety reducing technique is Progressive Relaxation as first proposed by Jacobson in 1929. (29) A modification of this technique was used recently by Aiken and Hendrichs in an attempt to control psychiatric disturbance of cardiac surgery patients. (1)

Pain in the post-operative patient serves no useful purpose ordinarily. It is detrimental in that it interferes with the ability of the patient to cooperate with necessary treatments. Pain present in the postoperative patient, limits movement, hinders necessary

coughing and deep breathing exercises, slows early ambulation and increases anxiety. Consequently pain decreases self motivation by increasing dependency on the nurses. Increasing hostility may develop toward members of the hospital staff, particularly when there is insistence on the ordinary exercises of the postoperative period. Unrelieved postoperative pain was related to the incidence of psychiatric symptoms observed in cardiac surgery patients according to a recent nursing study of sensory disturbances by Ellis. (19)

In the post-operative period, pain relieving agents usually include the use of narcotics, morphine and its derivatives. These have the disadvantages of depressing respiration and the cough reflexes, sometimes producing nausea, drowsiness, personality changes, and in some cases offering inadequate pain relief. (63) Other means of relieving pain are those that involve promoting relaxation and affording anxiety relief, including tranquilizers plus many nursing activities.

The focus of this study was to determine the effects of post-operative pain in cardiac surgery patients when Progressive Relaxation was invoked as a systematic nursing intervention.

It is considered particularly appropriate that patients undergoing cardiac surgery were the subjects of this study. Open heart surgery is an especially stressful experience and is known to cause

pain and anxiety. (1, 5, 19, 37, 54, 57) Patients experiencing other surgical procedures vary in their expectations of stress or anticipation of pain and consequently vary more in their postoperative responses. Recent research indicates a correlation between stress and the development of coronary artery disease. (11, 35, 62, 73) Hence, patients scheduled for surgery involving grafting of the coronary arteries may need stress or anxiety relieving measures more than other cardiac surgery patients.

The stress of cardiac surgery is demonstrated by the number of psychiatric disturbances that occur among patients undergoing this type of surgery. Ellis designated such disturbances as Indeterminate Stimulus Experiences or ISEs, i. e. experiences of patients for which there were no adequate stimuli, or experiences in which stimuli were misinterpreted. (19) Sixty-seven percent of patients interviewed by Ellis described ISE phenomena, which many patients associated with inadequately controlled pain. An attempt to prevent the occurrence of psychiatric disturbances was reported by Aiken and Henrich. (1) Relaxation exercises, a modification of Progressive Relaxation, were taught to an experimental group of cardiac patients in the preoperative period. Their responses were compared to a control group who did not receive teaching. It was conjectured that preoperative anticipatory fear would be reduced by the practice of Progressive Relaxation, consequently reducing the incidence of

psychiatric reactions in the postoperative period. The group was small; the results were not statistically significant. However, the findings indicate that there were fewer psychiatric reactions in the experimental group compared to the control group. This study was hailed by Notter as an example of the advent of clinical nursing research. (59)

Progressive Relaxation was first proposed by Jacobson in 1929. (29, 30) As a method of anxiety and tension control, it was later used and described by Dixon and Dickel. (17) Wolpe, (75) maintaining that it is impossible to sustain antagonistic feeling states simultaneously, i. e. to feel both relaxed and anxious at the same time, made extensive use of relaxation. He reports excellent results in the relief of phobic fears and fears of normal people by systematic desensitization, a form of reciprocal inhibition. Natural or painless childbirth utilizes relaxation procedures. (31) Practice in relaxation is a major part of the instructions. Relaxation procedures have been recommended for the relief of pain in rheumatoid arthritis and as a prelude to exercises for the correction of posture. (48)

Progressive Relaxation as a nursing intervention incorporates four major principles of providing relief for patients in pain. These are listed by McCaffery (46): 1. Modifying anxiety associated with the pain experience, 2. Altering the amount or pattern of stimuli

through major sensory modalities, 3. Eliciting behaviors that are incompatible with pain responses and 4. Using what the patient believes will result in pain relief. It would appear that the use of Progressive Relaxation would be useful to relieve pain.

Pain has been the subject of much research. Historically the focus of the research was on the physiology of pain, then on pain thresholds. Finally as the problem of the measurement of pain relief by the newer analgesics became more complicated, the study of pain thresholds progressed to studies of individual differences in pain behavior. Finally, the study of individual differences stimulated interest in the determinants of behavior as a part of the total pain syndrome.

In very early research on touch, Weber in 1846 ruled out pain as a true sensation. To him it seemed that pain had no proper stimuli, as did pressure sense, warmth, and cold. He rated the three modalities as true sensations. (28) In 1894, Max Von Frey mapped, separately, spots that related to pressure, warmth, cold and pain, and worked out simple pressure and pain stimulation laws. (28) Thus the ground work for research on the thresholds of sensation was outlined. Hardy, Wolff, and Goodell (28), in the late 1930's, developed a measurable stimulus for pain, and systematically determined the minimal stimulus that would cause pain. They measured pain thresholds and measured intensity of the sensory quality of

pain on a scale of dols. (28) The dol was defined as two jnd. The jnd was defined as a just noticable difference in pain sensation as evoked by measured increases in stimulus. The highest level of pain possible to imagine or to experience was ten and one-half dols (21 jnds). Pain threshold was defined as the sensation caused by the stimulus that produced minimal tissue damage, "the production of destructive reactions in tissue at a rate above the ability of the cell to compensate." (28) Careful painstaking laboratory measurements of the relation of stimuli to individual pain thresholds followed. Those psychophysical studies that related measured stimuli to pain thresholds supported the assumption that pain was a primary sensation with a direct communication from skin receptor to a pain center in the brain. (28) However, the work supporting this assumption was soon questioned as workers began to submit reports inconsistent with such a theory. Some of these reports were from studies of pain thresholds. Some observations of pain responses in clinical areas were in direct contradiction to the theory that pain was a primary sensation. Additionally, clinical studies of analgesic effects led to the consideration of the total individual behavior in regard to pain relief. Individuals reacted to painful physical stimuli in the same general manner as they reacted to other aversive situations.

In 1944, an early attempt to study factors contributing to change in individual pain thresholds was reported by Chapman and Jones. (14) They found that nervous tension in twelve subjects before an internship examination, produced a fall in pain threshold levels in one-third of the group. Among several factors tested, only mental fatigue and nervous tension produced any significant changes in cutaneous pain sensitivity. The authors urged that anxiety, tension and fear be controlled in threshold studies of pain, since they appeared to be of such great importance. That study was one of the first to focus attention on the definite, positive relationship of pain to anxiety.

During the period of time that evidence was accruing from laboratory studies, additional data were forthcoming from clinical investigation that cast doubts upon the accepted theory of pain as a primary sensation. (3, 4) Beecher (4) observed the phenomena of minimal pain responses of soldiers who had been wounded in battle. Comparing the soldiers to civilians who had suffered similar wounds, he observed that the civilians needed more pain medications and appeared to suffer more pain than the soldiers. It was reasoned that cognitive factors came into play that changed the meaning attached to the objective fact of tissue damage. For example, the soldiers associated the experience of being wounded with the fact that they would be sent home, and consequently would no longer need to fight. The relief of this anxiety, occasioned by removal from the battlefields,

appeared to diminish the experience of pain. In contrast, civilians, who experienced similar wounds, were observed to be in much more pain. The reason for this discrepancy in reaction was attributed to the difference in the meaning of the wound. For the civilians, the predominating concern was mutilation and injury, with an elevated anxiety level. For the soldiers, the meaning of the injury was that they would be going home. This meaning apparently preempted other feelings of pain or fear of injury such as the civilians reported. (4)

An interesting sequel to Beecher's study was his inference for controlled laboratory studies of pain. In the clinical setting, the response to pain differed significantly from pain induced in the laboratory. Although pain may be induced in the laboratory, the threat of permanent injury is absent. The subject knows that the stimulus is controlled and that no real harm will be done to him. However, this threat of harm or permanent injury is very real in the clinical situation. Other clinical observations, too, refute the assumption that pain is a primary sensation. These clinical observations include the reports of lobotomized patients, that "it still hurts, but it doesn't bother me." (61) The phenomenon of phantom limb pain is another observation that challenges the theory of pain being a primary sensation. (51) These patients differ in that the amputee, who no longer posesses anatomically, the primary source; while he still feels the pain, he does not suffer. These

responses seem to indicate that more is needed to explain the phenomenon of pain than a stimulus carried by certain neural pathways. Other evidences of pain as a complex entity are found among persons with congenital absence of pain who show no anatomical structural similarities and in the fact that individuals who exhibit considerable differences in response to painful stimuli also lack anatomical similarities. (61)

In some of their early work on analgesics for pain relief, LaSagna (39, 40), and Eysenck (20) noted frequently the variations in the responses of certain individuals. Eysenck proposed an explanation for the variations that were observed. He suggested that differing speeds of chemical reactions in the brain itself, caused the different responses to the same stimuli. That is, the duration and reception of stimulus varied from individual to individual because of these different reaction times. Eysenck classified individuals as extroverts or introverts. (20) According to this view, in the extrovert, stimuli are thought to be received more slowly and also dissipate slowly. By this theory, Eysenck explained variations in pain responses.

Variations in response were also observed in other studies of analgesics. (27, 36, 40, 61, 74) LaSagna (40) observed that about fifty percent of surgical patients receiving placebos were relieved of postoperative pain. This was decreased to fifteen percent when medication was prolonged. LaSagna was able to distinguish placebo

reactors from non-reactors by means of a Rorschach Inkblot test. (41) Consequently, it was believed that there were some consistent differences between those who reacted positively to placebos and those individuals who did not react to them.

