THE AFFECTIVE AND MEDICAL EFFECTS OF DIFFERENT PREOPERATIVE INTERVENTIONS WITH HEART SURGERY PATIENTS

A Dissertation

Presented to

The Faculty of the Department of Psychology

University of Houston

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Philosophy

By

Richard H. Lucas

December, 1975

ACKNOWLEDGEMENTS

I wish to thank the members of my committee for their suggestions and encouragement. I want to thank especially Jim Millham, not only for giving his time and enthusiasm, but also for challenging and teaching me.

The psychology and medical-surgical staffs at the Veterans Administration Hospital were very helpful during the planning and carrying out of this study. Drs. Sidney Cleveland, Kenneth Kopel, Eugene Guinn, and many nurses and secretaries made the day to day work run more smoothly than my usual pessimism would have forecast.

Though they will never read this, I owe more than thanks to those men who allowed me to enter their lives at a time of great uncertainty and suffering. They taught me some things about courage and hope that cannot be seen or felt in the pages of research reports.

Finally, and above all, it was Sherry who listened when I was struggling, pushed when I was too slow, and helped me to laugh when I was too serious.

THE AFFECTIVE AND MEDICAL EFFECTS OF DIFFERENT PREOPERATIVE INTERVENTIONS WITH HEART SURGERY PATIENTS

An Abstract of a Dissertation
Presented to
the Faculty of the Department of Psychology
University of Houston

In Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

By
Richard H. Lucas
December, 1975

ABSTRACT

A growing area of interest in psychosomatic medicine is the relationship between psychological variables and reaction to major surgery. Research has demonstrated beneficial effects of providing patients with information or emotional support prior to surgery. However, previous research has left ambiguous results and reasoning to explain why or how preoperative interventions help improve patients' recovery from surgery.

This study used a four group design to (a) investigate the medical and psychological effects of different modes of preoperative interventions with heart surgery patients, and (b) explore relationships between emotional states and medical recovery. Patients in Group I received a preoperative intervention actively focusing on plans for recovery and future life; Group II patients were asked to merely think about recovery and future plans; Group III patients were given an attention placebo; and Group IV patients were no treatment controls. It was hypothesized that (a) presurgical patients who experience more active, encouraging, and specific planning show better recovery, and (b) there is a relationship between positive affective state and better recovery.

Analysis of results showed no significant difference among the four groups on the medical measures of recovery. However, treatment (Groups I, II, and III) versus no treatment (Group IV) analysis showed significant difference

in the expected direction. No consistent pattern of relationships was found between patients' psychological state immediately following intervention just prior to surgery or during recovery with indices of medical recovery. Initial, pre-intervention testing of anxiety and mood state did show significant correlations with later medical recovery.

Although the levels of interventions used did not distinguish groups, the results support the notion that attention prior to surgery in itself contributes to improved recovery. This effect cautions against research using two group, treatment and control intervention designs that then argue for the effectiveness of the content of the intervention. Data from anxiety and mood testing suggest that the relationship between current mood and current medical recovery is not clear, and that patients' emotional state a few days prior to surgery is a better indicator of recovery than emotional state immediately prior to surgery.

This study suggests (a) the need for further clarification of the attention effects during preoperative interventions, and (b) the investigation of emotional support or information at a point when patients first learn they will have surgery rather than immediately prior to the operative procedure.

TABLE OF CONTENTS

TABLE OF CONTENTS (Cont.)

LIST OF TABLES

CHAPTER I

REVIEW OF THE LITERATURE

Introduction

Research in the area of the psychological implications of surgery and psychological preparation of patients for surgery has existed for some time (e.g., Deutsch, 1942; Elman, 1951; Keats, 1956; Rennecker & Cutler, 1952; Sutherland & Orbach, 1953). Often, early literature was speculative, based on case studies and using psychoanalytic concepts of facing stress. It was not until the nineteen sixties that research began to offer clear documentation of the methods of pre-surgical interventions to lessen the psychological stress and medical complications of major surgery. General findings have supported the hypothesis that pre-surgical information and/or reassurance decrease both psychological and medical operative stress (e.g., Egbert, Battit, Turndorf, & Beecher, 1963; Egbert, Battit, Welch, & Bartlett, 1964; Healy, 1968; Lindeman & Aernam, 1971; Schmitt & Woolridge, 1973).

The increased interest in this area has been due not only to the practical benefits for hospital staff and patients frequently mentioned (c.f. Egbert et al., 1964; Healy, 1968; Lindeman & Aernam, 1971; Schmitt & Woolridge, 1973), but also because of the empirical and theoretical challenge of Irving L. Janis' classic work, Psychological

Stress: Psychoanalytic and Behavioral Studies of Surgical Patients (Janis, 1958). Janis' behavioral research singled out two reaction variables felt important for surgical stress: (a) fear of bodily damage, and (b) externalized anger (Janis, 1958, p. 214). He used these two variables because there was general agreement in the literature regarding their occurrence during an environmental stress (Basowitz, Persky, Korchin, & Grinker, 1955; Cantril, 1943; Kardiner & Spiegel, 1947; Rado, 1950; Wilson, 1944). It has always been the common assumption of research in the surgical area that pre- and postoperatively the patient experiences a crisis not unlike an environmental stress, with bodily threat, trauma, loss of normal control, and rearrangement of cognition (Janis, 1958, pp. 213-222; c.f. also Gruen, 1975).

Janis hypothesized that persons with different levels of pre-crisis stress or "anticipatory fear" would react differently to the stressful event. Through pre- and post-operative interviewing techniques, he found that those with high preoperative fear had high postoperative fear and other emotional upsets; those with low preoperative fear showed anger and resentment; and those with moderate preoperative fear were relatively free from upsets postoperatively (Janis, 1958, p. 274). Janis' descriptive results suggested that persons in the high fear group would benefit from reassurance; those in the medium group, from information about surgery and its conditions; and those in the low group needed to

experience the "work of worrying" to stimulate appropriate psychological defenses against stress (Janis, 1958, pp. 352-388; c.f. also Dripps & Waters, 1941). The literature since Janis has thus focused on personality correlates of coping with surgical stress and pre-surgical interventions that provide either information or support for the patient.

Since the salutary effects of pre-surgical interventions are well documented, the present study focused on Janis' plea that "...investigations should lead to the establishment of empirically validated laws and generalizations about the conditions under which prepatory communications will be effective in increasing stress tolerance" (Janis, 1958, p. 388, emphasis added). In order to investigate those conditions, a two-fold need was perceived: (a) to employ more adequate controls to help clarify those features of pre-surgical interventions that might influence a patient's recovery from surgery; and (b) to assess the psychological effects of different kinds of pre-surgical interventions and correlate patients' emotional states with medical recovery.

Review of the Literature

The psychological literature in the area of surgical patients can be divided into two general categories: (a) those which employ interventions and (b) those that do not (usually case and correlational studies). The focus of the current study was of the former type which will be dealt with secondly.

Non-Intervention Studies. Case studies in themselves are more illustrative than empirical, but they often have heuristic value. They of course lack controls and quantifiable results. Janis used case studies to illustrate his concepts and to highlight some of the unconscious processes operating in his patients (Janis, 1958, p. 313 ff). Abram (1966) examined patients' perceptions of their illness, the surgical procedure, and the intensive care unit. He described anxiety symtoms, such as hyperventilation, which can occur independently of any recognizable physiological correlate. He made a distinction between postoperative delirium (a confused, psychotic-like state frequently encountered when a person first awakens after serious surgery) resulting from toxic etiology versus delirium resulting from extreme disruption of sensory input.

Dlin, Fischer, and Huddell (1968) interviewed 60 open heart surgical patients with the clinical assumption that such surgery is usually catastrophic and that the patient experiences a "major re-arrangement of his concept of himself and his life situation" (p.599). Because of this, and since "psychic and emotional adjustments are more often left to chance by the medical and surgical teams" (p. 599), the authors argue that each patient should be seen by a psychiatrist before and after surgery. Though the last part is open for debate, the fact of "chance" psychological help in the surgical-medical setting is a concern voiced by others

working in this area (Healy, 1968; Lindeman & Aernam, 1971).

Dlin et al. outlined six stages that most patients go through: initial shock, impaired ego defenses, presymbiotic, symbiotic, resolution of symbiotic union, and return to presurgical personality. The symbiotic stages are the medically necessary dependences on doctors and equipment in the intesive care unit. Dlin et al. outlined pre- and postoperative therapeutic techniques which would help patients go through these stages with less trauma: providing a "human anchor" of support the patient can rely on throughout the hospitalization, assessing strengths and weaknesses, discussing worries, anticipating problems, talking with key family members, being present upon awakening, explaining the situation of the intensive care unit, introducing personnel, and so forth. They contended that it takes many weeks and even months for a psychiatrist to become sufficiently comfortable and competent to become this stabilizing reality factor before, during, and after surgery.

The case history approach in this area lacks more than controls and quantifiable results. The distinctions between complications arising from psychological factors or physiological facts may be clear in certain areas of psychosomatic medicine, but the interplay of cause and effect in the postoperative situation of major surgery is extremely difficult to sort out. As Cohen and Lazarus (1973) state: no one really knows what recovery is because it is such a complex

set of physiological, psychological, social, and behavioral events.

Dlin et al. certainly offer helpful guidelines in dealing with patients, but their assertions that the human anchor must be a psychiatrist who is specially trained and who maintains close contact with patient and family make the results of these studies quite impractical. Dlin and his associates are well aware of the complexities of assessing the surgical patient's status, and mention that the whole concept of a "normal" reaction under the extremely disrupting state of open heart surgery is difficult to ascertain. They illustrate the pitfalls of employing usual psychiatric impressions when dealing with surgical patients: if the patient does not react, he is "denying"; if he is concerned over the trivial, he is "displacing"; if he is apprehensive, he is "overanxious"; if he cries, he is "depressed." Yet, these behavioral reactions can be very appropriate and adaptive under severe surgical stress. So the authors suggest that the normal reaction is mild anxiety, mild depression, acceptance of risks, hyper-preparedness for a struggle, and a realistic determination for survival. But certainly, these observations, without controls, without knowing how the environment can affect them, and with the prerequisite of a complex and poorly defined psychiatric treatment add very little to knowledge about improving the patient's lot. Furthermore, there is always the criticism

that, for intervention purposes, the patient's care is left just as much to the "chance" of the mental health professional's intuition and theoretical orientation as it is with the intuition and help of the surgical-medical staff.

Generally, correlational studies have attempted to deliniate personality factors that might influence the postoperative recovery period. Weiss (1966) administered the MMPI, Taylor Manifest Anxiety Scale, Cornell Medical Index, and Wechsler Memory Scale to open-heart surgery patients pre- and postoperatively. Although no single test or test scale distinguished those patients who had delirium from those who did not, Weiss states that the general test configuration showed that patients' reactions to surgery depend on ability to respond effectively to overwhelming stress. He used a control group of other major surgery patients, but reported no comparisons. Considering the paucity of his results, it appears that such a battery of tests is of little help in evaluating or treating postoperative problems preoperatively. Henrichs and Waters (1972) used procedures similar to Weiss and found that subjects with poor psychological adjustment postoperatively had varied personality profiles. The authors conclude that individualized therapeutic provisions are needed for heart patients. But again, there is little clarity on which tests give which results to indicate which provisions.

Another example of the correlation type is the study of

By-pass patients were seen by Boyd, Yeager, and McMillan (1973). Preoperative, postoperative, and 3,6, and 12 month follow-up by means of psychological testing and psychiatric interviews were employed on 27 Veterans Administration patients. Good and poor adjustment groups were determined, based on the promptness with which the patient returned to work and resumed a fulfilling life. They report that differences in coping techniques distinguished the two groups. The good adjustment group was distinguished from the poor group by dealing directly with their concern for their declining health, assuming some responsibility in doctor-patient communication, accepting doctors' authority only after consideration, and dealing with past trauma promptly. The good adjustment group also actively sought to clarify ambiguity and "were oriented to the future in their mental life and maintained a vibrant active self-image" (p. 40). This study, one of a few that followed patients after discharge, would suggest interventions that increase these attributes in all patients.

Cohen and Lazarus (1973) used preoperative interviews and tests of coping styles to study 61 patients who were to undergo various kinds of surgery. An independent observer and the patients themselves rated their anxiety levels. Postoperative recovery measures adapted after Andrews (1967) included: number of days in hospital, number of pain medications, number of minor complications, and number of

negative psychological reactions. Vigilant, middle, and avoidant groups were distinguished by sentence completion tests. Results showed that the avoidant and middle groups recovered faster, especially for days in the hospital and minor complications; and those whose test results showed them to be copers required more pain medication. Patients who reported high anxiety were significantly higher in number of adverse psychological reactions postoperatively. A repression-sensitization scale, thought to indicate the same cognitive style as avoidance-vigilance, did not distinguish patients with respect to the recovery variables. There were no significant age or social class differences, and the raters' observations were not related to the recovery variables.

The authors point out that previous research would not predict a faster recovery for the avoidant group (Chodoff, Friedman, & Hamburg, 1964; Goldstein, Jones, Clemens, Flagg, & Alexander, 1965; Janis, 1958). Cohen and Lazarus say, however, that Janis' work was restricted to pre- and post emotional reactions and not modes of coping. They neglect to say just what relationship their measurements of avoiding has to concepts such as denying and low anticipatory fear. It is important to note that tests designed to measure dispositional or typical coping styles (versus active or current style of coping under the stress) were not clearly related to the recovery variables, which is reminiscent of

the testing results of Weiss (1966) and Henrich and Waters (1972) mentioned above. Cohen and Lazarus conclude by saying that hyper-vigilance can be detrimental and denial can be helpful when positive outcome of the surgery is expected. Janis would certainly agree with the first half of that statement (his high anticipatory fear group), and might add that the reactive effects of the preoperative testing would have stimulated the work of worrying in the denying (or avoiding) group, producing better recovery; whereas the testing effect in the other group, having the same reactive effect, would not predict better recovery.

Auerbach (1973) and Spielberger (1973), in separate articles that appear to report the same study, investigated changes in anxiety during the course of hospitalization. State and trait anxiety tests were given at various points before and after surgery to 56 subjects. The results showed that anxiety state began to decrease slightly just prior to surgery and then decline rapidly three to nine days postoperatively. Trait anxiety did not change during the course of hospitalization. No correlations were made with medical recovery, however, and the results seem to contribute most to supporting the validity of their state and trait anxiety measures.

The above methods of studying surgical patients are obviously very complex. For instance, there is no way to relate a concept such as high vigilance from test results to

the patient's actual experience in the hospital. What is the patient vigilant or anxious about? Can "vigilance" be equated with information gathering, which is generally found to be a positive factor in recovery, or anxiety state or trait related to increase or decrease in denial? The fact that dispositional repression-sensitization was not significantly related to recovery variables in Cohen and Lazarus' study makes questionable just what coping modes were operating for the patients. Weiss (1966) said from his uncertain results that a patient's adaptation and psychological mechanisms for facing stress can only be determined under conditions of immediate stress. It is also notable that patients' self-reports of anxiety were the most predictive factor for postoperative psychological stress, and that raters could not observe this anxiety (Cohen & Lazarus, 1973). Cassady and Altrochi (1960) also found that raters could not agree in judging patients' high, medium, or low anxiety.

Attempts to predict the postoperative condition of confusion, disorientation, or hallucinations that occur frequently after heart surgery -- referred to as post-cardiotomy delirium (PCD) --have also met with mixed results. Silverstein (1960) performed neurological and psychological testing preoperatively. Psychological testing (Wechsler-Bellvue IQ and Bender-Gestalt) failed to distinguish those who developed PCD from those who did not. Blachly and

Starr (1964) made daily check lists on patients' mental status, although they did not include the list in their report. PCD was associated with seriousness of the medical problems and surgical procedures, whereas no relationship was found with IQ, preoperative psychiatric symptoms, cerebral vascular accident, or duration and knowledge of disease. Preoperative psychological disturbance was related to death following surgery, however. Later, Blachly (1967) found similar results, with the seriousness of the illness related to PCD but no psychological indices related to PCD. Egerton and Kay (1964) followed 60 patients through the course of surgery and found PCD related to family history of psychosis, previous brain danage, mitral valve lesion, marital instability, and "overwhelming" personal problems not related to the surgery. No correlations were found with IQ, educational level, type of work or work performance, or prior mental disorder of the patient. These findings are generally supported by Kornfield (1965) in a similar study.

Rubinstein and Thomas (1970), using interviews, found PCD related to organic brain syndrome and psychological symptoms. Morse and Litin (1968) matched groups who had PCD and those who did not and found, using interview data, that those who denied anxiety had less PCD, which is similar to the findings mentioned above that some kind of denial can facilitate recovery. Kimball (1969) similarly

found that "euphoria" or extreme denial resulted in faster recovery, but these patients experienced more depression than those who did not deny.

Elsberry (1972) summarizes her review of correlational studies of heart patients by saying that few consistent relationships among psychological variables and delirium have been found. And "there is no evidence from these studies that preoperative personality has any consistent relationship to the development of PCD" (p. 224). Most consistent findings have to do with the seriousness of the physical stress, disease, and surgical operations--which is not a startling conclusion. Granted, these studies deal with an extreme postoperative reaction (PCD), but they would imply similar results with other complications.

The correlations studies contribute little in the way of predicting medical reaction to surgery. Concepts and measurements of psychological variables are usually vague. Even if there were certain indicators of postoperative difficulties, there is nothing to suggest how to prevent them. Often, the conclusions are trivial, such as saying that more individualized treatment is needed or that how a person reacts to stress depends on adequate coping mechanisms. Also, there is no control over the reactive effects of administering tests or the interactive effects of pre- and post testing which tend to sensitize subjects (c.f. Campbell & Stanley, 1963). Basically, the problem

is not knowing what the patient is being sensitized to.

Studies Using Preoperative Interventions. The other line of research in relating psychological and physical variables has been direct intervention preoperatively as the independent variable and psychological and medical outcome as the dependent measure. Intervention studies have the twofold advantage over correlational studies of (a) providing clearer cause-effect relationships (provided controls are adequately employed), and (b) offering practical procedures for decreasing psychological and physical problems for the patient.

Haszen (1970) talked with ten patients who were to undergo gall bladder operations. She talked about their expectations and feelings, clarifying in a non-directive way, and told patients of the advantage of their own active participation in convelescence. Using pre- and postoperative tests of anxiety level, aggression, emotions, and perceptual and motor abilities, she found less anxiety, more realistic attitudes toward the medical staff, and quicker recovery of motor functions. Because only an abstract of this article is available, it is unclear how she used controls. A post-test only control group could have helped clarify if the improvement seen in the experimental subjects was due to expectancy or practice effects. The report indicates that measurement of emotional factors was poor (unexplained), and the author attributed the results to giving patients information about surgery rather than the emotional support.

Bolen (1973) reviewed the work of one physician who combined meditation with cobolt treatment for cancer and cancer surgery, and anecdotally states that medical improvment was correlated with degree of participation in the treatment. No statistics were given, and experimenter-subject bias factors may have been operating in this method. In a similar vein, Rodgers (1972) suggests that presenting the preoperative patient with information and ideas about surgery in a pleasing, simple, and direct style helps patients relax and focus less on pain. But no clear idea of what the preoperative intervention entailed or what postoperative measures were taken is presented. Similarly, control groups were lacking. Perhaps an extreme example comes from Gruen (1972) who used hypnosis and focused on quick recovery of physiological functions before heart surgery. Medical parameters of recovery, return to work, and discharge were above average, but within normal limits. There was only one subject in Gruen's study (himself), but he did report that he "felt good" during the recovery phase.

Burgess, Kirklin, and Steinhilber (1967) used the intervention of a brief psychiatric interview and supportive therapy by a psychiatrist. Thrity-six consecutive heart surgery patients comprised the experimental group. Two control groups were used: consecutive surgery patients before, and consecutive surgery patients after the intervention group. Follow-up interviews 6 and 11 months later

showed the experimental group to have fewer adjustment problems. Interestingly, the second control group (occuring in time after the experimental group) had fewer adjustment problems that the first control group (occuring before the experimental group). Yet, there was no preoperative intervention with either control group. This study raises several issues. First, were the post-discharge interviewers blind with respect to the groups? Secondly, the difference in control groups strongly suggests that the intervention created changes somewhere in the staff or institution, perhaps similar to the self-fulfilling prophecy or expectancy effect (Rosenthal, 1959, 1966; Rosenthal & Jacobson, 1968). Thirdly, the control groups lacked an intervention for attention only to equate them with the experimental group. If this had been done, would there have been differences in the two control groups or would it have diminished the differences between the control groups and experimental group? It seems quite clear from the differences in the two control groups that the intervention, though directed only toward the patient, had an effect on future patients in the same setting who never saw the experimenters. Despite this, not one study in he literature has ever controlled for this factor. Furthermore it raises the speculation that if this effect is present even after the experimenters leave the scene, then such influences as attention, expectations, etc. must be present for all experimental subjects in studies

where attention is not controlled. This could easily cause differences in postoperative measures between the experimental group and any control group not receiving some preoperative intervention.

Lazarus and Hagens (1968) also intervened with a psychiatrist pre- and postoperatively to give emotional support to the patients and employed a control group. They report that 11 of 33 patients in the control group and only 3 of 21 in the experimental group had major adverse psychiatric reactions following surgery. The measures of adverse reactions were doctor and nurse notes in charts that clearly indicated a behavioral abnormality. This study appears to argue well for the intervention, and certainly implies its beneficial effects. Upon closer examination, however, we see that the same criticism holds as for the previous study as to staff and/or patient expectations created by the intervention with one group and not the other. Also, the control subjects were in a different environment than the experimental group, even though they all were operated on by the same surgical team. The controls had private rooms, in contrast to the experimental patients who recovered in an open ward. Furthermore, the control patients were in a different hospital, implying a different recovery staff and a different set of doctors and nurses whose notes were used as the dependent measure. Another group in each hospital might have determined if the

experimental differences were due to the intervention or the environment. But as the study stands, the rival hypothesis that it was the patient's environment rather than the specific psychiatric intervention is still plausible.

Healy (1968) reports rather dramatic results in her study of 321 elective surgery patients. There were 181 subjects in the experimental group and 140 in the control group. Each experimental S was assigned "his nurse" who discussed with him in detail the expectations for surgery and recovery. These patients were given explicit instructions and practice in postoperative deep breathing and leg exercises, and were given the rationale for all postoperative medical equipment. After surgery, the nurse would maintain contact with her patient on the procedures. The control group received the "same care, reassurance, and explanation" (p. 63), but they lacked the specific detail, they were not given specific instructions or practice on the postoperative exercises, and were not followed through treatment by a special nurse. Healy's results are as follows: of the 181 experimental Ss, 135 were discharged sooner than expected, versus only 3 of the 140 Ss in the control group; 160 of the experimental Ss were on oral medications on the 4th day and off medications on the 6th postoperative day, whereas most of the control Ss were not given oral medications until the 6-7th day and 13 Ss were still on medication at discharge; there were 16 major complications reported for the control

group as compared to only 3 for the experimental group; and 176 of the experimental patients' familes left on the night of surgery whereas over half of the control group had some family members stay at the hospital.

These statistics are nothing short of astounding, and the monetary savings alone would delight the administration of any hospital. From a methodological viewpoint, however, the explanation of the results is not as clear. First, the added factor of explicit individual attention mentioned above is present. Secondly, since the nurse giving the special care met with the surgical and recovery teams, it is clear the staff was not blind with respect to the study, which could have influenced their treatment of the patient. Thirdly, the explicit practice and encouragement of the postoperative self care for the experimental group would certainly make a difference in medical outcome. It is a bit like saying that one group of patients who were told to take antibiotics and did take them recovered better from infections than another group who were told about the beneficial effects of the drug but did not take it. A similar comment is in order for the effect on the families. The special care nurse intervened with the families to allay fears and reassure them if the operation took longer or some other problem arose. It is not surprising that these families went home after the patient's nurse said everything is okay and she would be there. Healy does answer the

question posed in her title: "Does preoperative instruction make a difference?" and this critique is not meant to dispute her affirmative answer as long as the difference is seen as a simple relationship of extra medical care improving medical results. From a methodological and theoretical perspective, however, it is not clear what specific factors are influincing the different outcomes of the two groups.

Lindeman and Aernam (1971) used a very similar design and procedure as Healy. Their emphasis was on systematic training of one group of nurses to act as the special care nurses. The control group had nurses who relied on "intution" and usual practice to instruct the patients. A similar critique as with Healy's study can be made here, with the added dimension that in this study the expectation and practice effects can also be applied to the special care nurses as well as their experimental patients.

Egbert, Battit, Turndorf, and Beecher (1963) used a four group design to control for different effects. They randomly placed 449 patients of elective surgery into four groups. The day before surgery each Ss received one of the following four interventions, depending on group placement: (a) pentobarbital medication, or (b) visit by anesthetist who explained the details of surgery and recovery, and lended support, or (c) both pentobarbital and the anesthetist's visit, or (d) no intervention. A nurse, blind to the study, interviewed each patient in the study after the intervention

and made ratings as to whether the patient felt drowsy, relaxed, or nervous, and a general rating if the patient's psychological condition was adequate. Results showed that the effect of the pentobarbital alone did not distinguish the groups, but patients visited by the anesthetist were rated significantly lower on the measure of "looks nervous", whether they were given medication or not (groups 2 and 3, respectively). The authors' point and only conclusion is that the human attention and information provided by the doctor has an overt calming effect on the patient as measured by a nurse's rating. No indices of recovery were given which would have helped clarify the effect of the visit. As the study stands, it says little more than what is commonly known: information and reassurance from a doctor tends to reassure a patient.