Further studies of the relationship between pain and anxiety were conducted in observations of surgical patients by Janis. (32, 33) Anticipatory fear in preoperative patients was estimated. It was observed postoperatively that those who were high in anticipatory fear were also much more likely than others to be anxiety ridden after the operation. Those who had moderate anticipatory fear were observed to display anger and resentment toward the staff much less likely than others. (32) In a recall study of students who had undergone surgery, Janis reported a curvilinear relationship was observed between preoperative fear and postoperative adjustment. Those with moderate fear experienced the higher postoperative adjustment, i. e. a quicker return to normal functioning and living, in comparison with those subjects who had either low or high anticipatory fear. (33) The surgical patients in one study, were given special instructions by the anesthesiologist of what to expect in the postoperative period. The instructed subjects required less medication for pain and needed fewer days of hospitalization. (33)

These studies which revealed pain response as predictable and individually consistent, in addition to the phenomena of unexplained

pain mentioned earlier, tended to negate the assumptions of the physiological studies purporting pain to be a primary sensation. An explanation of many of the inconsistencies of these pain phenomena as well as individual variations is the Melzack Gateway Theory of Pain. (50, 51, 52) In this theory, it is proposed that there is a mediator of nerve impulses to the transmission cells that convey information to the brain and that this mediator is located in the substantia gelatinosa of the dorsal horns of the spinal cord. Large nerve fiber impulses and small nerve fiber impulses tend to counteract each other, consequently the messages to the transmission cells and then to the brain rise slowly. The gateway, without stimulation, is in a relatively open position. Upon initial stimulation, both large fibers and small fibers are activated and the messages rise slowly. Upon prolonged stimulation, the large fibers begin to adapt, resulting in increased small fiber activity proportionately, and increased messages, that result in increased activity of transmission cells. If at this time, the large fiber background is stimulated by some means such as vibration or scratching, the output of transmission cells decreases, because these maneuvers overcome the tendency of the large fibers to adapt. Acupuncture is such a maneuver. The apparent success of acupuncture as an anesthetic agent fits in well with the gateway theory. Spontaneous pain, in the absence of stimulation, could also be explained by the gateway being opened

because of sustained activity. Melzack states that the variability of pain response, even in cases of severe lesions, could be accounted for by the differences in balance between sensory facilitation and central inhibition of this input. (52) About the same time that Melzack was developing his theory of pain, laboratory studies of individual consistent ways of reacting to stimuli were underway. Ullman (71), in his work on sensory facilitation was able to classify individuals as inhibitors and facilitators, according to the results of a blindfold test. In this test, inhibitors minimized the differences in sizes of blocks. At the same time, the subjects classed as facilitators, judged these differences to be larger than they actually were. This occurred consistently with repeated experiments with the same individuals, just as individuals, in earlier studies of pain thresholds reacted consistently.

Many psychological tests have been developed to classify or to predict individual ways of reacting to stress. (64) One recent test is the Repression Sensitization Scale by Byrne. (6, 7) Individuals who score low on the scale are classified as Repressors; those who score high are classified as Sensitizers. The scores on the Repressor-Sensitizer Scale have been shown to be related to tolerence for noxious stimuli and conversely, those who had high scores showed low tolerance on the same measures. Another study showed that Sensitizers functioned with more facility than the Repressors in a

stress and ego involving situation and scored higher on the Manifest Anxiety Test. (38, 67) Repressors are more likely to receive a purely physical diagnosis of illness as opposed to the Sensitizers who are given a more frequent psychosomatic diagnosis. (65) Sensitizers reported to a College Health Center complaining of illness significantly more frequently than a comparable group of Repressors. (9) A low R-S Scale score (Repressor) has been shown in studies to indicate better life adjustment. (8, 10, 15, 22, 70)

It might be conjectured that the R-S Scale score would predict the amount of pain an individual would experience in the postoperative period. If the low scores (Repressors) show a high tolerance for noxious stimuli (2, 53, 58) in a laboratory test, it would seem that these low scores would also show a high tolerance for the pain of the postoperative period. Conversely, the high scores or Sensitizers, would be more likely to show less tolerance for pain in the postoperative period. The reduced pain tolerance is predicted for Sensitizers because of the results of the laboratory tests of tolerance for noxious stimuli and because of the higher comparative scores on the Manifest Anxiety Test. Also, if the Sensitizers "function with more facility in a stress and ego involving situation," (38) it might be expected that under conditions of severe stress, such as cardiac surgery, there would be more incidents of ego disintegration as the limits of this facilitation are reached.

It is expected that individuals undergoind stress such as cardiac surgery, will follow their usual coping styles of behavior as they attempt to use the defenses that have been successful in the past in dealing with stress and anxiety. Lazarus presents two general classes of coping with stressful situations. (43) These classes of coping styles are: 1. "Action tendencies aimed at eliminating or mitigating the anticipated harmful confrontation that defines the threat," and 2. "Purely cognitive maneuvers through which appraisal is altered without action directed at changing the objective situation,". (43) Lazarus, in a discussion of coping styles lists four basic types of direct action tendencies. These are: 1. Actions aimed at strengthening the individuals resources against harm, 2. Avoidance, 3. Attack, and 4. Inaction. If Progressive Relaxation were used as an action aimed at strengthening the individual's resources against harm, or as a cognitive maneuver through which appraisal is altered, would not the other direct action tendencies be modified in the subject? Would not the subject find it less necessary to resort to avoidance, attack and inaction? These direct action tendencies should be apparent in the behavior of surgical patients in the postoperative period, when the patient is dealing with the pain and stress of recovering from surgery. The ways these direct actions are displayed by the patients might be interpreted as lack of cooperation, or, if more aggressive, even as anger or hostility.

Experienced nurses are well aware of the variations in patient behavior and are accustomed to evaluating behavior. Consequently, systematic measures of direct action tendencies displayed by the patient as cooperative or hostile behavior might be obtained by soliciting such information from the nurses of the postoperative period.

The physiological response to pain may vary in individuals. The reaction to this physiological response is further varied by coping style, and by the effect of previous experiences on this coping style. Consequently, the response to pain is learned. (23, 50, 66) Cultural components do influence this response. (21, 25, 27, 45, 50 60, 64, 66, 67, 69, 76) Pain and anxiety have a mutual augmentative influence upon each other. That is, anxiety can be produced or increased by pain and the perception of pain is accentuated by the presence of anxiety. (32, 42, 66, 72, 77) Sternbac (66) states that even when there is a neurological explanation of pain, the reduction of anxiety, by whatever means, is usually accompanied by a reduction in pain behavior. He further states, "The interposing of an activity which involves behavior incompatible with pain or anxiety responses will, apparently, diminish both the overt pain responses and the experience of pain." He further states "Relaxation is one such class of incompatible behavior,". It is therefore suggested that Progressive Relaxation should be of benefit in the relief of the pain of

surgical patients if practiced by patients in the postoperative period.

Dealing with postoperative pain in the surgical patient is, for the most part, a nursing problem. Studies have shown that pain behavior is often unrelated to the amount of physical injury, but that this behavior is directly proportional to the amount of anxiety present. Coping style, as measured by the R-S Scale score, has been shown to have a positive relationship to the amount of anxiety present, and to tolerance for painful stimuli. Progressive Relaxation has been shown to alleviate anxiety. It would, therefore seem appropriate to use Progressive Relaxation as a nursing intervention to reduce postoperative pain. It could be expected that varying benefits would be derived by individuals in relation to their coping styles as measured along the Repressor-Sensitizer continuum. It also could be expected that individuals would differ in their response to the stress of surgery according to their place on the Repressor-Sensitizer continuum, and that those individuals at either end of the Scale would show the most difference when compared with each other. Also of interest and worthy of exploration are the relationships between the effects of Progressive Relaxation with the pain responses of these individuals at the extremes of the Repressor-Sensitizer continuum.

Purpose of the Study

Open heart surgery is a traumatic experience, both physically and emotionally. Pain is present in the first few postoperative days. Primary evidences of pain are the patients' complaints of pain and their need for medications for rest and for the control of pain. Other evidence of the presence of pain may be inferred from instances of patient behavior, as he attempts to control his environment. Such instances as lack of cooperation and increasing hostility could be interpreted as responses to pain. Other patient behaviors that have been shown to be related to the presence of unrelieved pain are those associated with personality disintegration. These include episodes of confusion, disorientation, and hallucinations.

The amount of perceived pain has been shown to be directly proportional to the amount of anxiety present. Because Progressive Relaxation has been shown to relieve anxiety, it is therefore expected that the perception of pain would be reduced in patients who have been trained in Progressive Relaxation.

The main focus of this study was to investigate the value of Progressive Relaxation as a nursing intervention to reduce post-operative pain, in which the patient was taught the technique in the preoperative period and practice was invoked in the postoperative period.

Specifically, it was hypothesized that:

1. Patients receiving relaxation instructions would require fewer pain medications than those who did not receive instructions.

2. Patients receiving relaxation instructions would require fewer sleeping medications and tranquilizers than those who did not receive instructions.

3. Patients receiving relaxation instructions would rate themselves as having experienced less pain than those who did not receive instructions.

4. Patients receiving relaxation instructions would be rated as more cooperative and less hostile by the nurses caring for them in the recovery room and after they left the recovery room.

5. Patients receiving relaxation instruction would report and would have recorded in the nurses notes fewer incidents of disturbing dreams, memory loss, confusion, hallucinations, and disorientation.

Secondarily, this study was an attempt to discover the relationship between the effects of coping style as measured by the Repression-Sensitization Scale and the responses of the subjects to the pain and the stress of cardiac surgery. It was expected that Sensitizers would in comparison to the Repressors:

6. Require more medications for pain, sleep, and tension.

7. Rate themselves as having experienced more pain.

8. Be rated by the nurses as having expressed more hostility and less cooperation.

9. Would report more incidents of disturbing dreams, memory loss, confusion, hallucinations, and disorientation; and would have more incidents of hallucinations or disorientation recorded in the nurses notes.

An additional purpose of this study was to gain information by exploring the interaction of the effects of Progressive Relaxation and extreme coping style upon the pain responses of individuals with extreme differences in coping style. Hypotheses were not formulated but it was expected that a trend could be observed depicting the possible relationships between these two sets of variables.

CHAPTER II

METHOD

This study was conducted at a 389 bed teaching hospital in a large metropolitan area in Oregon. The study covered a five month period.

An abstract of this proposed study was submitted to the Chief of Cardiac Surgery and to the Nursing Administration of the hospital by way of the Nursing Coordinator in charge of research. Oral permissions were obtained to conduct the study.

Subjects

The volunteer subjects of this study were patients with diagnosed cardiac valvular disease or coronary artery disease. All subjects were scheduled for mitral or aortic valve replacement or for coronary artery bypass graft surgery. In all instances, the Starr-Edwards valve was the prosthesis used for valve replacement; the saphenous vein was the graft material used for the coronary artery bypass surgery.

In addition to meeting the criterion of diagnosis, patients composing the subject pool were over twenty one years of age and were able to read and write English. Thirty patients were included in the

study. These patients were assigned to one of three groups upon admission to the hospital. The R-S Scale was administered to all subjects. Ten subjects were in each group. The subjects in Group 1 were taught Progressive Relaxation in daily visits with the investigator. The subjects of Group 2 were visited daily by the investigator, but no special instructions or treatment was given. The subjects of Group 3 were not visited by the investigator after the day of admission and served as a control group. The three Groups were designated as Group 1=Relaxation Group, Group 2=Visiting Group, and Group 3= Control Group.

Thirty nine patients were contacted and asked to volunteer to take part in this study. No one refused. Nine of these patients were subsequently dropped. An attempt was made to match the groups on the variables of diagnosis, age, sex, and coping style as measured by the R-S Scale score. Consequently, three subjects were dropped because they did not match on these designated variables. Two other subjects were dropped from Group 1, one because of surgery cancellation and the second because of his death on the first post-operative day. Four patients who were scheduled for differing cardiac surgeries had been contacted for Group 3 but were not continued in the study. These were contacted initially because the availability of adequate numbers of patients with the designated diagnoses was in doubt. It was thought to include these subjects by

matching them in the other two Groups if necessary. No other exclusions were made.