Egbert, in another study similar to Healy, focused on the preoperative visit's effects on reducing pain post-operatively (Egbert, Battit, Welch, & Bartlett, 1964). Ninety-seven patients undergoing various intra-abdominal surgeries were divided into a control and experimental group. The experimental Ss were visited by an anesthetist the evening before surgery and given detailed explanations about the pain they would experience, how long it would last, why they would have the pain, and how they could relax themselves to reduce pain. This same procedure was repeated for the experimental group the afternoon after

surgery and once to twice a day until the patient was completely off narcotics. The surgical and medical personnel were blind with respect to the study. Another anesthetist, blind to the study, visited the experimental and control groups after surgery and evaluated their pain and psychological reactions.

The dependent measure was the amount of pain medication requested by the patients. On the day of surgery, there were no signficant differences between the two groups. However, the experimental group asked for significantly less medication on the following four days. They were also sent home on an avergage of 2.7 days earlier, which was statistically significant. The independent rater evaluated the experimental Ss as more comfortable and in better physical and psychological health. The authors concluded that this result "shows that these patients (experimental) did not suffer through the postoperative course just to please the doctor" (p. 826). That statement is a bit difficult to understand since (a) it was a doctor who rated them, (b) the rating was from the subjective report of the patients, and (c) it is highly unlikely that a patient who was programmed to expect certain kinds of pain from one doctor would present a different story to another doctor. The unexplained purpose of the blind rater was to control for attention effects that create certain expectations, but only a control group receiving

an attention placebo could control for that.

Egbert and his associates acknowledge that most patients will respond to some kind of placebo effect (c.f. also Houde, Wallenstein, & Rogers, 1960 who put the number near 9 out of 10). In fact, Egbert et al. call their intervention "superficial psychotherapy" (p. 827) because their doctors were not trained in psychiatry, and they call the effect an "active placebo action" presumably because the pain reduction was accomplished without use of specific psychotherapeutic techniques or psychopharmacological agents. They go one step farther in their recognition of the effects of attention, information, and support by saying that the interventions changed the meaning of the postoperative situation for the patients. They also report that the pre- and postoperative interventions changed the meaning of the situation for the anesthetist--where he ceases to be more than a clever technician and takes an active and continous care role in the patient's welfare.

If the placebo effect is as strong as the authors claim, was it the attention the patients received, the information, or the daily contact with a member of the surgical team that contributed to the changes? Or are the results explainable because the implication the patient received from the intervention was that pain medication was superfluous? Or was it that the patient knew he was expected to know the location and duration of the pain and

was hesitant to ask for medication to alleviate a situation the staff already knew about? Or were there reactive effects on the nursing personnel who, although blind to the study, would certainly be aware that special care was given with the anesthetist making one or two daily visits?

Another study of this type which offers extra preparation for surgery is Schmitt and Woolridge's (1973). They matched two groups of patients according to type of elective surgery. The experimental Ss received a small group discussion with other patients about to undergo surgery the day before the operation. The patients were told by the nurse leading the group that its purpose was to talk about the surgery and feelings toward it. Four common elements emerged in the discussions: (a) need for orientation-type information; (b) requests for knowledge about surgery; (c) discussion of feelings about surgery; and (d) health teaching. Nineteen of the 24 experimental Ss were seen again individually on the morning of surgery. The 26 controls were given routine care and did not meet in any group. Three sets of dependent measures were used: (a) verbal indicators (questionnaires administered to all Ss on the day of discharge asking about anxiety prior to surgery and quality of sleep); (b) interactional indicators (from charts such as progress notes, graphic records, and operative records); and (c) physiological indicators (such as amount and length of anesthesia, minor complications,

urinary retention, pulse and blood pressure).

The results showed that the experimental Ss reported feeling less anxious the morning of surgery. However, there was only a slight difference in the two groups the evening before on self-reported anxiety. Schmitt and Woolridge attribute this to the possibility that the group discussion may have brought anxieties to the surface for the experimental Ss that day. The unstated implication is that the intervention allayed anxieties to a certain extend but created others, thus neutralizing anxiety overall the day before surgery. But the longer range effect of the group discussion (the next day and following) was to lessen anxiety for those who took part in the group. The experimental Ss reported sleeping better postoperatively. But in the group discussions they were encouraged to ask for sleeping medication, and indeed the experimental group did ask for more sleeping medication than the controls. On rather scant statistical evidence (using percentages with groups as small as five or six), Schmitt and Woolridge argue that for both the control and experimental Ss, those who asked for sleeping medication slept better than those who did not ask, whether they received the medication or not (not everyone who received medication had asked). The authors attribute this to the effect of a patient's asking <u>per se</u>, and hence feeling more control over his situation. Physiological measurements showed that the experimental

group needed to be on anesthesia for a significantly shorter period of time than the control group, had significantly less urinary retention, and had less increase in blood pressure and pulse rate. Although these levels were not medically important (that is, considered as complications), Schmitt and Woolridge attribute the differences to reduced stress among the experimental Ss. Interactional measures showed that the experimental Ss took less medication oeverall, resumed oral intake sooner, and were discharged 2.1 days sooner (statistically significant) than their matched controls.

Discussing the results, Schmitt and Woolridge see the differences as related to stress-reduction brought about by the experimental patients' contact with a nurse who showed understanding and interest in them as individuals. The effect of this reduction was a feeling of confidence and competence to deal with the situation. Of course, there is speculation since no measures of confidence or competence were taken. The same methodological problems as mentioned above apply here with respect to attention, expectations, etc. Since Schmitt and Woolridge mention the patients' increased confidence and competence, however, it is interesting to note that when personnel met with patients to explain procedures, expectations, etc. and not with the control subjects, it was just as likely that the experimental patients experienced an increased confidence and competence in the staff. And this could be reflected in

better interactional, verbal, and even physiological indices. In none of the studies is there any serious attempt to find out what emotional effect the intervention had on the patient, except for the one mentioned where a nurse rated anxiety level--a technique shown to be unreliable in other studies. Schmitt and Woolridge themselves question the validity of retrospective self-reports of anxiety by the patient, but they do not mention the very plausible reactive effect created by being given special care on the more positive self-reports of those who received that care.

CHAPTER II

PURPOSE OF THE STUDY

Critique of Previous Research

The foregoing review has outlined research in the area of understanding and changing surgical patients' psychological and medical reactions to major surgery. The correlational studies, where there was no intervention except for the pre-test, showed disagreement on some points (e.g., whether denying facilitates or inhibits recovery), and agreement on others (high vigilance or fear retards recovery). The concepts used, especially with testing instruments, were vague as they related to the patient's hospital experience. Dependent measures, especially from interviews, were often left to the imagination of the reader (e.g., "psychiatric symptoms", "personal problems", "negative psychological reactions").

There are two other major reasons for including these studies in reference to the present study. First, assessment of pre-surgical personality styles as they relate to the impending surgery is very difficult. Even if an ostensibly simple judgment of anxiety level were used, the evidence indicates that this is difficult to assess. It is probably this assessment difficulty which leads those who used well-accepted, standardized tests to conclude more with tautologies than results or suggestions for further research. The reference here is to statements such as

saying the patient's reaction to surgery appeared to be based on his ability to respond effectively to overwhelming stress, or the patient's preoperative personality determines postoperative recovery, so individually selected therapeutic provisions should be made. Perhaps the difficulty also lies in the variety of concepts used such as coping, avoiding, denying, repression, etc., that are difficult to relate to each other, and for which it is difficult to ascertain if they are actively in use by the patient at the time of his hospital stress.

The second point is that whether it be personality variables, styles of coping, or demographical data that relate to postoperative recovery, the clinical use of the information is quite unlikely. Administering and assessing tests, relating the findings to other patient characteristics, and then altering care to meet hypothesized problems is a task few surgical-medical units would probably care to undertake. The fact is that if major surgery is indicated, it will be performed by a competent surgical team and the recovery will be under a competent medical team who will react medically and psychologically to a patient as they deem fit regardless if the patient has a family history of psychosis, shows evidence of organic brain syndrome, or appears to be denying.

The intervention studies have shown clearly that extra preoperative psychological or medical care lead to better

postoperative results. There is something simple and straightforward about this; but for research purposes, it raises several questions already mentioned.

First, there are possible expectation effects of any intervention for the group receiving that intervention that do not occur with a control group that is not given that extra experience. Built into every intervention is the expectation that the patient will behave or feel differently the next time the experimenter comes to see him. These effects would be most strong when the dependent measure is the patient's self-report or interview. The placebo effect of expecting something to happen, especially vis-a-vis the authority of hospital staff would certainly play a part in outcome. This would occur for the patient, but also for the experimental team's recording of results--a fact Janis was well aware of and cautioned against (Janis, 1958, p 274).

A second, related issue was brought out by Burgess et al. (1967) regarding the change in the second control group. The presence of the interveners in the setting apparently changed the setting and affected patients who entered it weeks afterard. This cautions against using control groups after the intervention, but points to a more important issue, and that is the effect staff can have on patients' recovery even though blind with respect to specific hypotheses.

The third major issue is more an observation: positive outcomes are reported using everything from expert psychiatric

therapy several times to nurses untrained in psychology discussing patients' feelings just once before surgery. Reviewing the studies from this perspective, one could hypothesize that any type of preoperative attention, concern, information, etc. would be of help. The problem is that research in this area has not clarified this issue. Whether a patient is given direct instructions and practice in future behavior or is given a willing ear--both appear effective in helping the patient cope medically and psychologically. One wonders whether patients asked to do something unrelated to their surgery--such as give a lecture to the staff on their employment, or talk about the weather and the hospital food--might not produce the same results. The point may seem arbitrary, but it is extremely important because it has never been questioned in this area of research where claims are made for the effectiveness of a wide variety of interventions.

The common assumption of all intervention studies is that in the intervention process there is some learning on the part of the patients--be it specific recovery behavior or creating and reinforcing a psychological frameof mind that is more adept at coping with surgical stress. The results show that something happens, presumably during the intervention and then afterwards. The question raised here is: What happens? Is the functional result of the preoperative intervention to (a) provide active guidance

for future behavior; (b) allow the patient to become aware of his situation and let his existing coping processes come to the fore and function more adequately; (c) provide extra attention, regardless of the content, that the patient somehow translates into more co-operative recovery; or (d) create a generalized expectation for better recovery in the setting? These issues are of theoretical importance in understanding the effects of interventions, of methodological importance in designing research paradigms, and of practical importance in planning preoperative preparation for surgery in the clinical setting.

In summary, research has demonstrated beneficial results from a variety of interventions on medical recovery and to a lesser extent on psychological recovery. The research designs, however, make it very difficult to disentangle the effects of a particular mode of intervention from other factors such as expectancy and attention effects. Consequently, extactly what the effects are and how these effects come about are ambiguous at this stage. Clarifying the ambiguity of what the effects are and how they come about suggests a study whose methodology can begin to sort out the issues. The present study was designed to approach answers in clarifying what some of the parameters of effective interventions might be.

Theoretical Orientation

When we speak of planning intervention research with surgical patients, two major issues of theoretical importance are the kind of surgery and the choice of an intervention. Previous research has not given the former issue much attention, but reflection would indicate that the type of physical-emotional stress a person experiences is definitely related to the type of trauma he is exposed to and the implications of this event for his life.

Open Heart Surgery Patients. Patients of major heart surgery were chosen for this study because, according to Dlin et al. (1968) and Hite (1970), patients undergoing heart surgery experience a major readjustment of their life, at least temporarily. Heart surgery presents the patient, not only with a severe physical stress, but frequently with many psychological and sociological implications as well. My own experience with postcardiotomy and post myocardial infarction patients has shown that the medical, psychological, sociological, and economic stresses are frequently in active battle with the patient's modes of coping.

An explicit statement of the disruption of a person's life that can occur comes, not from a description of surgery, but from an analagous experience. Gruen (1975), in a study similar to the present one, describes the situation of heart attack patients in stark terms. The patient

> ...is faced with the sudden termination of his customary life-style, which has abruptly

> passed out of his control. He suffers pain, strange symptoms, and a frightening disruption of physiological processes that were once either automatic or taken for granted. He is afraid of getting worse or even of dying. He must leave his immediate future up to the 'experts,' most of whom he has never met before. He is concerned about the disruption in his family, friend, and work circles...and he worries about his capacity to reenter these circles. He faces an uncertain future in which resumption of normal activity is questionable for him.... he questions the reasons why he became ill and what he can do to prevent a recurrence (p. 223).

Gruen describes the disruption of the person's usual planning, continuity, and order, and states that the hallmark of coronary artery disease is uncertainty. It is no surprise that anxiety and depression are the most frequently mentioned accompaniments of traumatic heart disease (e.g., Rosen & Bibring, 1966; Wynn, 1967). Thus it is reasonable to focus on future uncertainty, anxiety, and depression as variables in the process of surgical treatment of heart disease.

There is another, quite intriguing aspect about heart surgery. Persons who undergo coronary artery by-pass or valve replacement surgery (the two most common types of open-heart surgery) usually have a long history of disease. Their lives have been reduced in activity; employment has been minimal or impossible for some; pain is sometimes a daily occurrence; and, perhaps most importantly, they are well aware that they are prime risks for a heart attack that can occur at any time and that will be very severe or fatal. Surgery offers hope--but hope for what? The surgical procedure is relatively new and quite sophisticated. Only

major medical institutions can afford the equipment and experts to perform it. No guarentee can be given that the patient's life will change. In short, it is reasonable to assume that open heart surgery places the patient at a crossroads where uncertainty is not lessened, but if anything it is given a temporary boost. No doubt, heart surgery focuses a person's thoughts and feelings on his past and future life in a major way.

Future Orientation Intervention. The content of the preoperative intervention for this study was two levels of orientation to the patient's future life. This type of intervention was chosen for several reasons. One is that, following Janis (1958, pp. 303-312; pp. 350-359), the patient's mental rehearsal of future stressful events seems to be the key to pre-crisis intervention. Another reason comes from the research evidence that a person will survive medical crisis better if he has specific plans for the time after the crisis (Cristopherson & Lunde, 1971). Also, the fears patients express are often of a future-orientation, such as economic, family, employment worries, poor prognosis (Boyd,et al., 1973; Cassady, 1960). The intervention studies mentioned in Chapter I already support this notion by suggestion that the patient's recovery will improve if he has a part in planning or mentally organizing his recovery (c.f. also Tryon & Leonard, 1965; Wilson, 1969). But the studies reviewed typically confounded this effect

with attention and expectancy effects. The Boyd et al. (1973) study stated that two indicators of good adjustment were orientation to the future and maintaining an active self-image. In Greun's work with heart attack patients, he assumed that brief psychotherapy would decrease anxiety and increase realistic plans for the future (Greun, 1975).

The purpose of a pre-surgical intervention is to decrease such emotional states as anxiety and depression and increase patient behaviors directed toward the goal of recovery. Why would an intervention focusing on a person's future life accomplish this? There is evidence from a wide variety of theoretical and experimental approaches to support such a contention.

In a psychoanalytic vein, French (1952) states that a recognized need seeks expression at first in diffuse motor activity, then in integrating a plan for realizing a goal, and finally this plan exerts a guiding influence by which a person exerts efforts to put the plan into action. Lewin (1951) talks about the importance of a time perspective in persisting through suffering, and the necessity of hope or an "outlook for the future" (p.107). Atkinson (1964), Cofer and Appley (1964), Rotter (1954) and Tolman (1948) all speak of present behavior as guided by goal expectation or anticipation rather than drives or past consequences. The thrust of all this is a two-fold emphasis: (a) recognition of personal action toward a goal ("If I do this, that will

result"), and (b) increased recognition and specificity of future goals influences present dynamics.

Not only behavior, but also emotional change can result from recognition and direction toward future goals. Specifically, lack of a belief in attaining a goal increases anxiety; and learning to avoid future problems, dangers, or pain will decrease anxiety or other negative emotional reactions to a crisis. Evidence to this effect comes from various theoretical and experimental sources (e.g., Freud, 1936; Goldstein, 1940; Maslow, 1941, 1943; Mowrer, 1960; Solomon & Brush, 1956; Whiteman, 1957). Neal Miller (1959) cites the importance of researching reactions to fear in naturalistic settings:

> ...the importance of knowing exactly what to expect or planning and knowing what to do to minimize the danger, of concentrating on the task at hand, of breaking seemingly impossible tasks into manageable steps and concentrating on the performance of each step (p. 268).

Ezra Stotland, in his book, The Psychology of Hope (Stotland, 1969), musters a great deal of evidence to support this theoretical perspective. He outlines several propositions, among which are: (a) motivation to achieve a goal is a positive function of the perceived probability of attaining the goal and importance of the goal; (b) the higher the perceived probability, the greater the positive affect experienced; (c) organisms acquire schemas for action by their perception of a number of associated events or from communication from others; and (d) the strength of the

motivation toward a goal is, in part, a function of the number of times or intensity the future events are enumerated (Stotland, 1969, pp. 7-13). Furthermore, he demonstrates that the amount of motoric energy a person puts forth to acquire schemas for action is relatively unimportant (c.f. also Bridger & Mandel, 1965; Cook & Harris, 1937 who showed that a person merely being told of a future event will experience emotional and physiological reactions similar to the real event, even though the event does not happen).

Stotland makes a further distinction that is important for this present study. He distinguishes schemas for action in the state of arousal from those that are latent. Latent schemas can be invoked by someone else directing the person to invoke the schema (p. 43). Once invoked, the schema has the potentiality to guide, direct, or motivate behavior, perceptions, and affect. This distinction was used in the present study by creating two types of future orientation interventions: one in which patient and intervening agent actively plan the future together, and another in which the agent simply asked the patient to invoke future plans.

All of this suggests that patients undergoing heart surgery who are given the opportunity to acquire schemas for future action will have less emotional disturbance and more behaviors directed to recovery than those who do not have the orientating goals and expectations for a successful recovery and future discussed or invoked before

surgery. As Stotland puts it:

> ...an individual with a hopeful higher order schema in a state of arousal generally would be in a good mood, would be energetic, oriented to the future, aggressive but not hostile. An individual with a hopeless higher order schema in a state of arousal generally would be in a bad mood, would lack energy, would be oriented to the present, would be hostile. A higher order schema may thus determine how the individual feels about many specific situations, about the 'little things' (1969, p. 80).

Purpose of the Study

General Purpose. The purpose of this study was (a) to investigate the proposition that heart surgery patients who receive preoperative interventions of a future orientation would show better emotional and physical recovery than those who do not, and (b) to design a research paradign to explore the differential effects of different levels of preoperative interventions, where levels were defined as different degrees of communication about the future. These levels ranged from active communication (Group I) to merely invoking thoughts about the future (Group II) to interpersonal attention with no future orientation (Group III) to no intervention or attention at all (Group IV). This design offers control groups to analyze the effects of attention or expectancy.

It would be expected that the more the intervening agent communicated future schemas for action and the more the intervening agent was himself actively involved in communicating hope for the future, the less anxiety and

depression and the better the medical recovery. This would also imply that positive correlations should exist between affect and better medical recovery.

Statement of Hypotheses. There were three general propositions investigated in this study. The first two dealt with the physical (medical) and psychological (anxiety and depressive mood) effects of the different levels of interventions. The third dealt with the relationship between psychological state and medical recovery from surgery. It was expected that the more specific the intervention regarding the future and the more active the intervening agent and the patient in focusing on the future, the better would be the medical recovery and the lower anxiety and depressive mood experienced by the patient.

Hypothesis I: If future orientation offers patients schemas for action after surgery and after discharge, then there will be a direct relationship between the level of future orientation and medical indices of recovery. Therefore, Group I will show better medical recovery than Group II which will show better recovery than Group III, which will show better recovery than Group IV.

Corollary I: Since three different kinds of attention are employed in the first three groups (treatment groups), thereby creating expectations of success and human interest, Groups I, II, and III will be distinguished from Group IV (no treatment) by better medical recovery.

Hypothesis II: If future orientation focuses the patient more on goals than present distress, and if expectations are communicated for successful recovery and an active future life, then Group I will show less anxiety and depressive mood immediately after the intervention and postoperatively than Group II, which will show less anxiety

and depressive mood than Group III.

Hypothesis III: If it is the psychological state that mediates medical recovery to a significant extent, then there will be a positive relationship between psychological state (affect and cognitive expectations) and medical recovery.

CHAPTER III
METHOD

Subjects

The subjects were 36 patients undergoing Coronary Artery By-pass or Aortic Valve Replacement surgery at the Veterans Administration Hospital in Houston, Texas. They were assigned in a random, rotating fashion to one of four groups, with nine subjects comprising each group. There were seven by-pass and two valve patients in each group. Subjects were not included if they showed current psychiatric disturbances, were over 60 years of age, had other severe medical complications, were unable to read, or refused to participate. Only two potential subjects were rejected at the point of initial interview. One refused to participate due to extreme anxiety, and one was unable to read. Two subjects died during the course of the study--one during surgery and one just prior to surgery. Consequently, they were not used for anlaysis, and two other subjects were chosen to replace them in the study. The random, rotating assignment was altered near the end of the study once to place a valve surgery patient in a group that had only one valve patient to equalize the number of by-pass and valve patients across groups.

There were 35 white males and one black male ranging in ages from 26 to 60 years, with an average age of 52.2 years. Further demographic data is presented in Table 1. The table indicates that the groups were very much alike

TABLE 1

Demographic Data on Subjects
According to Treatment Groups
(N = 9 per Group)

		Gp I	Gp II	Gp III	Gp IV
Age	$\bar{X}$ years	52.4	51.8	51.3	53.3
	SD	6.73	6.32	9.52	4.62
Marital Status	Married	7	6	6	
	Single	0	1	2	a
	Divorced	2	2	1	
Occupation	Manual	1	3	4	
	Semi-skilled	5	3	2	a
	Skilled	3	3	3	
Last work	$\bar{X}$ years ago	0.69	2.18	2.43	
	SD	0.78	3.20	3.70	a
Education	$\bar{X}$ years	10.2	9.2	10.8	
	SD	2.7	3.5	2.6	a
Previous Surgery	$\bar{X}$ operations	1.55	1.22	1.11	1.33
	SD	0.39	1.02	0.46	0.82
When Diagnosed with heart condition	$\bar{X}$ years ago	3.15	3.53	4.15	
	SD	2.55	5.39	3.87	a

[a] Information not available because Group IV subjects were never seen for interview. Age and previous operations, however, were always given in the charts.

with the possible exception that that subjects in Groups II and III had been out of work longer than those in Group I. But the standard deviations show that there was wide variance within the groups on this variable. Almost every subject had undergone some surgical procedure previously, the most common being appendectomy, hemorroidectomy, toncillectomy, or surgery associated with injury.

Preoperative Interventions

Subjects in Groups I, II and III (treatment groups) received different preoperative interventions depending on group assignment. The interventions were performed by this investigator one or, in a few cases, two days before the subject's surgery and lasted between 20 and 30 minutes.

Subjects in Group I received an intervention in which the interviewer helped the subject to anticipate and structure his personal life and activites after surgery. The interviewer, in an active, interested manner told the patient some of the things that could be expected after surgery, offered suggestions or alternative solutions for activities or problems after discharge, explained how difficult issues could be broken into manageable parts, and emphasized self-help and independence after discharge. Group II subjects received the same interview questions about future goals and plans, but the interviewer was an active listener, not a contributor to the future plans. No

information, alternative solutions, or suggestions were offered. Thus, subject's schemas for future action were assumed to be invoked. Patients in Group III served as an attention placebo control group. The intervention with these subjects was an interview with no other purpose than to talk about how the patient was doing, the weather, and the hospital. Only current and past issues were discussed. Group IV received no interventions. Appendices B, C, and D outline and specify the form of the three interventions.

Psychological Variables

Trait and State Anxiety. The State-Trait Anxiety Inventory (Spielberger, Gorsuch, & Luschene, 1970) was administered to assess subjects' (a) general anxiety prior to surgery and (b) current anxiety state at four different points during their hospitalization--twice before and twice after surgery. The tests were administered in the usual manner. The lists of items in the Trait-Anxiety questionnaire and the State-Anxiety Questionnaire are given in Appendices E and F, respectively. The tests were hand scored, with raw scores being converted to standard scores using norms from a general medical surgical population as given in the Manual (Spielberger et al., 1970).

Depressive Mood. The Depression Adjective Check List (Lubin, 1967) was administered with the State Anxiety Questionnaire at four points. This instrument has been

found to be sensitive to transient mood states (Lubin, Dupre, & Lubin, 1967; Lubin, Hornstra, & Love, 1974). The Depression Adjective Check List (DACL) consists of seven lists of adjectives (numbered A through G), divided into two sets, ABCD and EFG. Because Set II (EFG) was normalized on a male population and found to be more sensitive than Set I for males, only this set of three lists was administered at the testing points. The order of the three lists was randomized for each testing point. The adjectives in these three lists are given in Appendix G. Subjects mark those adjectives which apply to them "Today--right now." The tests were hand scored, and the total raw scores for the three lists at each testing point were summed. (Standard scores for each separate list are available, but not for the total Set II).

Cognitive Expectations. Before the interventtion, each subject in the first three groups were also asked two questions to assess his expectations for medical success of the surgery and the social-psychological implications of surgery for his life. Patients were asked to rate on a scale of 1 to 7, with 1 being "Not at all successful" and 7 being "Very much successful," their answer to this question: "How successful do you personally think the operation will be?" Further clarification was given if needed. Secondly, they were asked to rate on a 7-point scale, with 1 being "No improvement" to 7 being "One hundred percent imporvement," the answer to

this question: "How much do you think the operation will improve your quality of life--your ability to do things, feel better, etc.?" The number 1,2,3,4,5,6, or 7 was recorded for each subject for each question.