Among the thirty subjects, there were fifteen male and fifteen female patients. Five male and five female patients were assigned to each of the three groups. Diagnostically, the thirty patients included fifteen patients scheduled for valve replacement, and fifteen who were scheduled for coronary bypass. These too, were equally divided among the three groups. Each group included five patients scheduled for vein grafts of the coronary artery and five patients scheduled for valve replacement.

In addition an attempt was made to match the three groups on the variable of coping style as measured by the R-S Scale. There was no attempt to match groups on the demographic variables of education and marital status. However, the Groups were comparable on these variables as may be seen in Table 1.

Design

This study was experimental in design, with one treatment group, Group 1, and two control groups, Groups 2 and 3. The main focus of the study was the manipulation of the independent variable, the practice of Progressive Relaxation as a nursing intervention. The first part of the study was concerned with the effects on pain responses of the experimental conditions in which the three Groups

Table 1. Composition of Experimental and Control Groups by Sex, Age, Diagnosis, R-S Scale Scores, Marital Status and Education.

	Group		
	1. Relax (N=10)	2. Visit (N=10)	3. Control (N=10)
Sex			
Male	5	5	5
Female	5	5	5
Type of Surgery			
Coronary Bypass	5	5	5
Valve Replacement	5	5	5
Age			
Mean	49.5	52.8	49.9
S. D.	10.7	9.8	10.4
R-S Scales Score			
Mean	41.2	41.2	40.9
S. D.	17.7	16.6	17.7
Marital Status			
Single	0	2	0
Married	7	6	6
Divorced	3	2	3
Widowed	0	0	1
Education			
Mean Years	11.9	11.7	11.8

were comparable on the variables of age, sex, and diagnosis. Because it was believed that coping style was an important variable to be considered when measuring stress responses, control of coping style was also established among the three Groups by an equal distribution of subjects along the R-S continuum. Hypotheses 1 through 5 specified the expected benefits to be derived by the therapeutic technique of Progressive Relaxation.

The second part of the study was exploratory in nature and focused on the effects of coping style. The data collected in the experimental part of the study were reviewed in an attempt to determine relationships between individuals with different coping styles with reactions to pain. The R-S Scale served as the variable by which to classify the subjects. After pooling the responses of the subjects from the original three Groups, two divisions were formed according to the Median R-S Scale score of the subjects. Those subjects who scored below the median were designated as Repressors (N=15). Those who scored above the median were designated as Sensitizers (N=15). Hypotheses 6 through 9 specified the expected relationships between the Repressors and the Sensitizers on the same dependent variables that were indicated in the first part of the study. Finally, since those individuals who cluster about the median bear more resemblance to each other than to the subjects at either end of their respective categories, a more definitive grouping of the

R-S continuum was made by dividing the subjects by quartiles according to the R-S Scale score. The subjects below the first quartile, Q_1 (N=7), were referred to as the Extreme Repressors. Those subjects of the interquartile range $Q_3 - Q_1$ (N=16), were referred to as the Neutrals, and those subjects above the third quartile, Q_3 of the R-S continuum, (N=7), were referred to as the Extreme Sensitizers. No hypotheses were formulated but a comparison was made of the responses of the Extreme Repressors and the Extreme Sensitizers. This comparison was extended to include the effects of instructions in Progressive Relaxation on the reactions of the Extreme Repressors and the Extreme Sensitizers.

Measurements of the same dependent variables provided the data for both parts of the study. These dependent variables fell into three categories.

The first category to be examined was that of the relief of pain. The measures used to test the difference in pain relief were: 1. A self estimate by each patient of the amount of pain that he had experienced and 2. A count was made from the patients' medical records of the number of medications he had received for the relief of pain, for sleep and for tension relief.

The second category explored was that of patient behavior. Estimates were made of individual patient hositility and cooperation by the nurses from two postoperative time periods.

The third category investigated was that of mental status disturbance and psychiatric symptoms observed. Two measures were undertaken. One, patients were asked an open-ended question concerning mental status during the postoperative period. These answers were categorized according to content. Two, a count was made from the nurses notes of the number of days of disorientation or hallucinations for each patient.

Data Collecting Instruments

The Revised Repression-Sensitization Scale, a 127 item questionnaire developed by Donn Byrne, was administered to each subject. This test envisions coping style as a continuum ranging from extreme repression to extreme sensitization. (8) Sensitization defense mechanisms involve the approaching of anxiety-provoking stimuli in an effort to control these stimuli and their consequences. Repressor defense mechanisms involve the avoidance of anxiety-provoking stimuli. The R-S Scale is one valid reliable method to assess coping style, according to Byrne and others. (6, 7, 8, 9)

Three measures of the patients postoperative behavior were made by the following means:

1. Self estimates by the patient: one of pain and one of postoperative mental status.

2. Estimates by nurses from two postoperative time periods. These were estimates of the amount of Hostility and the amount of Cooperation that each patient had exhibited.

3. Counts from the nurses notes of the numbers of medications received by each patient for the relief of pain, insomnia, or tension, and of the number of days that incidents of disorientation or hallucinations were recorded.

For the first measure, the self estimate measures of pain and mental status, two different techniques were used to obtain these scores. First, each patient was asked for an estimate of the amount of pain he had experienced since surgery. The subject was asked to indicate this amount of pain by drawing a bisecting horizontal line across a previously constructed ten inch vertical line. The instructions to each patient were:

> We know that all patients having surgery such as you have had undergo some pain. I would like your estimate of the total amount of pain you have had since surgery. This line represents pain. The bottom of the line would indicate no pain at all. The top of the line would indicate all the pain you could possibly have had. Could you please draw a line across this line to show how much pain you have had since surgery?

The subject's estimate of pain was determined by measuring the distance from the bottom of the vertical line to the bisecting line drawn by the subject. This line was measured to the nearest one-tenth of an inch. The number of tenths of inches then became the

score of the subjects estimate of pain. For example, 5.6 inches would become a self estimate of pain of 56.

The second technique involved self evaluations of mental status. Subjects were asked the following question:

> Was there anytime since your surgery that you were perhaps a little mixed up----? ---that you didn't know exactly what was going on around you?

A content analysis of the answers resulted in the following categorizations which were constructed into an ordinal scale of severity of mental disturbance:

0. None
1. Dreams or mixed up from the medications.
2. Memory loss or confusion.
3. Frank disorientation or hallucinations.

If the answer of a patient included more than one of the complaints listed, the rating of the more serious complaint was given. For example, if a subject complained of dreams and of hallucinations, a rating of 3, the more serious rating was given.

The second measure of patient postoperative behavior (Cooperation, Hostility) involved two time periods. One nurse from the cardiac recovery room and one nurse from the post recovery period were asked to evaluate each patient on the variables of Cooperation and of Hostility. The nurse who had been assigned to care for the patient in each time period was the one selected to give these evaluations. No nurse was excluded, nor was any particular nurse

selected for these estimates for any reason other than that of having given the most care to the patient and consequently, having more occasion to observe his behavior. In the procedure followed for obtaining these data each nurse was asked to give her estimate of individual patient Cooperation and Hostility by answering these questions:

> If you had to place __Name__ on a ten point scale of Cooperation with ten indicating the most Cooperation possible, where would you place him?

> If you had to place __Name__ on a ten point scale of Hostility with ten being the most hostile possible, where would you place him?

After giving these estimates each nurse was asked incidentally, if she had observed any disorientation or bizarre behavior on the part of the patient. Their answers served as a means of verification of information from the nurses' notes described in the following section.

The third measure of patient postoperative behavior was selected information from the nurses' notes. This involved counts from the charts of the number of pain medications, sleeping medications, and tranquilizers received during the first ten postoperative days. This count was confined to the first ten days because some of the patients were discharged as early as the tenth postoperative day. A count was also made from the charts of the number of days

that incidents of hallucinations or disorientation occurred for each patient. In a reliability check, nurses verbal replies to a question concerning bizarre behavior agreed in all instances with the information recorded on the charts. That is, there were no incidents charted that were not reported verbally, and all incidents reported verbally were also found recorded.

Procedure

Patients were assigned to one of three groups upon admission to the hospital after they had been scheduled for cardiac surgery. See Table 2. The groups were Group 1, the Relaxation groups, Group 2, the Visiting group and Group 3, the Control group. Patients who were scheduled for admission during any one week were assigned to the same group to avoid the contamination that would necessarily occur if a patient from any one of the three groups were to share a room with one of the subjects from a different group. Contact between the subjects was further minimized by the physical constraints imposed by the hospital floor plan which separated the immediate postoperative patients from the newly admitted and convalescent patients. Table 2 may be consulted for the approximate time spent by patients in each phase of their hospital course. Although the newly admitted patients were not in a separate part of the hospital from the convalescing patients, contact was minimal

because of the limitations of activity on the part of the postoperative patient.

Each patient was contacted as soon after admission as possible, and asked to participate in the study. The Revised Repression-Sensitization Scale was administered. The patient signed one of three permission slips, according to the Group assignment. See Appendix A.

The subjects of Group 1 were then introduced to Progressive Relaxation and a practice session was held. These practice sessions were repeated twice daily until the ninth postoperative day, excluding the day of surgery as may be seen in Table 2. In addition, tapes of these relaxation practice sessions which were made by the investigator were provided with a Cassette player for the patient to use. The recommended number of times for use of the tapes was twice daily. Tape 1 was provided for the first two days and included tensing instructions along with the relaxation. The second tape included whole body relaxation and was used for the duration of the subjects hospitalization. (Content of the two tapes may be found in Appendix B.) By duplication of instructions and voice of the investigator on the tapes, continuity and repetition were insured. The recommended number of times for use of the tapes was twice daily. No tape was used in the cardiac recovery room period, but relaxation practice with the investigator was held twice daily.

The patients in Group 2 received visits from the investigator at two different times during the day for the first nine postoperative days. These visits included the days in the cardiac recovery room but excluded the day of surgery. An attempt was made to duplicate the continuing, interested, supportive relationship that developed along with the relaxation instruction given to the subjects in Group 1. No special information or instruction was given to these subjects. However, questions were answered just as with Group 1.

The subjects of Group 3 received no special treatment or instructions. They were seen by the investigator for the purpose of testing of the dependent variable on the ninth postoperative day.

Statistical Tests

For the purpose of analysis of the data presented in this study two types of statistical tests were used. In the first part of the study in which three comparable groups were measured as to the effects of the independent variables, the analysis of variance was used to test the differences between the Groups.

In the second part of the study which focused upon the subjects coping style, the responses of all subjects were pooled. The R-S Scale score served as the discriminitive variable for classifying all 30 subjects. The median test (18) was used to delineate the relationships between the patients' coping style and pain responses.

Table 2. Design of Procedures For Subjects of each of Three Groups.