Medical Recovery Variables

Medical indices of recovery from surgery were a compilation of postoperative variables that had been used in previous research, that gave both general and specific indications of recovery, and which were judged to be reliably observed from patients' charts. Spcifically, these medical recovery variables (MRV) were:

1. Time spent in the surgical intensive care unit (SICU).
2. Number of days from operation to discharge.
3a. Amount of blood given during surgery.
3b. Amount of blood given after surgery in SICU.
4. Amount of time elapsed until vital signs (V.S.) returned to normal.
5. When patient resumed oral intake.
6. How soon blood values returned to normal.
7. How soon patient was up and about on his own.
8a. Number of complications in SICU.
8b. Number of complications after SICU.
9a. Number of medications received beyond routine in SICU.
9b. Number of medications received after SICU.
10. Number of medications prescribed at discharge.

Because numbers 3, 8, and 9 were divided into two time periods, there were actually 13 MRV used in the analysis.

All of the above indices were coded from each subject's chart shortly after discharge by this investigator (Coder I). A nurse, who was made familiar with the criteria for including the MRV, but not with the hypotheses of the study nor with the fact that patients' charts represented different treatment

groups, reviewed seven of the charts as a reliability measure (Coder II). Coder II was used only as a test of reliability; the data gathered by Coder I were the only data used in the analyses.

The above indices included some discrete, well defined measures (e.g., number of days to discharge); whereas others were judgments made on criteria established with medical and nursing personnel beforehand. Appendix H outlines and defines these ten measures, giving the exact unit of measurement used, operational definitions of each, and exactly where the data were found in the charts. Appendix I further defines variable #8, the kinds of complications recorded. Appendix J defines which medications were included for variables #9 and #10.

Procedures

Close contact was maintained with the Cardiac Catheterization Laboratory (where every heart surgery candidate is seen for evaluation), operating room personnel, and nurses on the cardiac wards to screen for prospective subjects. When it had been determined that a patient would undergo by-pass or valve surgery, and after that patient had been so informed by the surgeons, he was approached and asked to participate in the study if he met the age and medical requirements. During the preliminary interview (outlined specifically in Appendix A), the patient was informed of the study and asked to sign an informed consent form. If he

agreed to participate and if he met the requirements, he was asked a few demographic questions. The patient was then assigned to Group I, II, or III, depending on which group was next in rotation. Then, the following events took place for each subject in the first three groups:

1) At the time of the intial interview or shortly thereafter, the subject was administered the Trait and State Anxiety Questionnaires and the DACL (Testing #1).

2) The day before his operation, the subject was (a) asked the two questions about his expectations for success and improvement of life; (b) given the specific intervention according to his group assignment; and (c) immediately following the intervention, administered the State Anxiety and the DACL (testing #2).

3) Subject underwent heart surgery.

4) Subject spent a few days in SICU and then was transferred to a medical recovery ward.

5) On the day the patient was transferred, the State Anxiety and DACL were administered (testing#3).

6) The day prior to discharge or the day of discharge the subject was administered the State Anxiety and the DACL (testing #4).

After the subject was discharged, his hospital chart was obtained and the MRV were recorded. Subjects assigned to Group IV were those patients who, for one reason or another, were not seen by the interviewer (e.g., interviewer was

unable to see a patient before surgery due to scheduling problems; patient was set to surgery without interviewer knowing beforehand; interviewer was away from the hospital for a few days). Yet, the names, ages, and type of surgery were easily obtained from postoperative surgical conference agendas. Thus, charts could be obtained and MRV recorded for nine subjects who met the requirements but were never seen for intervention or testing.

The entire study took four and one-half months to complete. As far as can be determined, all subjects received usual hospital care except for the interventions and testing required by this study. Many nurses and physicians were aware that a study was being conducted, and a few knew the general purpose of the study. However, none was aware which subjects were assigned to which groups because the fact that there were different treatment groups was never communicated to them.

CHAPTER IV

RESULTS

Reliability in Coding Medical Recovery Variables

Percentages of agreement between Coder I and Coder II recording the medical recovery variables (MRV) was calculated according to the formula:

$$\frac{\text{Number of Agreements}}{\text{Number of Agreements} + \text{Number of Disagreements.}}$$

Number of agreements refers to the number of times Coder I and Coder II coded the same datum on a particular MRV for each of seven charts.

Two charts each were taken from Groups I, III, and IV, and one chart from Group II, making a total of seven charts. The results for each of the MRV are given in Table 2. The percentages represent the proportion of agreement on each MRV for the seven charts. Therefore, 100% indicates Coder I and Coder II agreed on all seven charts with respect to a particular variable; 71% indicates Coder I and Coder II agreed on a particular variable in five of the charts, but disagreed on two ($\frac{5}{5 + 2} = .71$).

Two columns of percentages are listed. The first gives percentages when there was perfect agreement; the second shows percentages when there was perfect and "close" agreement. Close agreement was operationally defined as a difference of one or two measures between the two coders. For example, if Coder I tallied four compli-

TABLE 2

Percentates of Inter-Coder Agreement
for Medical Recovery Variables
(Proportion of Agreement for Seven Charts)

	Perfect Agreement	Perfect and Close Agreement
1. Hours in SICU	100	100
2. Discharge date	100	100
3a. Blood given in surgery	100	100
3b. Blood given in SICU	100	100
4. Return to normal V.S.	71	71
5. Return to oral intake	100	100
6. Blood values stabilized	71	85
7. Patient up and about	100	100
8a. Complications in SICU	57	85
8b. Complications after SICU	14	71
9a. Medications in SICU	28	85
9b. Medications after SICU	28	85
10. Discharge medications	100	100
Total	77	91

cations in SICU and Coder II tallied three, this was considered close agreement; if Coder I found 12 medication events for a patient after SICU and Coder II found 11, this was regarded as close. But if Coder I found 17 medication events and Coder II recorded only 14, this was regarded as a disagreement. It should be pointed out that in every case when there was disagreement, it was due to Coder I judging medical recovery as slower and involving more complications, medications, etc. than Coder II. This bias was strictly a coder bias and therefore would not be expected to seriously effect interpretation of any group effects that might be demonstrated. The data coded by Coder I was the only data used for the analyses. Finally, the total reliability percentages, especially for the "Perfect and Close Agreement" indicate a fairly high level of inter-coder reliability in recording the medical recovery variables.

Effects of Treatment on Medical Recovery

The relationship of communication of future schemas for action, invoking future schemas, attention, and no treatment (Groups I - IV, respectively) to the 13 MRV was assessed by means of a multivariate analysis of variance with the interventions treated as levels of a single factor and the MRV as dependent variables. These data were analysed by means of the Statistical Package for the Social Sciences (Nie, Bent, & Hull, 1970). Prior to analysis all MRV were transformed into z scores so as to better reflect differences based on distributional characteristics of each of the measures.

The multivariate analysis of variance (MANOVA) testing the equality of group means for the 13 MRV was found to be non-significant , Λ (39.00, 59.97) = 6.49, by Wilks' Lambda criterion. Therefore, there was no evidence for any differences among the four groups on the medical measures used in this study. Appendix K presents the means and standard deviations of all 13 MRV for each of the four groups.

Because differences between treatment and no treatment might have been masked in the overall analysis, a further analysis comparing treatment (Groups I, II, III) and no treatment (Group IV) was performed. This MANOVA yielded a significant, Λ (13.00, 22.00) = 0.409, $p < .03$, difference on the MRV between treatment and no treatment groups.

In order to determine which of the MRV contributed to this latter difference, a discriminant function analysis

was performed. The discriminant function analysis indicated that the difference between treatment and no treatment conditions could be attributed to differences in the amount of blood given during surgery, V (1) = 23.93, $p < .001$, and number of medication events in SICU, V (2) = 32.27, $p < .001$, by Rao's V statistic (Rao, 1952). The scaled discriminant function coefficients for amoung of blood given during surgery and number of medications in SICU were found to be 1.00 and 0.58, respectively, and the Wilks' Lambda test of equality of group means for these two MRV was significant, λ (2, 33) = 0.51, $p < .001$, None of the other MRV was found to contribute significantly to the discriminant function.

Therefore, those patients who received preoperative interventions were found to have significantly less blood given during surgical procedures (X = 1.667; SD = .832) than those receiving no preoperative intervention (X = 3.556; SD = 1.424), and fewer medications in SICU (X = 4.037; SD = 3.736) than those receiving no intervention (X = 11.00; SD = 11.94). Analysis did not indicate evidence for differential effects of the three types of preoperative interventions on medical recovery. There was no evidence of significant contributions to the treatment versus no treatment difference beyond the two MRV mentioned. Appendix K does suggest that treatment groups had fewer complications and recovered faster than the no treatment group for the MRV

of hours in SICU, resumption of oral intake, return to normal blood values, and time until up and about without assistance. However, the discriminant functional analysis showed blood given in surgery and medication events in SICU to account for the significant variance between the treatment and no treatment groups.

Effects of Treatment on Psychological Variables

Before viewing the differences among the treatment groups on the psychological measures taken after intervention, it is important to see whether the groups differened initially on the psychological measures of anxiety, depressive mood, and cognitive expectations. Table 3 presents the means and standard deviations for the treatment groups (Groups I, II, III) on the initial testing (testing #1) for trait anxiety, state anxiety, depressive mood (DACL), and the two questions concerning success of surgery and improvement of quality of life. Analysis of variance showed no significant differences, F (2,24) < 1.00 for each of the five analyses, between the group means on these five measures. Therefore, the three treatment groups did not initially differ with respect to trait or state anxiety, depressive mood, or expectations for surgery.

In order to analyse the differences in state anxiety and depressive mood across the three treatment groups and over the four testing points, a repeated measures analysis

TABLE 3

Means and Standard Deviations for Psychological Testing and Cognitive Expectations, Testing #1

	Group		
	I	II	III
Trait Anxiety	47.00 7.228	44.89 9.867	46.56 6.654
State Anxiety	46.33 5.385	47.78 11.92	53.44 7.108
DACL	28.22 9.148	29.11 10.69	32.44 11.02
Success of Surgery	6.111 0.742	6.222 0.632	6.333 1.058
Quality of Life	5.444 1.130	5.333 1.581	4.888 2.028

Note.- Analysis of variance showed no differences among the means of the three groups.

of variance was performed, with one between and one within variable. The between variable is groups and the within variable is four levels, corresponding to the four testing points. This analysis tests the null hypothesis that there is no difference on psychological measures at various testing points and that there is no interaction between groups and time of measurement on the psychological variables.

Table 4 presents the results of this analysis for state anxiety. There is no evidence of differential effects of the three treatment levels with respect to anxiety over time. Nor were there any interaction effects of treatment group and time. There was a significant difference for time, however, indicating that patients' state anxiety changes significantly at different testing points.

Table 5 presents similar results for the DACL. Treatment level did not distinguish groups with respect to this measure of mood, nor were there interaction effects between group and time. But there were significant differences in the measures of depressive mood at various testing points.

Table 6 shows the means and standard deviations for the state anxiety and the DACL at the four testing points for the 27 subjects in the treatment groups. In order to investigate further the differences, analyses of variance were performed comparing the means between testings #1 and

TABLE 4

Relationships between Groups and Time of Testing for State Anxiety

Source	SS	df	MS	F
Groups	2195.35	2	264.78	1.24
Error (Uncorrelated)	5129.27	24	213.71	
Time	629.47	3	230.82	15.26*
Error (Correlated)	1088.94	72	15.12	
Group x Time	119.83	6	19.97	1.32
Error (Correlated)	1088.94	72	15.12	

*$p < .01$

TABLE 5

Relationships between Groups and Time of Testing for Depression Adjective Check List (DACL)

Source	SS	df	MS	F
Groups	297.24	2	148.62	<1
Error (Uncorrelated)	7144.28	24	297.67	
Time	1420.52	3	473.51	7.71*
Error (Correlated)	4421.72	72	61.41	
Group x Time	236.76	6	39.46	<1
Error (Correlated)	4421.72	72	61.41	

*$p < .01$

TABLE 6

Means and Standard Deviations for State Anxiety and DACL at Testings #1, #2, #3, and #4 (Treatment Groups Collapsed, N = 27)

		Testing			
		1	2	3	4
Anxiety	$\bar{X}$	49.185	45.963	47.630	42.370
	S.D.	8.8319	7.7235	7.9766	7.9288
DACL	$\bar{X}$	29.926	23.889	29,741	21.630
	S.D.	10.088	7.6124	14.062	10.389

#2, #2 and #3, and #3 and #4. The F values from these analyses are presented in Table 7. There were significant drops in anxiety and depression just prior to surgery. There was a tendency to return to initial anxiety and depression following surgery (testing #3), and then a significant drop from testing #3 to testing #4, the day of discharge.

Relationships between Psychological Measures and Medical Recovery Variables

There were 11 psychological measures taken for each of the 27 patients in the three treatment groups: one trait anxiety, two cognitive expectation questions, four testings of state anxiety, and four testings of depressive mood. Each of these measures was correlated with the 13 MRV, providing a 13 x 11 correlation table of Pearson product-moment correlation coefficients. Table 8 presents only those correlations found to be significant, $p < .05$.

Since a 13 x 11 table provides 143 coefficients, seven or less significant correlations would be expected by chance. However, 10 correlations were found to be statistically significant. As the table indicates, 9 of the 10 significant relationships occur with testing measures taken before the actual intervention (testing #1), and 6 of the 10 occur with the DACL at testing #1. The more depressed a patient, as measured by the DACL, the longer he spent in SICU, the more blood required during surgery,

TABLE 7

F Values for Differences between Successive Testings

	Testings		
	#1 vs #2	#2 vs #3	#3 vs #4
DACL	11.49**	6.06*	30.11**
State Anxiety	14.38**	2.76	59.65**

Note.- df = 1,24

*p < .05

**p < .01

TABLE 8

Significant Correlations Between Psychological and Medical Measures

	Trait Anxiety	DACL Testing #1	State Anxiety Testing #1	State Anxiety Testing #3
Blood given in SICU	.570			
Complications after SICU	.402			
Time in SICU		.468		
Blood given in surgery		.483		
Return to normal V.S.		.384		
Resumption of oral intake		.453		
How soon up and about		.397		
Complications in SICU		-.447		
Medications after SICU			.392	
Discharge medications				.513

Note. - These correlations were taken from a larger correlation matrix of coefficients for all 13 MRV and 11 psychological measures for the 27 subjects in Groups I, II, and III. All of the above correlations are Pearson product-moment correlation coeficients and are significant (df=25, $p < .05$).

the longer it took to resume oral intake, the longer it took to be up and about, and (unexpectantly) the fewer medical complications in SICU. Trait anxiety was related to blood given in SICU and complications occuring after SICU. The number of medications received after SICU was related to a patient's state anxiety before the intervention. The only postoperative measure that was related to medical recovery was patients' state anxiety at testing #3, right after leaving SICU, which was related to the number of medications prescribed at discharge. Therefore, the data do not suggest that patients' mood or anxiety fluctuate according to medical indices (or vice versa), but rather that patients' preoperative and pre-intervention emotional set and state (especially depressive mood) are most indicative of how a patient will tolerate surgery and medical recovery. Patients' cognitive expectations of success of surgery and improvement of life taken before intervention, however, were not significantly related to subsequent medical recovery.

CHAPTER V

DISCUSSION

Effects of the Interventions on Medical Recovery

Hypothesis I predicted differential medical recovery as a result of different modes of interventions. Unlike previous studies, the present investigation included control for sensitizing the patient to the future and an attention placebo control. It was expected that each of the components of future oriented counseling--(a) the development of future schemas, (b) the sensitizing of existing or personally developed future schemas, (c) the attention and concern of an intervening agent--would contribute to better medical recovery. Therefore, Group I which included all three components would demonstrate the best medical recovery, Group II would be second best, and Group III would be third in medical recovery. It was futher expected that groups receiving one or more of the components of preoperative counseling would demonstrate better recovery than the group receiving no preoperative counseling (Corollary I). Differences between groups were expected to clarify the operative elements in the effects of presurgical counseling.

Hypothesis I was not supported by the data in this study. At the simplest level it would appear that preoperative interventions emphasizing differences in future

orientation do not differentially improve medical recovery following open heart surgery. However, the significant difference between treatment and no treatment groups indicate that developing or invoking future schemas are not essential to the type of improvement seen in medical recovery as a function of preoperative counselling. So although the content of the interventions did not stimulate differences in the treatment groups, the experience of attention, interest, and participating in a research project apparently did contribute to better recovery. The major reason for employing a four group design including an attention placebo was precisely to explore this phenomenon.

Egbert et al. (1963) strongly suggested this effect in their four group design employing an orientation to the future. The determining factor in patients' experience of pain in that study was whether or not they had been seen by an anesthetist. The treatment of administering calming medication before surgery did not distinguish the groups, but the attention and concern of the anesthetist did, whether patients received the medication or not. In that report Egbert et al. mentioned another study using a two group design in which the preoperative orientation to future pain and discomfort was presented in a bland, matter-of-fact way to one group and in a supportive, reassuring way to another group. This was an attempt to

explore a component of the attention effect. However, the study was abandoned because no differences were occurring between the groups. This fact further lends support to the notion that it is attention in and of itself which is the primary component and not the content or mode of attention given. Egbert et al. (1964) made a special point in saying the effect of their work was due to a placebo effect because the intervening agents were not trained to do psychological counseling. The present study brought the salience of the attention placebo effect under direct experimental investigation and found it to be the determining factor in affecting recovery. These findings are congruent also with the consistently positive results achieved when nurses untrained in counseling perform preoperative interventions.

Research studies that have shown the most dramatic results have typically been characterized by a high degree of attention (e.g., Dlin et al. 1968; Egbert et al., 1964; Gruen, 1975; Healy, 1968). Periodic, on-going support, reassurance, and information is more characteristic of those studies showing positive results. Also, previous studies have mentioned either in theory or anecdotally that patients' perception of the intervening agent as a warm, empathic, supportive person is crucial (e.g., Schmitt & Woolridge, 1973). The present study only employed a one-time intervention, but the effects of this

attention was demonstrated in better medical recovery for those who received an intervention than those who did not. The evidence of the present study, therefore, suggests that two group designs using treatment and no treatment groups should be interpreted with the attention placebo effect in mind, and that caution should be taken in assuming the beneficial effects of the particular content of an intervention without controlling for the attention effect.

Treatment Groups and Psychological Variables

Hypothesis II predicted differential anxiety and mood as a result of different modes of interventions. It was expected that each of the components of future oriented counseling--development of schemas, sensitization of existing schemas, and interest--would contribute to patients experiencing less anxiety and depression following intervention and during recovery (testings #2, #3, and #4). Therefore, Group I would have lower anxiety and depressive mood scores that Group II which would have lower scores than Group III on the State Anxiety Questionnaire and the Depression Adjective Check List.

Hypothesis II was not supported by the data. There was no evidence that the interventions differentially affected anxiety and mood. The data did show, however, that there were significant decreases in anxiety and mood between initial testing (testing #1) and immediately prior to

surgery (testing #2) for all treatment subjects taken as one group. After patients leave SICU (testing #3) there was a trend to return to initial anxiety and mood state, but then there was a significant decrease again between that testing point and day of discharge (testing #4).

It might appear that the interventions were instrumental in effecting the decrease in psychological state just prior to surgery. In the study, however, there was no group which was tested without an intervention to control for what could be a naturally occurring phenomenon of decrease in emotional state just prior to surgery. Auerbach (1973) and Spielberger (1973) lend some support to the possibility of this being a naturally occurring phenomenon. In their research investigating changes in anxiety state before and after surgery they found a decrease in anxiety beginning 24 hours prior to surgery.

The change in psychological state prior to surgery suggests further clarification because there is no apparent reason why such a change should occur, especially in the direction of less anxiety just prior to an extremely stressful and dangerous event. There are at least two possible explanations for this shift.

One possibility, which is also discussed below in connection with the correlations between psychological variables and medical recovery, is that patients prepare themselves before the day prior to surgery. If patients

have mobilized coping mechamisms or defenses the day before surgery, these would be reflected in self-reports of lower anxiety and depression than when they first learned about having surgery. There may well be a process of mobilizing coping mechanisms that reaches a plateau some time ahead of the stressful event.

The second possibility comes from observations of the patients in this study. At initial testing the patients had just been informed they would undergo open heart surgery. It was not infrequent for patients to state at that time that they were concerned, unsure of what the operation would entail, were unclear which of the doctors would perform the surgery, or did not know when the operation would take place. However, the day prior to surgery, at the intervention and testing #2, many reported that they had received much more information about the details and purpose of their surgery and had been visited by the surgeon who reassured them. Of course all of them knew then exactly when the operation would take place. The phenomenon of a decrease in anxiety and depression may well be a result of the naturally occurring events in the patient's hospital experience which provide information and support that was not present during initial testing.

The fact that there is a drop in anxiety and depression from testing #3 to testing #4 is understandable because at testing #3 patients are experiencing a lot of pain and

discomfort, their mobility is limited, and it is usually too early to determine how successful the surgery was. So at testing #3 there was an increase in anxiety and depression to levels similar to that of initial testing. At testing #4 the patient is relatively free from pain, knows he has recovered successfully, and is typically anxious to return home. At discharge, patients in this study usually expressed gratitude to the hospital staff and hope for a life freer from heart disease. The scores at testing #4 no doubt reflect these feelings.

Whether the decrease in scores from testing #1 to testing #2 is the result of coping mechanisms is speculative and probably varies from patient to patient. However, it must be remembered that psychological testing on the day before surgery did not correlate with medical recovery. The general change in psychological state for the three groups is quite evident. But the fact that the change did occur in this and other studies does not imply that psychological state the day prior to surgery is an indication of how patients will recover. So whether the change is a result of naturally occurring phenomena in the hospital system or a patient's coping mechanisms or both, a patient's decrease in anxiety and depression just prior to surgery does not necessarily herald better medical recovery. Therefore, research employing interventions with the primary goal of decreasing anxiety or depression prior

to surgery should make careful analyses of the relationships between emotional state and medical recovery in combination with assessment of the effects of the intervention to clarify what impact the intervention might have. The present evidence suggests that conclusions about decreasing patients' anxiety or depression through intervention and then relating these changes to recovery should be made with some caution.

Psychological Variables and Medical Recovery

Hypothesis III was a direct, exploratory question asking whether anxiety and mood tested before and after surgery relate to patients' medical recovery. Had Hypotheses I and II been clearly supported, then further analyses would be needed to investigate how psychological state and medical recovery might co-vary. Since there were not group effects among the three treatment groups, simple correlations were performed between the psychological testings and the medical recovery variables for all 27 subjects in these groups.

The results did not show consistent relationships between emotional state and medical recovery. The data do not suggest simple relationships between reported emotional state just prior to and after surgery with subsequent and concurrent medical recovery, respectively. The fact that 9 of the 10 significant relationships that were found occurred at testing #1 before the intervention

further illustrates how complicated the relationship might be. The evidence indicates that how a person feels three or four days prior to surgery is a better correlate of medical recovery than his emotional state just prior to surgery (testing #2) or while in the middle of recovery (testing #3).

Testing #1 took place shortly after the subjects knew they would have surgery but had not been given specific information or preparation for it from the medical staff. It was suggested previously that at initial testing patients have not prepared themselves for surgery. It is suggested here that the first testing might have reflected patients' emotional reaction to the impending stress and therefore (especially for the measure of trait anxiety) might present a picutre of the patient's typical reaction to stress. This typical or initial reaction might then characterize how he copes with the psychological and physical stress of surgery.

Combining the evidence that initial psychological state correlated better with medical recovery than other testing points with the evidence of the change in emotional state just prior to surgery raises an interesting point concerning how patients might prepare themselves for surgery. The concepts of anticipatory grief, the work of worrying, mentally rehearsing for a crisis are crucial for the rationale of preoperative interventions. The evidence from

this study suggests that patients may do the work of worrying, anticipating, and planning before the day prior to surgery, because it is the testing at that point which correlates with recovery and because there appears to be a generalized drop in anxiety and depression just prior to surgery. It is as if the patient prepares himself for the trauma of surgery much like the athlete who prepares for a strenuous game by working out hard for a time and then resting the day before the contest. Subjects in the present study often reported the day prior to surgery that they were "all ready" or "as ready as I'll ever be", whereas a few days before they expressed apprehension and concern.

The data from this study do not provide direct and unequivocal support for this view of the process of preparing for surgery. What the data do is point to phenomena that have not been dealt with in previous research and which may be crucial to the planning and investigation of preoperative interventions. The data suggest that the timing of the intervention may be extremely important. The unspoken assumption of research in this area is that the day prior to surgery is the important one. It may be that a few days prior to surgery is when patients are organizing their thoughts and emotional energies to face surgery. It may be that then is the time to intervene to help the patient prepare for surgery and its aftermath.

Implications for Further Research

The results of this study suggest several directions for further research. One direction is the investigation of the attention placebo effect. Employing different amounts of attention as the independent variable before and/or after surgery would help in further understanding to what extent attention can influence medical recovery. There may be different kinds of attention such as interviews or filling out self reports, or a combination of different kinds of attention which could be shown to be more or less effective in influencing medical recovery.

Another direction for research is the investigation of the possibility that interventions designed to teach patients or direct their expectations may be differentially effective at different preoperative time periods. The foregoing discussion alluded to a possible "critical period" of the patient's experience when his thoughts and feelings about surgery may be more in flux and thereby more open to change. A research design using time before surgery as the independent measure could explore this possibility.

The changes in emotional state prior to surgery suggest both theoretical and experimental investigation of the process or stages persons might undergo as they prepare for surgery. The question here is whether the process by which patients appear to move from some emotional upset to more calm before surgery is similar to the way people

prepare themselves for other inevitable stressful events (e.g., the stages of denying, anger, bargaining, depression, and acceptence frequently seen with dying patients), or whether the shift in emotional state is a function of the contact with hospital personnel who give information and support. Perhaps extensive interviews or some form of naturalistic observation or patient diaries could shed some light on this process.