Time of Procedure	Group 1. Relax	2. Visit	3. Control
Preop. (3 days)			
Day of admission			
R-S test	X	X	X
Consent form signed	X	X	X
Pre-Surg Days			
*PR instruction	X		
*PR tapes	X		
*PR practice with investigator 2x day	X		
Visit 2x daily with investigator		X	
Day of Surgery ----------			
CRR: (3-5 days)			
PR practice with investigator 2x day	X		
Visit with investigator 2x daily		X	
Discharge Evaluation **H*C CRR nurses	X	X	X
Post-Recovery Room: (3-5 days)			
*PR practice with investigator 2x day	X		
*PR tapes	X		
Visit 2x daily with investigator		X	
9th Post-operative day			
Self pain evaluation	X	X	X
Self psychiatric report	X	X	X
10th Post-operative Day			
**H&C evaluation by Post CRR nurses	X	X	X

*PR -- Progressive Relaxation

**H&C-Hostility and Cooperation Ratings

No statistical tests were performed for the last part of the study in which an attempt was made to obtain information by comparing the pain reactions of individuals with extreme differences in coping styles.

CHAPTER III

RESULTS

This study of cardiac surgery patients was concerned with the effects of two major sets of factors upon the reactions by the subjects to the trauma and the stress of the surgery in the early postoperative period. First, an examination was made of the effects of Progressive Relaxation as a nursing intervention, on the designated outcome variables which indicated in a general way the patients' reaction to pain. Second, an exploratory study was made of the effects of coping style (Repression-Sensitization) on the same set of dependent variables which were used in the first part of the study. Finally, comparisons were made of the relationships of extreme coping styles (Extreme Sensitizer and Extreme Repressor) to the dependent variables designated in the major portion of the study. This comparison of the Extreme Repressors and Extreme Sensitzers included the effects of Progressive Relaxation on the responses of the subjects.

Main Effects of Progressive Relaxation

The expected effects of Progressive Relaxation as a nursing intervention were specified by hypotheses 1 through 5. The subjects

were assigned to three groups which were comparable on the variables of age, sex, diagnosis and coping style as measured by the Repression-Sensitization Scale.

The first hypothesis stated that patients receiving instructions in Progressive Relaxation would require fewer pain medications than those who did not receive such instructions. The results of an analysis of variance were not significant ($F = .22$). The hypothesis was rejected. There was no significant difference between the groups on the numbers of pain medications required. The results are shown in Table 3. As may be noted in Appendix 3, there was great variation in the individual scores of the subjects.

Table 3. Range, Median, and Mean of the Number of Pain Medications Received by the Subjects of Three Groups.

	Group 1 Relax N=10	2 Visit N=10	3 Control N=10
Range	12-56	8-53	21-39
Median	32.0	30.0	27.5
Mean	30.5	31.8	28.3

The second hypothesis stated that subjects who received instructions in Progressive Relaxation would require fewer tranquilizers and sleeping medications. A comparison of the numbers of

these medications that were required by the subjects of the three groups may be seen in Table 4. The results of an analysis of variance to test the differences between the groups was not significant ($F = 1.1$). The hypothesis was rejected. A trend may be noted in that subjects of Group 1, the Relaxation group, required fewer medications for insomnia and tension compared to the subjects of the other two groups.

Table 4. Range, Median, and Mean of Numbers of Tranquilizers and Sleeping Medications Required by Subjects of Three Groups.

	Group 1 Relax N=10	2 Visit N=10	3 Control N= 10
Range	2-11	1-29	1-21
Median	6.0	5.5	6.5
Mean	6.3	11.3	7.9

The self estimates of the amount of pain which was experienced by the patient provided the data for the third hypothesis. It was hypothesized that patients receiving instruction in Progressive Relaxation would rate themselves as having experienced less pain than those patients who did not receive instructions. The mean of the pain estimates given by the subjects in Group 1, the Relaxation group, was indeed lower, although not statistically significant as

tested by an analysis of variance (F = .065). A summary of the self estimates of pain by groups may be seen in Table 5. Individual estimates of pain are listed in Appendix 3.

Table 5. Range, Median and Mean of Self Estimates of Pain by Subjects of Three Groups.

	Group 1 Relax N=10	2 Visit N=10	3 Control N=10
Range	23-94	30-95	25-100
Median	73	71	72
Mean	64.8	68.3	66.1

Measures of Cooperation and Hostility observed by the nurses caring for the subjects of the three groups constituted the data for the fourth hypothesis. It was hypothesized that those patients receiving relaxation instructions would be rated as more cooperative and less hostile than the subjects who did not receive instructions. Although there was great individual variation in these ratings (Appendix C), there was little difference between the groups. In fact, the subjects of the Relaxation group were rated as slightly more hostile and slightly less cooperative by the nurses of the cardiac recovery room. The nurses in the post recovery room period rated the Relaxation group subjects as slightly more cooperative than the members of the other two groups. The differences were so slight that no statistical tests were performed (see Table 6).

The fifth hypothesis was that patients receiving instructions

Table 6. Median, Range, and Mean of Estimates of Subjects' Hostility and Cooperation Made by Nurses in Two Time Periods.

Measure	Group 1 Relax N=10	Group 2 Visit N=10	Group 3 Control N=10
Hostility			
CRR			
Median	2	1	1.5
Range	1-9	1-7	1-6
Mean	3	2.4	2.2
Post CRR			
Median	2	1.5	1
Range	1-4	1-10	1-8
Mean	1.9	3	1.8
Cooperation			
CRR			
Median	7.5	9	8
Range	5-10	4-10	5-10
Mean	7.6	8.3	8
Post CRR			
Median	8.5	9.5	9
Range	1-10	1-10	3-10
Mean	8	7.9	7.7

in Progressive Relaxation would report fewer incidents of disturbing dreams, memory loss, confusion, hallucinations, or disorientation and would have fewer incidents of hallucinations or disorientation recorded in their charts by the nurses. Each subject was asked to respond to an open-ended question that related to postoperative mental status. These answers were divided into four categories, according to the severity of disturbance. Although a subject may have reported more than one instance of a disturbance when questioned, only one category was assigned, according to the more serious disturbance. That is, if a subject reported both disturbing dreams and hallucinations, only the complaint of hallucinations was recorded.

There was very little difference between groups on the number of reported mental disturbances. Groups 1 and 3 each reported 50 per cent (N=5), with Group 2 reporting just slightly over one half (N=6). In constrast to the similarities in incidence of disturbances that were just noted, there were differences of hallucinations or disorientation. Of the sixteen subjects who reported mental disturbances, seven had experienced hallucinations or disorientation. It is of interest to note that only one was from Group 1, the Relaxation group. However, there were three each from Group 2 and Group 3. Although these measurements were subjective in nature, and small numbers of subjects were involved, the results show that subjects in Group 2 and Group 3 reported the more serious disturbances of

hallucinations or disorientation more often than the subjects of Group 1. A summary of these results may be seen in Table 7.

Table 7. Number and Per Cent of Subjects Reporting Certain Psychiatric Disturbances Listed by Group.

Psychiatric Disturbance	Group 1 Relax N	%	2 Visit N	%	3 Control N	%
1. None	5	50	4	40	5	50
2. Disturbing Dreams	2	20	1	10	1	10
3. Memory Loss Confusion	2	20	2	20	1	10
4. Hallucinations	1	10	3	30	3	30

A second measure of mental status used for hypothesis 5 was a count of the number of days that hallucinations or disorientation were recorded by the nurses in the patients' charts. To verify the information from the charts, the nurses from both the cardiac recovery room and the post recovery room time periods were asked for verbal reports of bizarre or unusual behavior by each patient. These verbal reports from the nurses, in all instances, agreed with the information from the charts. Consequently it was accepted that all observed incidents were recorded.

Thirty six per cent or eleven subjects had incidents of disorientation or hallucinations recorded. These eleven subjects are

listed according to Group and length of the disturbance: Group 1 had three subjects for a total of six days; Group 2 contained three subjects for a total of seven days; Group 3 showed five subjects for a total of nine days. The differences noted of the number of disorientation days among the groups was not significant according to an analysis of variance ($F = 0.18$). However, again a trend was noted in the expected direction. Group 1 had fewer subjects who had documented psychiatric disturbances than the subjects of the other two groups. Individual scores on this variable may be found in Appendix C.

Between the patient self reports of mental status disturbance and the charted record of the number of days of disorientation, there were some discrepancies. Although sixteen patients reported some sort of mental disturbance, only eleven had episodes of disorientation that were charted. A plausible explanation may be that the symptoms were too mild in nature to be noticed by the personnel. In addition, although eleven subjects had episodes of disorientation recorded, only seven subjects stated that they had experienced episodes of disorientation or hallucinations. This discrepancy may be partly explained by the memory loss that many of these patients mentioned. Of the four subjects whose record of hallucinations or disorientation did not agree with their verbal reports, three complained of memory loss. This memory loss may have covered the period of disorientation.

Effects of Coping Style

The second part of this study focused upon relationships between the variables underlying the R-S Scale scores (coping style), and the reported and observed reactions to the trauma and the stress of cardiac surgery as outlined by hypotheses 6 through 9. An exploration was undertaken of comparisons of the pain reactions of the Extreme Sensitizers and the Extreme Repressors. This exploration was extended to include the effects of the experimental treatment, Progressive Relaxation, on the Extreme Sensitizers and the Extreme Repressors. No hypotheses were offered.

Hypothesis 6 stated that the Sensitizers would require more medication for pain, sleep and tension than the Repressors. The difference between the number of pain medications required by the Repressors and the Sensitizers was tested for significance using the Median test (18). The results were not significant

$$(X^2 = 1.2,\ \text{d.f.}\ 1).$$

A trend was noticed in the expected direction. Table 8 shows the numbers of subjects who were above and below the median requirement for pain medications. Individual scores may be found in Appendix C.

Table 8. Numbers of Sensitizer and Repressors Above and Below the Median Requirements of Pain Medications.

	Median Number Pain Medications	
	Above	Below
Sensitizers	9	6
Repressors	5	10

The relationship between the R-S Scale score and the number of medications required for sleep and tension was also tested for significance using the median test. The results were not significant

$$(X^2 = 0.01).$$

Pain was also evaluated by means of self estimate measures which were collected in the postoperative period for the purpose of testing hypothesis 7. It was hypothesized that Sensitizers would rate themselves as having experienced more pain than the Repressors. The differences between the self estimates of pain by the Sensitizers and by the Repressors were tested for significance using the median test. The results showed no significant difference

$$(X^2 = 2.1).$$

The results showed that the relationships were in the expected direction, however.

For the additional part of the study concerning the relationships between the Extreme Sensitizers and the Extreme Repressors with

the dependent variables, the measurements were again reviewed and categorized as may be seen in Table 9. Attention is drawn to the marked differences between the pain responses of the Extreme Repressors, the subjects below Q_1, and the responses of the other subjects, the Neutrals, and the Extreme Sensitizers, the subjects above Q_3. The Extreme Repressors gave pain estimates that were lower and required fewer pain medications than the other subjects, the Neutrals and the Extreme Sensitizers.