The results and discussion of this study do not mean to imply that investigations into the effects of the content of preoperative interventions should be abandoned. The issue of how much information should be given a patient before surgery and in what form is not clear from the literature, and from this investigator's experience with surgical and medical staff, it is an issue of concern and debate in clinical settings. Where further research might help is in the investigation of when information or support should be given to provide the best opportunity for improving recovery from surgery.

BIBLIOGRAPHY

Abram, H.S. Psychological problems of patients after open-heart surgery. Hospital topics, 1966, 44, 111-113.

Abram, H.S. The psychology of chronic illness. Journal of chronic diseases, 1972, 25, 659-664.

Aiken, L.H., and Henrichs, T.F. Systematic relaxation as a nursing intervention technique with open heart surgery patients. Nursing research, 1971, 20, 212-217.

Andrews, J.M. Coping styles, stress-relevant learning and recovery from surgery. Unpulished doctoral dissertation, University of California, Los Angeles, 1967.

Atkinson, J.W. An introduction to motivation. New York: Van Nostrand, 1964.

Auerbach, S.M. Trait-state anxiety and adjustment to surgery. Journal of consulting and clinical psychology, 1973, 40, 264-271.

Basowitz, H., Persky, S., Korchin, S., and Grinker, R. Anxiety and stress. New York: McGraw-Hill, 1955.

Blachly, P.H. Open-heart surgery: physiological variables of mental functioning. International psychiatry clinic, 1967, 4, 133-155.

Blachly, P.H., and Starr, A. Post-cardiotomy delerium. American journal of psychiatry, 1964, 121, 371-375.

Bolen, J.S. Meditation and psychotherapy in the treatment of cancer. Psychic, 1973, 4, 19-22.

Boyd, I., Yeager, M., and McMillan, M. Personality styles in the postoperative course. Psychosomatic medicine, 1973, 35, 23-40.

Bridger, W., and Mandel, F.J. Abolition of the PRE by instructions in GSR conditioning. Journal of Experimental psychology, 1965, 69, 476-482.

Burgess, G.N., Kirklin, J.W., and Steinhilber, R.M. Some psychiatric aspects of intra-cardiac surgery. Mayo clinic proceedings, 1967, 42, 1-2.

Cassady, J.R., and Altrochi, J. Patients' concerns about surgery. Nursing research, 1960, 9, 219-221.

Campbell, D.T., and Stanley, J.C. Experimental and quasi-experimental designs for research. Chicago: Rand McNally and Company, 1963.

Cantril, H. The cuases and control of riot and panic. Public opinion quarterly, 1943, 7, 669-679.

Chodoff, P,, Friedman, S.B., and Hamburg, D.A. Stress, defenses and coping behavior: Observations in parents of children with malignant disease. American journal of psychiatry, 1964, 120, 743-749.

Clyde, D.J. Multivariate analysis of variance on large computers. Clyde Computing Service, Miami, Florida, 1969.

Cofer, C.M., and Appley, M.H. Motivation: Theory and research. New York: Wiley, 1964.

Cohen, F., and Lazarus, R.I. Active coping processes, coping dispositions, and recovery from surgery. Psychosomatic medicine, 1973, 35, 375-389.

Cook, S.W., and Harris, R.E. The verbal conditioning of the galvanic skin response. Journal of experimental psychology, 1937, 21, 202-210.

Cristopherson, L.K., and Lunde, D.T. Selection of cardiac transplant recipients and their subsequent psycho-social adjustment. Seminars in psychiatry, 1971, 3, 36-45.

Deutsch, H. Some psychoanalytic observations in surgery. Psychosomatic medicine, 1942, 4, 105-115.

Dlin, B.M., Fischer, H.K., and Huddell, B. Psychologic adaptation to pacemaker and open heart surgery. Archives of general psychiatry, 1968, 19, 599-610.

Dripps, R.D., and Waters, R.M. Nursing care of surgical patients: Part I: The "stir-up". American journal of nursing, 1941, 41, 530-534.

Egbert, L.D., Battit, G.E., Turndorf, H., and Beecer, H.K. Value of pre-operative visit by anesthetist: Study of doctor-patient rapport. Journal of the american medication association, 1963, 185, 553-555.

Egbert, L.D., Battit, G.E., Welch, C.E., & Bartlett, M.K. Reduction of postoperative pain by encouragement and instruction of patients. The new england journal of medicine, 1964, 270, 825-827.

Egerton, N., and Kay, J.H. Psychiatric disturbances associated with open heart surgery. British journal of psychiatry, 1964, 110, 433-439.

Elman, R. Surgical care: A practical physiologic guide. New York: Appleton-Crofts, 1951.

Elsberry, N.L. Psychological response to open heart surgery. Nursing research, 1972, 21, 220-227.

French, T.M. The integration of behavior: Volume I, Basic postulates. Chicago: University of Chicago Press, 1952.

Freud, S. The problem of anxiety. New York: Norton, 1936.

Goldstein, K. Human nature in the light of psychopathology. Cambridge, Mass.: Harvard University Press, 1940.

Goldstein, M.J., Jones, R.B., Clemens, T.L., Flagg, G., and Alexander, F. Coping style as a factor in psychophysiological response to a tension-arousing film. Journal of personality and social psychology, 1964, 1, 290-302.

Gruen, W.A. A successful application of systematic self-relaxation and self-suggestion about post-operative reaction in a case of cardiac surgery. International journal of clinical and experimental hypnosis, 1972, 20, 143-151.

Gruen, W.A. Effects of brief psychotherapy during the hospitalization period on the recovery process in heart attacks. Journal of consulting and clinical psychology, 1975, 43, 223-232.

Haggard, E.A. Psychological causes and results of stress. In Human factors in undersea warfare. Washington: National Research Council, 1949.

Healy, K.M. Does preoperative instruction make a difference? American journal of nursing, 1968, 68, 62-67.

Harlow, H. F. The formation of learning sets. Psychological review, 1949, 56, 51-65.

Henrichs, T.F., and Waters, W.F. Psychological adjustment and response to open-heart surgery: Some methodological considerations. British journal of psychiatry, 1972, 120, 491-496.

Heszen, I. Effect of information on patient's post-operative behavior. Studia psychologicyne, 1970, 10, 133-154.

Hite, K.E. A phenomenon of rebirth: Coming alive in analytic and medical patients. American journal of psychoanalysis, 1970, 30, 19-29.

Houde, R.W., Wallenstein, S.L., and Rogers, A. Clinical pharmocology of analgesics: 1. Method of assaying analgesic effect. Clinical pharmacology and therapy, 1960, 1, 163-174.

Huck, S.W., Cornier, W.H., and Bounds, W.C. Readings: Statistics and research, New York: Harper and Row, 1974.

Janis, I.L. Psychological stress: Psychoanalytic and behavioral studies of surgical patients. New York: John Wiley and Sons, 1958.

Kardiner, A., and Spiegel, H. War stress and neurotic illness. New York: P. B. Hoeber, 1947.

Keats, A.S. Postoperative pain: Research and treatment. Journal of chronic diseases, 1956, 4, 72-83.

Kimball, C.P. Psychological response to the experience of open-heart surgery. American journal of psychiatry, 1969, 126, 348-359.

Kornfield, D.S. Psychiatric complications of open-heart surgery. New england journal of medicine, 1956, 273, 287-292.

Lazarus, H.R., and Hagens, J.H. Prevention of psychosis following open-heart surgery. American journal of psychiatry, 1968, 124, 1190-1195.

Lesse, S. Future oriented psychotherapy: A prophylactic technique. American journal of psychotherapy, 1971, 25, 180-193.

Lewin, K. Field theory in social science. New York: Harper, 1951.

Lindeman, C.A., and Aernam, B.V. Nursing intervention with the presurgical patient -- the effects of sturctured and unstructured preoperative teaching. Nursing research, 1971, 20, 319-333.

Lubin, B. Depression adjective check lists: Manual. San Diego: Educational and Industrial Testing Service, 1967.

Lubin, B., Hornstra, R.K., and Love, A. Course of depressive mood in a psychiatric population upon application for service and at 3- and 12-month reinterview. Psychological reports, 1974, 34, 424-426.

Maslow, A.H. Deprivation, threat, and frustration. Psychological review, 1941, 48, 364-366.

Maslow, A.H. Conflict, frustration, and the theory of threat. Journal of abnormal and social psychology. 1943, 38, 81-86.

Melges, F.T. Future oriented psychotherapy. American journal of psychotherapy, 1972, 26, 22-33.

Miller, N.E. Liberalization of basic S-R concepts: Extensions to conflict behavior motivation and social learning. In S. Koch (ed.), Psychology: a study of a science, Volume 2. New York: McGraw-Hill, 1959.

Morse, R.M., and Litin, E.M. Postoperative delirium: A studyof etiologic factors. American journal of psychiatry, 1969, 126, 388-395.

Mowrer, O.H. Learning theory and behavior. New York: Wiley, 1960.

Rado, S. Emergency behavior. In P. Hoch & J. Zubin, (eds). Anxiety. New York: Grune and Stratton, pp. 150-175.

Nie, N.H., Bent, D.H., and Hull, C.H. Statistical package for the social sciences. New York: McGraw Hill, 1970.

Rao, C. R. Advanced statistical methods in biometric research. New York: Wiley, 1952

Rennecker, R., and Cutler, C. Psychological problems of adjustment to cancer of breat. Journal of the american medical association, 1952, 148, 833-838.

Rodgers, B.P. Therapeutic conversation and post-hypnotic suggestion. American journal of nursing, 1972, 72, 714-717.

Rosen, L., and Bibring, G.L. Psychological reactions of hospitalized male patients to a heart attack. Psychosomatic medicine, 1966, 38, 808-821.

Rosenthal, R. Research on experimenter bias. Paper read at American Psychological Association, Cincinnati, 1959.

Rosenthal, R. Experimenter effects in behavioral research. New York: Appelton, 1966.

Rosenthal, R., and Jacobson, L. Pygmalion in the classroom. New York: Holt, 1968.

Rotter, J.B. Social learning and clinical psychology. New York: Prentice Hall, 1954.

Rubinstein, D., and Thomas, J.K. Psychiatric findings in cardiotomy patients. Association of operating room nurses, 1970, 11, 71-82.

Schmitt, F.E., and Woolridge, P.J. Psychological preparation of surgical patients. Nursing research, 1973, 22, 108-116.

Silverstein, A. Effects on the brain of extracorporeal circulation in open-heart surgery. Neurology, 1960, 10, 987-992.

Solomon, R.L., and Brush, E.S. Experimentally derived conceptions of anxiety and aversion. In M. Jones (Ed), Nebraska symposium on motivation. Lincoln: University of Nebraska Press, 1956.

Spielberger, C.D., Gorsuch, R.L., and Luschene, R.E. STAI Manual. Palo Alto: Consulting Psychologists Press, 1970.

Spielberger, C.D. Emotional reactions to surgery. Journal of consulting and clinical psychology, 1973, 40, 33-38.

Stotland, E. The psychology of hope. San Francisco: Jossey-Bass, Inc., 1969.

Sutherland, A., and Orbach, C. Psychological impact of cancer and cancer surgery: II. Depressive reactions associated with surgery for cancer. Cancer, 1953, 6, 958-962.

Tolman, E.C. Cognitive maps in rats and men. Psychological review, 1948, 55, 189-208.

Tryon, P.A., and Leonard, R.F. Giving the patient an active role. In J.K. Skipper and R.C. Leonard (eds.) Social interaction and patient care. Philadelphia: J. B. Lippinicott Company, 1965, pp. 120-127.

Weiss, S.M. Psychological adjustment following open-heart surgery. Journal of nervous and mental disease, 1966, 143, 363-368.

Whiteman, M. Anticipated frustration as a determinant of anxiety. Journal of general psychology, 1957, 57, 183-195.

Wilson, W. State of men severely wounded in battle. Lancet, 1944, 246, 586-589.

Wilson, W. Preoperative anxiety and anesthesia: their relation. Anesthsia and alalgesia, 1969, 48, 605-611.

Wynn, A. Unwarrented emotional distress in men with ischemic heart disease. Medical journal of Australia, 1967, 2, 847-851.

APPENDIX A

Pre-Intervention Interview

APPENDIX A

PRE-INTERVENTION INTERVIEW[1]

"Hello, Mr. _____, my name is Richard Lucas; I'm a psychology consultant for patients on surgical wards. Lately I've been trying to get around to talk with men who are going to have heart surgery. I've talked with some of the surgeons here. We all want you and other veterans to get the best care possible. What I'd like to do is talk with you for a while before your operation. We hope that by talking with you and other men we can get more information oh how to help people who are having heart surgery like yours. I'll also be asking you to fill out some simple check lists on how you have been feeling. For right now, do you have any questions? Or do you have any objections to filling out some forms on how you are feeling? Or talking with me? (I answers questions). Ok, fine. First, I'd like to get some information from you. Then I'll ask you to fill out a check list on how you generally feel and how you're feeling today."

I presents informed consent form, explaining that P is free to not participate if he so desires. The form reads:

> I voluntarily agree to participate in this research project consisting of an interview and paper and pencil tests. I do so with the understanding that the answers will be kept strictly confidential.