In addition, the Extreme Repressors who had also received instructions in Progressive Relaxation also gave even lower pain estimates and required fewer medications for pain than the Extreme Repressors who had not received instructions. The results showed an unexpected relationship among the Extreme Sensitizers. In Group 1, the Relaxation Group, the Extreme Sensitizers received more medications for pain and gave higher estimates of pain than those of the other two groups. The numbers are too small for conclusions to be made. However, the foregoing comparisons of Extreme Sensitizers and Extreme Repressors seem to indicate that the Extreme Repressors who were subjects of Group 1 were more positively affected by the practice of Progressive Relaxation than the Extreme Sensitizers. Or another interpretation might be made. Perhaps, the practice of Progressive Relaxation allows the more intensive use of defense mechanisms already present. That is, the Repressors

repress their reactions to stress even more and the Sensitizers become even more sensitized in their reactions to stress.

Table 9. Mean Pain Responses of Extreme Repressors $\leq Q_1$, Neutrals Q_2, and Extreme Sensitizers $\leq Q_3$ of Three Experimental Groups.

Name-Group	Mean Pain Responses Self Estimates	Mean Pain Responses Medication Requirements
Extreme		
Repressors $\leq Q_1$		
Group 1 (N=3)	43.0	22.6
Group 2 and 3 (N=4)	63.2	28.5
Neutrals Interquartile Range		
Group 1 (N=5)	68.8	35.6
Group 2 and 3 (N=11)	69.0	31.2
Extreme		
Sensitizers $\geq Q_3$		
Group 1 (N=2)	85.0	33.0
Group 2 and 3 (N=5)	66.4	28.0

The eighth hypothesis stated that the Sensitizers would be rated by the nurses caring for them as less cooperative and more hostile than the Repressors. The ratings for the Sensitizers and for the Repressors showed great variation for both time periods, i.e. the cardiac recovery room and the post recovery room period. Raw scores may be seen in Appendix C. Each subject received four ratings. A median test was performed comparing each of the four

ratings. The results are shown in Table 10. These results are not statistically significant, but again trends were noted in the expected direction.

Table 10. Subjects Above and Below Median R-S Scale Score and Median Hostility and Cooperation Rating of Two Time Periods With Corresponding X^2 Value.

Measure	R-S Scale Score Above Median	Below Median		p
Hostility				
CRR				
Above Median	10	5	2	N.S.
Below Median	5	10		
Post CRR				
Above Median	5	7		
Below Median	8	10	0.01	N.S.
Cooperation				
CRR				
Above Median	5	5		
Below Median	10	10	0	N.S.
Post CRR				
Above Median	4	8		
Below Median	11	11	1.2	N.S.

Explorations of the relationships between the hostility and cooperation ratings received by the Extreme Sensitizers and the Extreme Repressors were also made. The Extreme Repressors were rated as much more cooperative and much less hostile than the Extreme Sensitizers. These ratings may be seen in Table 11. The

greatest difference was noted in the cooperation ratings from both time periods.

Table 11. Mean Values of Hostility (H) and Cooperation (C) Ratings of Extreme Repressors and Extreme Sensitizers by the Nurses of the Cardiac Recovery Room and the Post Recovery Room.

	CRR		Post Recovery	
	H	C	H	C
Extreme Repressors	1.6	9.1	2.3	8.4
Extreme Sensitizers	6.4	7.5	2.0	6.1

Of particular interest is the contrast between the ratings of the Extreme Repressors who were in the Relaxation group, with the ratings received by the other Extreme Repressors. Those in the Relaxation group were rated as less hostile by the nurses of both time periods, but as less cooperative by the nurses of the post recovery room period. There were also differences noted between the Extreme Sensitizers of the Relaxation group and the ratings received by the other Extreme Sensitizers. Those of the Relaxation group were rated as much less cooperative by the nurses of both time periods, and as markedly more hostile in the cardiac recovery room. These ratings may be seen in Table 12. Again, it would seem that the Repressor and Sensitizer coping styles may have been accentuated by the use of Progressive Relaxation.

Table 12. Mean Hostility and Cooperation Ratings of Extreme Repressors and Extreme Sensitizers of Group 1 (Relax) and Group 2 and 3, in Two Time Periods.

	Extreme Repressors		Extreme Sensitizers	
	Group 1 Relax	Group 2 and 3 Control	Group 1 Relax	Group 2 and 3 Control
	(N=3)	(N=4)	(N=2)	(N=5)
CRR				
Hostility	1.3	1.5	7.0	6.2
Cooperation	9.3	9.0	6.5	8.0
Post Recovery				
Hostility	2.0	2.5	1.5	2.0
Cooperation	7.1	9.0	4.5	7.5

The ninth hypothesis was that Sensitizers would experience more psychiatric disturbance than the Repressors. There were only three Repressors who had notations of disorientation while there were eight Sensitizers with periods of disorientation charted. The Repressors totaled seven days and the Sensitizers fifteen days that these periods were charted. This difference was expected, for information from the literature suggests the R-S Scale score as a measure of adjustment (8, 10, 22, 70). The difference between the number of Sensitizers and the number of Repressors who had experiences of disorientation recorded in their charts was tested for significance using X^2. The results were not significant

$$(X^2 = 2.2).$$

Differences were also noted between the self reports of mental status disturbance between the Sensitizers and the Repressors who complained of some sort of mental status disturbance during the

postoperative period. Ten Sensitizers reported these experiences in contrast to 5 Repressors. The results of a median test were not significant ($X^2 = 3.60$). Again a trend is noted in the expected direction.

The above differences between the Sensitizers and the Repressors on incidence of psychiatric disturbance and self mental status reports were duplicated by the Extreme Repressors and the Extreme Sensitizers. Two of the Extreme Repressors experienced incidents of hallucinations or disorientation in contrast to four of the Extreme Sensitizers. Three of the Extreme Repressors stated they had experienced disturbances in mental status and five of the Extreme Sensitizers made such complaints. There was one Extreme Repressor and one Extreme Sensitizer from the Relaxation group who had incidents of disorientation charted. Reports of mental status disturbances were made by one Extreme Repressor and both Extreme Sensitizers of the Relaxation group. There seems to be little difference here; certainly more Sensitizers showed more disturbance of mental status, although not statistically significant.

Additional evidence of the disturbances experienced by the Extreme Sensitizers, the seven subjects above Q_3, the upper quartile of R-S Scale scores, may be gained by the following abbreviated case histories. Among these seven subjects, only one patient could be said to have experienced a good postoperative period. The R-S Scale scores ranged from 55 to 81. Vignettes of each

patient's postoperative course follow:

Male, R-S 55. Coronary bypass. This patient was given a hostility rating of 7 by the nurses of the cardiac recovery room period and 10 by nurses of the post recovery room period. He received 53 medications for pain and suffered severe respiratory complications caused partly by refusal or inability to stop smoking. It was observed that he was continually angry.

Male, R-S 60. Coronary bypass. He was discharged 14 days postoperatively, and complained bitterly of pain. He received more pain medications than any other subject during the first ten days postoperatively. Repeat angiography showed occluded arterial arteries.

Male, R-S 66. Coronary bypass. This patient gave a self estimate of pain of 100 and complained continually of pain throughout his 12 days of postoperative hospitalization. Since he was disoriented and hallucinating for two days, he stated that he "didn't remember at all what went on in there". That is, he did not remember the time in the cardiac recovery room.

Female, R-S 64. A mitral valve replacement. She estimated her pain at only 42 on the self rating scale and had only eight pain medications postoperatively. However, she complained of pain whenever visited by the investigator. She seemed unable to remember to ask for pain medications, and complained of memory loss and confusion with one day of disorientation charted. Fourteen days elapsed postoperatively before discharge.

Female, R-S 67. A mitral valve replacement. She estimated her pain at 87, and complained resentfully of pain, stating that, "some of the nurses aren't very nice around here." She also spent 14 days in the hospital after her surgery.

Female, R-S 72. Coronary bypass. This woman estimated her pain at 78 and required only 34 medications for pain. She was discharged twelve days postoperatively after an excellent postoperative course.

Female, R-S 81. Coronary bypass. Her self estimate of

> pain was 94. She spent ten days in the cardiac recovery room, nine of them on the respirator, although there were repeated attempts to wean her from it. She spent 16 days in the hospital postoperatively. She complained of confusion and memory loss and had two days of disorientation charted.

Another subject, Male 81, who had a coronary bypass operation, was dropped from the study after his death on the first postoperative day. This was the only death among the subjects of the study. These abbreviated case histories point out the advisability of special planning for those who score high on the R-S Scale when surgery is pending, for special attention will be necessary, whether planned or not.

Although control of variables was sought, and was accomplished to more than a fair degree (See Table 1), another consideration arose. Five subjects included in the study, had histories of some degree of mental disturbance before surgery. Although these were represented in each group, there were fewer in Group 3, the Control group, than in the other two groups. The distribution of disturbances was as follows:

Group 1. Relax, two subjects.
One experienced depression of enough significance prior to surgery, that it was noted on the Progress Notes.
One with a history of drug dependence and accompanying emotional instability.

Group 2. Visit. Two subjects.
One with some brain damage, perhaps from anoxia during a previous cardiac surgery. One who had undergone shock treatment for involutional psychosis, and who continued to have some unusual thought processes.

than were the subjects of the other two groups.

Table 13. Mean and S. D. of Length of Disability, Pulmonary Bypass Time, Days in Cardiac Recovery Room and Postoperative Day of Discharge for Subjects of 3 Groups.

Time	1 Relax	2 Visit	3 Control
Length Disability			
Months (Mean)	38.7	49.0	31.7
S. D.	39.0	45.0	21.0
Pulmonary Bypass			
Minutes (Mean)	125.9	107.7	110.3
S. D.	53.0	58.0	39.0
Cardiac Recovery			
Days (Mean)	5.2	5.2	4.4
S. D.	2.2	2.4	1.2
Postoperative Discharge			
Day (Mean)	12.7	12.4	11.3
S. D.	2.3	2.6	1.2

In addition, it was necessary for two subjects, one from Group 1 and one from Group 2, to return to surgery for control of hemorrhage within eight hours of their initial surgical procedure. This additional surgical trauma and resultant weakening from hemorrhage must also be a factor in the consideration of physical condition.

CHAPTER IV

DISCUSSION

The main focus of this study was on Progressive Relaxation as a nursing intervention for the relief of pain and the related symptoms of pain.

That pain is indeed a problem to patients having open heart surgery was verified by the self estimates of total pain experienced that were given by the subjects in response to questioning. The median estimate of 70 indicated that a considerable amount of pain was present. Complaints of pain were many, during the visits with the investigator, and comments such as, "How long is it going to hurt like this," and, "If only it didn't hurt so much when I move," were frequently heard. That the amount of pain is not proportional to the physical injury is demonstrated by the variations in the estimates of pain and in the numbers of pain medications required. These findings are consistent with those in the literature. (3, 4) Range of the number of pain medications required by each subject was from 8 to 56, with a median of 30. These numbers were found to relate with the R-S Scale score, although not to a statistically significant degree.

The subjects of this study were matched in groups on the variables of age, sex, and diagnosis. Diagnosis did not control for physical condition nor for severity of disease. The subjects of Group 3, the Control group, had fewer months of disability prior to surgery and did require less time on the pulmonary bypass machine during surgery. Studies have indicated that these variables are related to the incidence of psychiatric disturbance after cardiac surgery. (5, 1) Nurses are well aware, too, that for the patient with chronic illness, the resulting exhaustion magnifies pain. (46). With this difference between groups considered, small variations in self estimates of pain for the groups become more meaningful. The means were Group 1, the Relaxation group, 64.1, Group 2, Visiting group, 68.2, and Group 3, the Control group, 66.1. In fact, with the subjects of the control group considered less ill or in better physical condition than the subjects of Group 1, the Relaxation group and Group 2, the Visiting group, the lack of statistically significant findings between the three groups on the first five hypotheses could indicate some measure of significance. It would be expected that subjects who are more ill would exhibit more psychiatric symptoms, need more pain medications, rate themselves as having experienced more pain and exhibit less cooperation and more hostility to staff members. Taking this difference in illness between the groups into consideration, the results of this study might be considered

to have significance.

Progressive Relaxation, used as a treatment for anxiety and tension is taught and learned over a period of months, according to Jacobson. (29, 30). Wolpe, in his treatment of fears of normal individuals, shortens this period to weeks, with results evident at the end of a week of practice. (75) It was thought, in this study, to achieve some benefit at the end of about four days of practice, for patients were previously admitted as long as five days previous to surgery to complete testing procedures. This practice was unfortunately suspended during the time of the study. Patients were discharged after testing and readmitted later for their surgeries. Consequently, there was a shorter period of time elapsing between admission to the hospital and surgical procedure. It was attempted to teach Progressive Relaxation in this study in as little as three days for some subjects. It is believed that these subjects were unable to attain sufficient relaxation in this period of time to be of much assistance to them during the postoperative period when the patients were to use the procedure whenever they thought it appropriate. Nevertheless, subjects did report benefiting from this use. Without exception, the subjects of the Relaxation group expressed gratitude for the introduction of Progressive Relaxation. Comments such as, "I don't know what I would have done without it," and "I'm going to continue to use it," and "It certainly did help," were typical. One subject, who

was being interviewed by another investigator for a different purpose, gave an unsolicited testimonial. The patient had been rehospitalized for an angiography after his surgery, and was being interviewed following the procedure. He reported that "things were pretty uncomfortable until they told me to relax, and I remembered that Mrs. _____ taught me how to do that, so I did--and I even went to sleep." This report was in marked contrast to that of a second patient who had an angiography on the same day and who complained bitterly of the discomfort and pain endured during the procedure. If further studies are made using Progressive Relaxation for hospitalized patients, it is suggested that more time be allowed for the learning of the procedure. Too, it should be of interest, to follow subjects after discharge, in order to discover if there are lasting benefits that have not been investigated in this study.

It is known that subjects do vary in the degree of relaxation it is possible for them to attain, and in the length of time and practice that it takes to gain the same level of relaxation. Assuming that the amount of anxiety relief is proportional to the degree of relaxation, it would seem reasonable to have some physiological measure of the degree of relaxation. Galvonic skin response is one measure. There are other measures of muscular activity similar to electrocardiographs, the electromyograph, EMG, that could be used. These measures might be of use in other studies.

Progressive Relaxation was used as a nursing intervention for the control of psychiatric disturbance by Aiken and Hendrichs. (1) Aiken taught Progressive Relaxation to patients during the presurgery period and provided them with tapes to use during this learning period. Eight per cent or one out of twelve of her subjects who were taught Progressive Relaxation exhibited psychiatric symptoms. In the present study 30 per cent or three of the ten subjects taught Progressive Relaxation experienced periods of disorientation or hallucinations. Thirty per cent is less than other reports from the literature of an incidence of from 40 to 60 per cent. (5, 64)

One of the problems of comparing incidence of psychiatric disturbance between studies is that of definition. In Aikens' study, "transient periods" lasting less than twenty-four hours were excluded. Only five of the eleven subjects in the present study experienced disorientation on more than one day, and these were repeated transient periods for the most part.

Ellis (19) included all sensory disturbances in her study of cardiac surgery patients. She solicited reports of such disturbances by interviews with the patients in the postoperative period. The incidence of such disturbances in her report was 67 per cent. In the present study 58 per cent or seventeen of thirty subjects, reported these experiences. Only 50 per cent of Groups 1 and 3 had such experiences and 60 per cent of the subjects of Group 2. Ellis

reported that a significant number of patients experiencing psychiatric disturbance related this to pain that was not relieved. Her findings were corroborated by the findings of the present study. Higher self estimates of pain were made by those patients who reported disturbances in mental status. However, too, these varied along the R-S Scale continuum. That is, those subjects who scored above the Median R-S Scale score also complained more of mental status disturbance and give higher estimates of pain. Perhaps magnification of these symptoms may be considered a reflection of coping style rather than a cause and effect relationship. To refute the latter statement, the subjects for who observed occasions of disorientation were charted also gave estimates of pain above the median in all but one case. The relationship of mental status disturbance and the presence of pain is a subject that warrants further investigation.

It might be thought that the reduction of psychiatric symptoms observed in the present study might be in part attributed to the continuing relationship between the investigator and the patients in the visiting and the relaxation groups. This phenomenon was commented upon by Meyer (54) who was attempting to discover causes for psychiatric disturbance in patients having cardiac surgery. He visited these patients daily for investigative purposes, only incidentally answering questions and explaining procedures to patients as they asked about them. He found no instances of psychiatric

disturbance among the patients he visited, although, until that time the incidence had been around 60 per cent. He concluded that the reduction in symptoms was due to the allaying of anxiety by the continuing interested relationship with the investigator. This continuing relationship was duplicated in the present study for the subjects of Group 1 and 2. However, the subjects of Group 2, the Visiting Group, contained six subjects who complained of mental disturbance; one more than the five subjects each from Group 1 and Group 3. Consequently, there is little difference that can be attributed to a visiting relationship.

There were problems encountered with the collecting of data for this study. Some of them were foreseen and attempts were made to structure data by specific questions, techniques and procedures in an effort to obtain valid measures.

The self estimates of pain by the patients seemed to be an ego threatening process. One patient remarked, while considering where to draw his line, "I wasn't quite that much of a baby." The patients, when asked to draw a line to indicate "the total amount of pain you have had since surgery", were quite hesitant and unsure. Daily self estimates of pain might have been of greater value, for one tends to forget unpleasant experiences as a protective mechanism. Some type of behavioral observations at previously set times, too, could have been of benefit. These behavioral observations would

require more investigators and perhaps more confounding of findings as different observers were used.

The number of pain medications administered in this study was controlled by factors other than the pain experienced. Those who complained the most of pain did not necessarily receive the most medication. Some of the reasons for withholding medications were physical condition, respiratory difficulties, blood pressure readings, lowered activity, and level of consciousness. The difficulties of measuring pain, well documented in the literature (3, 21, 41, 60, 64, 66, 74), were also met in this study.

One of the procedures used to measure pain responses was the questions addressed to the nurses concerning the hostility and cooperation that had been observed in the patient behavior. At times it was felt that the amount of hostility engendered in the nurses was being measured, and, too, that this rating was an ego involving procedure for the nurse. One head nurse stated, "We don't allow our patients to be uncooperative here. They can't beat the system." The system mentioned by the nurse refers to the early ambulation, coughing, and self care that is a part of the routine nursing of cardiac surgery patients. Consequently, to rate a patient as uncooperative, a nurse would rate her care as being lacking in some way. It is gratefully recognized that, even if this were true, judging by the ratings given to the patients, quite a high degree of objectivity must

have been employed because there were a number of ratings of less than 10, indicating less than full cooperation.

One expected difficulty not encountered concerned the entrance of the investigator into the cardiac recovery room to help the patients practice Progressive Relaxation on the first postoperative day and in the days following. The investigator expected to encounter problems caused by limited patient consciousness, and the presence of life maintaining machines and apparatus. Some patients were on respirators, all had intravenous feedings, and chest drainage tubes, and were being continually monitored by Eletrocardiograph bedside monitors. The level of consciousness varied from patient to patient. However, all patients visited were able to respond to the investigator and seemed appreciative of being visited. All patients of Group 1 practiced Progressive Relaxation with the investigator. No positioning was attempted; that is, if a patient were on his side, he was left in that position, rather than lying on his back, as he is instructed to do in the relaxation instructions. Some waiting was involved on the part of the investigator until such time as the patient could be free from procedures for a short period of time.

In the second part of this study, an attempt was made to investigate the relationship of coping style as measured by the R-S Scale score, with the reactions to the stress of cardiac surgery. Trends were observed that indicated that the Sensitizers do, indeed, have

more problems and react more strongly to the stress of surgery, than do the Repressors. The results were not statistically significant. However, on all variables tested, the results occurred in the expected direction. Particularly, in the incidence of psychiatric symptoms, there was a definite tendency noted for the Sensitizers to exhibit more symptoms. The Sensitizers in general, had more stormy convelescent periods, indicating that special nursing care planning is necessary in the care of Sensitizers, in particular. The Extreme Sensitizers had longer hospital stays and more physical complications as previously described. The disruption that occurs in the care of these patients is detrimental to the patient, the hospital, the staff, and other patients in the hospital. These tendencies noted above could be expected from the literature, since Sensitizers were found to receive a psychosomatic diagnosis oftener than Repressors. (65) The Sensitizers also appear to show less adjustment to life situations according to psychological tests. (10, 15, 38) Consequently, they could be expected to exhibit personality disintegration more frequently.

The administering of the R-S Scale was not an involved procedure. The time usually spent was from twenty to thirty minutes. This would seem time well spent as an adjunct to nursing care planning.

Explorations were also attempted of the effects of Progressive Relaxation with individuals of different coping styles. There were

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

There were two main parts of the study. First, hypotheses were formed concerning Progressive Relaxation as a nursing intervention for the control of pain and behaviors related to pain. Second, coping style, as measured by the R-S continuum, was investigated in relationship to the designated variables of the first part of the study and hypotheses were formulated. Finally, the interaction of the effects of Progressive Relaxation and extreme coping style upon the pain responses of individuals with extreme differences in coping style, was explored. Hypotheses were not formulated but it was expected that a trend could be observed depicting the possible relationships between these two sets of variables.

There was no statistical difference noted on any of the designated variables for both parts of the study. However, for both sections, trends were noted in the expected direction on all but two of the hypotheses. There were very nearly equal measures on the variables of pain medications required and the hostility and

cooperation estimates by the nurses. Inasmuch, as the subjects of Group 3, the Control group, might be considered less ill than the subjects of the other two groups in the first part of the study, trends become more meaningful.

Conclusions

There was no statistical difference on any of the variables tested. Consequently, no definite conclusions nor generalizations may be made. However, a study of this size could well be considered a pilot study; therefore, some inferences from the trends noted in the statistical comparisons, and from the additional descriptive data may be appropriate.

Consequently, the following conclusions are offered:

1. Patients who practice Progressive Relaxation will probably experience fewer incidents of psychiatric disturbance, and will report that the practice was of benefit to them.
2. A longer period of learning time is needed for the Practice of Progressive Relaxation than a few days before the stress of surgery.
3. Sensitizers, in comparison to Repressors, may require more medications for pain, sleep and tension, and will probably complain more of pain and of psychiatric disturbance.
4. The differences noted between the responses of the Extreme

Repressors warrant further study with a larger group of subjects. With a larger group the subjects at the extremes of the R-S continuum would show more difference in coping style. Consequently their responses to stress could be expected to vary more.

5. Extreme Sensitizers will probably have more complications and more problems during their convelescent period than other patients with similar diagnosis.

Recommendations

Because of the trends noted in the relationships of some of the hypotheses, and because of some of the difficulties encountered in the study, it is recommended that:

1. Further studies be undertaken of Progressive Relaxation as a nursing intervention. In these studies, it is further recommended that a longer period of time be alloted for this learning before a time of stress, such as an operation. It is also recommended that some measures of the degree of relaxation be determined. Other settings, such as clinics or physicians' offices, or in home visits by visiting nurses might be appropriate settings for further study.
2. Use of the R-S Scale as an adjunct to nursing care planning be explored, in further studies. Particular attention should

be given Extreme Sensitizers.

3. In any study of pain, it is suggested that additional, multiple, behavioral measures be used, because the number of pain medications received is not an accurate measure of the degree of pain.

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APPENDICES

APPENDIX A

CONSENT FORMS

CONSENT FORM FOR GROUP 1

RELAXATION GROUP

Date _____

I _____ do freely give my consent to be a part of a research study of cardiac surgery patients. This study is conducted by Doris Bafford R. N., A Master of Nursing student in the University of Oregon School of Nursing.

I understand that I will be asked to complete a questionnaire, and will be taught relaxation exercises to practice to help me during my hospital stay. I will also be asked for an evaluation of my experiences before leaving the hospital.

_____

CONSENT FORM FOR GROUP 2

VISITING GROUP

Date _____

I _____ do freely give my consent to be a part of a research study of cardiac surgery patients. This study is conducted by Doris Bafford R. N., a master of Nursing student in the University of Oregon School of Nursing.

I understand that I will be asked to complete a questionnaire, and I will be followed by the investigator through daily visits. I will be asked for an evaluation of my experience before leaving the hospital.

_____

CONSENT FORM FOR GROUP 3

CONTROL GROUP

Date _____

I _____ do freely give my consent to be a part of a research study of cardiac surgery patients. This study is conducted by Doris Bafford R. N., a Master of Nursing student in the University of Oregon School of Nursing.

I understand that I will be asked to complete a questionnaire, and will be asked for an evaluation of my experiences before leaving the hospital.

_____

APPENDIX B

RELAXATION INSTRUCTIONS

Instructions In Progressive Relaxation

Tape 1

I am going to teach you here, relaxation exercises, exercises you can use to conserve your energy, to gather your resources so your body can better do its work of healing. Most people are tense, more than they realize. Even when they feel they are relaxed they have much residual tension. This residual tension uses valuable energy, and sometimes makes ordinary symptoms seem worse than they are. I am going to teach you a method of relaxation that has been found useful in reducing residual tension, so you can go through this surgical experience more comfortably. Relaxation is a learned skill, and just as other skills are learned by practice so is relaxation. Driving a car, playing a piano, learning to type, all such skills require practice. So too does relaxation. These instructions will help you to know the difference between tense muscles and relaxed muscles, to recognize residual tension, and true relaxation. You will be asked to let go, to go negative, to go all the way down to zero. All of these instructions mean to relax your muscles even more than you already have, and to go on relaxing them. I want you to study the difference, as we go through these instructions, between the feeling of a tense muscle and a relaxed muscle, so as we practice you can later check out your muscles for residual tension. It is not

appropriate, of course to be relaxed at all times, however, useless tension in muscles you are not using, wastes valuable energy. A truly relaxed body is a wonderful sensation. You will enjoy the feelings of calmness that spread over your body as you become completely relaxed. Alright, now, lie back comfortably, close your eyes and let yourself relax to the best of your ability. As you relax comfortably, clench your right fist--clench it tight. And tighter, and study the tension as you do so. Feel the tension therein your forearm as well as in your wrist and hand and fingers. Now, let the tension go, let go of the tension in your hand and arm. Let go all the way. Let your fingers loosen, and become relaxed. Study the difference in feeling. Now let yourself go and try to become more relaxed all over. Once more clench your right fist tight, and tighter and study the tension as you do so. All the way up your forearm, your elbow, and now, let go, relax. Your fingers uncurl, straighten out, and again notice the difference, the contrast between the feelings of tension and the good feelings of relaxation. Now clench your left fist tight and tighter, Feel the tension. Now relax. Notice how the comfortable feelings of relaxation replace the uncomfortable tenseness. Now again clench your left fist, and again let the tension go. Let your hand and arm relax. Study the difference. Keep on relaxing--all the way down to zero--more and more--continue letting go, more and more. Now bend both elbows, and tense your

biceps. Tense them hard, and harder, and study the tense uncomfortable feelings all the way up into your shoulders, and in the backs of your arms. Now straighten out your arms. Let them relax and again note the difference. Let the relaxation develop, all the way down to zero. Once more, tense your biceps, bending your arms. Hold the tension and observe it carefully. Feel it in the backs of your arms, in the front of your biceps, up across your shoulders into your back. Now relax. Relax to the best of your ability. Pay close attention to the feelings that have replaced those of tenseness. Now hold your arms out straight, straight and tight, so you feel the tension in the backs of your arms and up into your neck, and now relax, get comfortable again, all the way down to zero. Let the relaxation proceed on its own. Feel comfortably heavy as you let your arms relax more and more. Let the bed hold them up. Continue relaxing your arms further, even when you think you are fully relaxed, continue letting go. Go negative, all the way down to zero. Now we'll pay attention to your head and neck. Let yourself relax to the best of your ability. All the way down to zero. Now, wrinkle up your forehead, raise your eyebrows up high, and now, relax. Smooth out your forehead smooth out. Feel your entire scalp become smoother and smoother. Now frown, crease your brows. Close your eyes tight and tighter. Feel the uncomfortable tension. Now relax your forehead. Let your eyes close gently, comfortably,

easily, as you calmly relax and let go. Notice the good feelings of relaxation all over your forehead, your scalp, eyes and face. Very comfortable. Very relaxed. Feel the difference. Now, clench your jaws. Bite your teeth together. Push your tongue hard against the roof of your mouth. Note the tension and the uncomfortable feelings. Now let yourself become comfortable again. Let your lips slightly part. Enjoy the relaxation. Now purse your lips. Hold them tight and tighter. Now let them go. Relax. Feel the relaxation all over your face, over your forehead, all over your scalp. Let go in your lips, your jaws, tongue and face. Feel the difference. The relaxation proceeds further and further as you become more and more comfortably relaxed. Now, attend to your neck muscles. Push your head back as far as it can go against the pillow. Feel the tension in your neck and in your chin muscles. Roll your head to the right and now to the left, and feel the tension shift as you do so. Straighten your head and bring your chin down on your chest. Now let your head return to a comfortable position. Let the pillow hold up your head, and feel the relaxation in your nexk. All the tensions go--letting go all the way--all the way down to zero. Let the relaxation proceed on its own. All the way over your scalp, all down your neck around to the front of your neck, up over your chin, up over your eyes, over your brow. Your forehead becomes all smoothed out, very smooth, and very comfortable.

Note the difference between the tenseness and the relaxation. Now shrug your shoulders. Bring them up all the way up to your ears--now bring them forward and back and note the tension shift as you move. Now drop your shoulders and relax again. Let the good feelings of relaxation spread from deep in your shoulders over your back and neck and up over your face and scalp, down over your shoulders, down your arms and out over your forearms and out through the tips of your fingers. Let the good feelings of relaxation flow over you. All the way down to zero. Very comfortable and very relaxed. Feel the difference between the tenseness and the relaxation. Feel the comfortable heaviness in your arms and shoulders that go with relaxation. Now breathe in and fill your lungs and hold your breath. Study the tension in your rib cage and around to your back, and down into your stomach and now exhale. Let the walls of your rib cage go, letting the air escape by itself, no effort on your part. Now breathe easily, freely, gently and continue relaxing. Feel the full relaxation and enjoy it fully. Take a deep breath now and note the tension. Fine. Now breathe out and appreciate the relief from tension. You don't have to be tense. Just breathe normally. Let go and enjoy the relaxation. Now lets pay attention to your stomach muscles, your abdominal area. Tighten your stomach muscles. Pull in hard, and note the tension. Now relax, let the muscles loosen. Note the contrast. The tension leaves. You become very relaxed. Now let your

stomach out. Push it out, hard and tense. Notice the tension all over your lower abdomen and around into your back. Now pull in hard and notice the tension shift. Now relax your stomach fully. Let the tension dissolve. Let the relaxation spread. Breathe easily in and out. Notice the rhythmic relaxation deepen as you exhale. Now arch your back. Make your lower back quite hollow, and feel the tension along your spine. Locate that tension in your lower back area. Now relax again. Note the location of the difference in feeling. Let go even more at that location. Let the feelings of relaxation increase as you focus there. Going all the way down to zero. Let the good feelings of relaxation spread all over your body as you breathe comfortably in and out. With each breath you become even more relaxed, more comfortable all over your body. Now flex your buttocks and thighs, pressing down your heels, hard. Feel the tension spots. Now relax. Feel the difference in those spots. All over your thighs and hips. Relax, becoming very comfortable. Now point your toes down, feeling the tension over the fronts of your thighs. Study that tension. Now relax your feet and calf muscles. This time bend your toes toward your face, so you feel tension along your shins. Bring your toes right up. Relax again. Keep relaxing for awhile. Now let yourself relax further all over, relax your feet, ankles, calves and shins. knees, thighs buttocks, and abdomen. Feel the heaviness of your lower body as you relax

still further. Now let the relaxation spread from your stomach muscles, over your back, letting go more and more. Let the relaxation proceed to your upper back, chest, shoulders, neck, and arms and right to the tips of your fingers. Keep relaxing more and more deeply. Make sure no tension has crept into your throat. Relax your neck and jaws, and all your facial muscles. Keep relaxing your whole body like that for awhile. Very comfortable, very relaxed. All the way down to zero. Now it will seem to you that you can become twice as relaxed as you are now, just by taking in a deep breath and letting it go. Now breathe in easily and let it out slowly. Feel how comfortable and relaxed you have become. That's fine. Just carry on relaxing like that. When you wish to get up count backwards from four to one. You will then feel refreshed, alert, wide awake and calm.

Progressive Relaxation Instructions

Tape 2

Now we are going to learn how to become even more relaxed than you have already. A completely relaxed body is a wonderful sensation. Relaxation is a learned skill just as other skills are that are learned by practice. In these instructions you will be asked to let go, to go all the way down to zero. This simply means to let go even further than you already have. Muscles that you are not using when tense, use valuable energy that is needed for your body to do the work of healing. Now settle back as comfortably as you can, lie down, let your arms lie comfortably. Relax your arms, let the tension flow, out of your hands and out of your forearms. Let all the tensions go, all the way down to zero. Let your forearms go, let the tensions flow from your biceps, from the fronts of your arms and from the backs of your arms. Let the tensions flow from your shoulders, from your neck, up over your face. Let the tenseness go from your forehead, as the muscles relax, let the tensions flow from your forehead. The smoothness travels all over your scalp, becoming very smooth, flowing down over your ears, over your neck. Your lips part easily, softly, comfortably as you breathe easily in and out. Your tongue floats in your mouth. Your jaw muscles relax, the tenseness flows away. The tenseness is gone, you let the tenseness go from your neck, from your back, you let go more and more. Let

the feelings of relaxation spread all the way down your back, around your chest. As you breathe easily in and out you become more comfortable and more relaxed. The feelings of relaxation spread, all over your body, all over your abdomen. You let go of the muscles of your abdomen. You let go of the muscles in your buttocks. Let the tensions go. Continue letting go, all the way down to zero. The tensions in your legs follow. You let go more and more down the fronts of your legs, down the backs of your legs. All the tensions and uncomfortable feelings flow down your legs and out through the tips of your toes. You become more and more comfortable and more relaxed. You let your arms relax, your shoulders relax. Your biceps let go, you let go in your neck muscles. You let go in your scalp, your forehead smooths out, the smoothness traveling down over your face. Your eyes close comfortably and easily. Very comfortable and very relaxed. Your lips part softly, comfortably as you let go, and breathe easily in and out. Your tongue floats in your mouth. Your throat muscles relax, all the tensions go. You let go in your neck, you let go over your chest. You breathe easily in and out, very comfortable, very relaxed. You let the feelings of relaxation flow on down your back, around to your stomach. You let go in the muscles of your abdomen, becoming very soft, down over your legs, over the backs of your thighs, down over your calf muscles, over your shins, down over the ankles and out through the tips of your toes.

All the tensions go. You let go further and further, more and more relaxed, all the way down to zero. Very comfortable. You let go of all the tensions, all the uncomfortable feelings. You let go more and more, all the way down to zero. As you breathe comfortably in and out it seems you become even more relaxed. Very comfortable and very relaxed. The soft warm comfortable feelings of relaxation spread as you breathe comfortably, in and out. They spread all over your chest, all over your back, all over your lower abdomen down your legs, over your shins and out through the tips of your toes. The good feelings of relaxation spread all over your body as you become very comfortable and very relaxed. Now it will seem to you as you lie there that you can become even more relaxed, just by taking in a deep breath and letting it go. Now, breathe in. That's fine. Now let it out. Notice how comfortably heavy and relaxed you have become. ------Now just go on relaxing like that for a few minutes. When you want to awake count backwards from four to one and you will find that will awake feeling alert, wide awake and comfortable.

APPENDIX C

DATA

Individual subjects by Group, with accompanying R-S Scale score, number of medications required, self estimates of pain and disorientation.

		Medications		Self Estimate		
Group	R-S Score	Pain	Sleep & Tranq.	Pain	Mental Status	Days Disorientation
1	19	23	11	23	1	0
	52	31	4	92	0	0
	19	12	7	31	0	0
	60	56	8	76	1	0
	39	28	5	50	0	0
	45	50	2	80	3	2
	23	33	5	76	0	2
	81	12	10	94	2	2
	45	26	7	52	2	0
	29	34	4	70	0	0
2	37	46	29	98	2	1
	53	42	4	30	0	0
	55	53	19	79	1	0
	23	33	17	97	3	4
	32	38	7	72	0	0
	24	25	1	48	0	0
	66	27	26	95	3	2
	29	27	4	70	0	0
	29	19	4	52	2	0
	64	8	2	42	3	0
3	67	30	21	87	3	1
	39	34	17	74	3	4
	72	24	2	78	2	1
	36	39	7	70	0	0
	33	22	2	100	0	0
	27	21	5	25	0	0
	42	32	6	37	0	1
	25	29	6	46	3	0
	16	29	1	62	0	0
	52	24	12	82	1	2

Individual scores* of subjects in three groups on the variables of Hostility and Cooperation as estimated by Nurses of two time periods, The cardiac recovery room (CRR), and the post recovery room (Post CRR) period.

Group	CRR		Post CRR	
	H	C	H	C
1	1	10	1	8
	4	5	4	10
	1	9	3	10
	5	6	1	8
	1	10	2	10
	4	6	2	9
	2	5	2	5
	9	7	2	1
	1	10	1	10
	2	8	1	9
2	1	8	2	8
	1	10	1	9
	7	4	10	1
	3	8	6	8
	1	10	0	10
	1	10	2	8
	5	5	5	5
	2	8	1	10
	1	10	1	10
	1	10	1	10
3	1	8	1	10
	4	5	1	3
	2	8	2	5
	1	10	1	10
	2	8	1	7
	1	8	1	10
	6	6	8	4
	1	9	1	10
	1	9	1	10
	3	8	1	8

* A higher score indicates a higher amount of the characteristic observed on both measures.

Individual R-S Scales Scores Grouped by Quartiles With Accompanying Group number, Estimate of Pain, Number of Pain Medications and Days of Disorientation as Charted in Nurses' Notes and Self Psychiatric Rating.

R-S Score	Group #	Pain Est.	# Pain Med.	Days Disorient.	Self Psych.
16	3	62	29	0	1
19	1	23	23	0	0
19	1	31	12	0	0
23	1	76	33	2	0
23	2	97	33	4	3
24	2	48	25	0	0
25	3	46	27	0	3
27	3	25	29	0	0
29	1	70	34	0	0
29	2	70	17	0	0
29	2	52	19	0	2
32	2	72	38	0	0
33	3	100	21	0	0
36	3	70	39	0	0
37	2	98	46	1	2
39	3	74	34	4	3
39	1	50	28	0	0
42	3	37	32	1	0
45	1	80	50	2	3
45	1	52	35	0	2
52	1	92	31	0	0
52	3	82	26	2	1
53	2	30	41	0	1
55	2	79	53	0	0
60	1	76	56	0	1
64	2	70	8	0	0
66	2	95	24	2	3
67	3	79	30	1	1
72	3	87	24	1	2
81	1	94	12	2	2

AN ABSTRACT OF THE THESIS OF

DORIS CURTIN BAFFORD

For the MASTER OF SCIENCE

Date of receiving this degree: June 7, 1974.

Title: PROGRESSIVE RELAXATION AS A NURSING INTERVENTION: A METHOD OF CONTROLLING PAIN IN THE OPEN HEART SURGICAL PATIENT.

Approved: [redacted]

May Rawlinson, Ph. D. Associate Professor
Thesis Adviser

This was an experimental study of volunteer subjects who were scheduled for cardiac surgery at a 389 bed teaching hospital in a metropolitan area. The surgeries were either a mitral or aortic valve replacement or a coronary artery bypass operation.

The main purpose of the study was to observe the effects of Progressive Relaxation when it was invoked as a nursing intervention for the control of pain in the postoperative patient. A second purpose was to investigate the effects of coping style on the reactions to the stress of cardiac surgery. Explorations were also made of the relationships between the responses of the Extreme Sensitizers and the Extreme Repressors with the practice of Progressive Relaxation.

For the first part of the study thirty subjects were assigned to three groups of ten, namely, Group 1, the Relaxation Group, Group 2, the Visiting Group, and Group 3, the Control Group. The subjects of Group 1 were taught Progressive Relaxation by the investigator in two daily 15 minute sessions from the day of admission until the ninth postoperative day excluding the day of surgery. The subjects of Group 2, the Visiting Group were visited twice daily by the investigator, in an attempt to duplicate the interested, supportive relationship that developed along with the teaching of Progressive Relaxation. The Control Group received no visits and no special treatment after initial contact with the investigator until the measurements on the ninth postoperative day. These three Groups were comparable on

the variables of age, sex, diagnosis and coping style as measured by the R-S Scale. The R-S Scale was administered to each subject after admission to the hospital.

For the second part of the study, the responses of the subjects on designated variables were pooled and divided according to the median R-S Scale score. Those above the median were designated as Sensitizers, and those below the median were designated as Repressors. In order to examine the differences between reactions of subjects with extreme differences in coping styles, the subjects were divided by quartile scores of the R-S continuum. Those subjects below Q_1, the lower 25 percent of the subjects according to R-S Scale scores, were named Extreme Repressors. Those subjects of the interquartile range of R-S Scale scores were designated as Neutrals. The subjects above Q_3, the upper 25 percent of the subjects according to the R-S Scale continuum, were designated as Extreme Sensitizers. There were seven Extreme Repressors and seven Extreme Sensitizers and sixteen Neutrals.

Measures of the same dependent variables were used for both parts of the study. These measures were: number of medications required for pain, sleep and tension, self estimates by the subjects of the amount of pain he had experienced and of disturbances in mental status, behavioral observation estimates of hostility and cooperation by the nurses of two postoperative time periods, and

the number of days that disorientation or hallucinations were charted for each subject.

There was no statistical difference shown on the above listed variables for either part of the study. However, for both parts, trends were noted in the expected direction on all variables tested except for the requirement for pain medications in the first part of the study. Here the findings indicated that the requirements of the groups were very nearly equal. Because of these trends, and because the Control group could have been considered less ill, because of less months of disability prior to surgery, it was concluded that Progressive Relaxation might have some benefit as a nursing intervention for the control of pain and that further study was warranted. It was further concluded that the R-S Scale could be a valuable predicter of patient behavior.

It was recommended that further studies be conducted of Progressive Relaxation as a nursing intervention whenever pain and anxiety are present, and that additional physiological measures be used to determine the degree of relaxation attained, as well as behavioral, repeated measures of pain responses. It was also recommended that the R-S Scale be considered as an adjunct to nursing care planning in further studies with special attention given to the planning of the care of the Extreme Sensitizers.