I obtains demographic data from P and presents first testing.

---

[1] Throughout this and the following Appendices, I stands for "Interviewer" and P stands for "Patient."

APPENDIX B

Intervention with Group I Patients

APPENDIX B

INTERVENTION WITH GROUP I PATIENTS

"I want to thank you, Mr. _____, for agreeing to talk for a while. I'm not a medical doctor, so if you have any specific questions about your medical condition, you should ask your doctor. It's very natural to be somewhat concerned about having an operation. (P may say something; I nods head, agrees, etc.) Sure, but for now while we talk, I'd like to look at what some of your plans are for after the operation. Let's think for a moment that the surgery is over and that things have gone well. Do you think you can do that-- think about a week or so from now? (I may have to encourage or clarify)."

(A). From what you expect, how many days after the operation do you think you'll be discharged?

(I listens and helps P project a realistic view of the recovery phase including approximate time spent in SICU and how many days he will be in the hospital. What SICU is like is explained).

(B). After you are discharged, what are some things you'd like to do that first week back home?

(I listens; I may have to give caution or encouragement if P's plans are unrealistically over-zealous or too passive, respectively. I supplies activities such as: reviewing doctor's orders for medication, exercise, rest, or diet; plan activities with family, friends; check with employer (if appropriate), insurance, etc. I informs P of regular follow-up visits in the chest clinic and the reason for them).

(C). You said that you had worked as a(n)_____. What possibilities do you see for work in the future?

(I helps P look at realistic possibilities, explaining that "future" may be several months away, but that others like himself have returned to gainful employment after heart surgery. Examples of "success stories" are given without inducing unrealistic hope. If P has been out of work for some time, or his work was quite physically strenuous, suggestions for other types of work are given along with the names of agencies -- Texas Rehabilitation Commission, VA Counseling, etc. -- to help in job choice and seeking employment).

APPENDIX B (CONT.)

(D). We've found that it is good for heart patients to have hobbies or outside interests. What are some things you'd like to do with your leisure time this next year or so?

1) Alone?

(I explores with P things P once did but perhaps gave up as he got older or because of his condition. I helps with new interests, such as things I's friends do, or ideas I has that haven't been acted on yet such as going fishing, gardening, etc).

2) With others?

(Things to do with wife, children, extended family? Plan a trip or other activity with wife or friends)

(E). Let's look at some of the things we've talked about. Let's imagine yourself one year from now. OK, it is now (date), 1976; you had your heart surgery one year ago; and everything worked out fine. What are some of the things you are doing?

(I reviews P's plans with him, reminding him of things he said, encouraging and reinforcing realistic plans. I communicates interest and hope that these things will be possible if P takes the initiative to do them. I emphasizes specific things P can do to make them happen).

APPENDIX C

Intervention with Group II Patients

APPENDIX C

INTERVENTION WITH GROUP II PATIENTS

The prepatory statement, "I want to thank you, Mr.____ ..." is exactly the same as with Group I patients as given in Appendix B.

I asks the same questions (A) through (E) as with Group I as given in Appendix B. However, I basically listens and does not volunteer information, solutions, or suggestions. I shows genuine interest without being overly supportive or reinforcing. I may have to rephrase the question if P gets off the topic. I may have to help the P explore the things he says by saying such things as: "Oh, tell me more about that," or "How do you go about doing that?" The idea is to maintain P's own exploration of the future for the duration of the interview.

APPENDIX D

Intervention with Group III Patients

APPENDIX D
INTERVENTION WITH GROUP III PATIENTS

"I want to thank you, Mr. _____, for agreeing to talk for a while. I'm not a medical doctor, so if you have any specific questions about your medical condition, you should ask your doctor. I'd just like to visit and talk a while about how things are going so far. It's very natural to be somewhat concerned about having an operation. (P may say something; I nods head, agrees, etc.) Sure, but for now while we talk, let's just talk about how things are going here in the hospital. I'd just like to visit for awhile."

From the list of question areas below, I spends the duration of the interview as an interested person, sometimes actively listening, sometimes talking himself. I keeps the intervention on topic about the events in the here-and-now or the past, but guides P away from talk about the operation, recovery, or the future.

(A). General Comfort: How have you been feeling since admission? Any aches, pains, or complaints? How are you feeling today?

(B). Hospital and Ward: Is this your first heart admission? First time in this VA or any VA? How are things going on this ward? Have you gotten to know other patients? What kinds of things have they done to you to get you ready for surgery? How's the food here?

(C). Staff: How's the staff treating you? They pretty busy here? Which staff have you talked to the most?

(D). Visitors: Any family or friends stop by? Any visitors like social worker, chaplain, other patients' families you've talked to?

(E). Expectations: Things going pretty much as you expected? Did it take longer than you thought for the doctors to decide on surgery, or shorter than you thought?

(F). Summing up: Review of the interview.

APPENDIX E

Trait Anxiety Questionnaire

APPENDIX E

TRAIT ANXIETY QUESTIONNAIRE (Spielberger, 1968)

Subject answers each item by marking: "Almost Never," "Sometimes," "Often," or "Almost Always."

1) I feel pleasant
2) I tire quickly
3) I feel like crying
4) I wish I could be as happy as others seem to be
5) I am losing out on things because I can't make up my mind soon enough
6) I feel rested
7) I am "calm, cool, and collected"
8) I feel that difficulties are piling up so I cannot overcome them
9) I worry too much over something that really doesn't matter
10) I am happy
11) I am inclined to take things hard
12) I lack self-confidence
13) I feel secure
14) I try to avoid facing a crisis or difficulty
15) I feel blue
16) I am content
17) Some unimportant thought runs through my mind and bothers me
18) I take disappointments so keenly that I can't put them out of my mind
19) I am a steady person
20) I get in a state of tension or turmoil as I think over my recent concerns and interests

APPENDIX F

State Anxiety Questionnaire

APPENDIX F

STATE-ANXIETY QUESTIONNAIRE (Spielberger, 1968)

Subjects answer each item by marking: "Not at all," "Somewhat," "Moderately so," or "Very Much so."

1) I feel calm
2) I feel secure
3) I am tense
4) I am regretful
5) I feel at ease
6) I feel upset
7) I am presently worrying over possible misfortune
8) I feel rested
9) I feel anxious
10) I feel comfortable
11) I feel self-confident
12) I feel nervous
13) I am jittery
14) I feel "high strung"
15) I am relaxed
16) I feel content
17) I am worried
18) I feel over-excited and "rattled"
19) I feel joyful
20) I feel pleasant

APPENDIX G

Depression Adjective Check List

APPENDIX G

DEPRESSION ADJECTIVE CHECK LIST (Lubin, 1967)

Subject checks those words which describe his present mood.

Form E

[illegible]happy	Lost	Strong	[illegible]afe
A[illegible]ive	Broken	Dejected	W[illegible]ted
B[illegible]e	Good	Awful	Cri[illegible]cized
Do[illegible]ncast	Burdened	Glum	Fit
Di[illegible]irited	Forlorn	Great	
Com[illegible]sed	Vigorous	Finished	
Dist[illegible]ssed	Peaceful	Hopeless	
Cheer[illegible]ess	Well	Lucky	
Lonel	Apathetic	Tortured	
Free	Chained	Listless	

Form F

Sorrowful	[illegible]vnhearted	Jolly	J[illegible]ous
Lively	W[illegible]ied out	Desterted	De[illegible]oyed
Uneasy	Pl[illegible]ful	Grieved	Somb[illegible]
Tormented	Joy[illegible]ss	Low	Uncon[illegible]rned
Low-spirited	Desp[illegible]ring	Steady	
Clean	Gay	Wretched	
Discouraged	Frien[illegible]	Terrible	
Suffering	Succes[illegible]l	Inspired	
Broken-hearted	Reject[illegible]	Woeful	
Easy-going	Crestfal[illegible]n	Unworthy	

Form G

Heartsick	Heavy-hearted	I[illegible]ger	[illegible]e
Healthy	Failure	D[illegible]ined	O[illegible]ssed
Sad	Glad	De[illegible]late	[illegible]s
Afflicted	Despondent	Mi[illegible]able	El[illegible]
Lonesome	Sunk	Mer[illegible]	
Fine	Optimistic	Dul[illegible]	
Alone	Jovial	Mela[illegible]holy	
Gloomy	Enthusiastic	Inter[illegible]ted	
Depressed	Bleak	Unwant[illegible]	
Alive	Griefstricken	Gruesom[illegible]	

APPENDIX H

Medical Recovery Variables

APPENDIX H

MEDICAL RECOVERY VARIABLES

Listed below are the Medical Recovery Variables used in this study; the unit of measurement, criteria for recording, or operational definition of each; and where the information was found for each variable.

1). Time in Surgical Intensive Care Unit (SICU)

a) given in hours from the time and date patient was received in SICU from the operating room to time and date patient was transferred;

b) taken from SICU nursing notes hourly flow sheet.

2). Days to Discharge

a) given in days from the day of operation to the day of discharge;

b) taken from surgeon's record of operating date and doctor's discharge orders.

3). Blood Given During and After Surgery

a) given in number of units of whole blood (500 cc's per unit) infused during surgery and in SICU;

b) taken from anesthetist's operating notes and nursing notes.

4). Return of Normal Vital Signs (VS)

a) given in hours from the time patient entered SICU to the time blood pressure, pulse, and temperature became stabilized within a normal range after infusion of blood had been discontinued and after vasal pressers had been discontinued; (if there was an abnormal reading of VS after this point, it was listed as a "complication");

b) taken from nursing notes hourly flow sheet of VS.

APPENDIX H (CONT)

5). Resumption of Oral Intake

a) given in 12-hour periods after surgery in which patient resumed oral intake (i.e., 1st 12-hour period, 2cd 12-hour period, and so forth);

b) taken from nursing notes hourly flow sheet of intake where date and time of first and subsequent oral intake is given.

6). Return to Normal Blood Values

a) given in 12-hour periods after surgery in which patient's blood values returned within a normal range; "normal" was defined as that range standardly used by the hospital's hemotology laboratories; the time at which hemoglobin, whole blood count, and platelet count were all within normal range was recorded unless another blood value was abnormally high or low, in which case the time that value came within normal limits was recorded;

b) taken from computor print-outs of patient's blood values.

7). Time Patient was Up and About on His Own

a) given in hours from the end of surgery to the first time it was charted that the patient was "out of bed without assistance", or "ambulating freely," or the like;

b) taken from nursing progress notes.

8). Complications in SICU and Medical Recovery Ward

a) given in numbers of complications serious enough to be charted or which required treatment; Appendix I lists and defines these complications;

b) taken from nursing notes, doctor's progress notes, and doctor's orders.

9) Medications Received Over and Above Routine

a) given in number of medication events from entrance into SICU to discharge except those given routinely to all patients; "medication event" was defined as the occurrence of a patient taking a medication; Appendix J further defines and lists the medications;

APPENDIX H (CONT)

b) taken from nursing notes and "Continuing Medication" daily flow sheet.

10). Discharge Medications

a) given in the number of different medications prescribed at discharge;

b) taken from doctor's discharge note.

APPENDIX I

Medical Complications

APPENDIX I

MEDICAL COMPLICATIONS

The general rule for including a complication as a medical event in the patient's recovery was: if it was deemed serious enough by the medical staff to be charted. The complications listed below were those used in this study. Following each is given the definition or event in the charts that was used to score or record the occurrence of the complication. The complications were most often charted in the nursing notes, but were also found in doctors' progress notes.

A). Premature Ventricular Contractions, Tachycardia, or Arrythmia.

- recorded each time they are charted; if this complication continued for a few hours, it was counted as one occurrence; if it was then brought under control and re-occurs, it was recorded again.

B). Patient Confused, Anxious, Depressed, Hostile, Combative.

- recorded if: (1) a doctor was called; (2) it occurred over serveral hours of nursing notes or charted several times (one occurrence of "Pt looks depressed"was not counted); or (3) an overt behavior manifesting these emotions was charted -- e.g., "Pt pulled NG tube," "Pt very restless, restraints applied."

C). Abnormally High or Low Blood Pressure, Pulse, or Temperature.

- recorded if: (1) doctor was called; or (2) if this complication was noted after patient had been stablized. E. g., "MD notified of increased blood pressure," "cooling blanket applied for increased temperature."

D). Low Urine Output (= Temporary Kidney Failure)

- recorded if urine output for a three hour period averaged less than 30 cc's.

APPENDIX I (CONT)

E). Patient Refuses Treatment.

- recorded if, after patient had been charted as being "alert and awake", he refused some treatment. E. g., "Pt refuses IPPB."

F). Bleeding from Incision or from Chest Tubes.

- recorded if chart stated that incision or chest tubes bleed.

G). Leg Complications.

- recorded if there was bleeding from the leg incisions or if other leg problems (e.g., poor circulation) necessitated some treatment. E. g., "T.E.D. stockings applied."

H). Shortness of Breath.

- recorded if SOB was charted or if oxygen was given after it had been discontinued for routine post-operative use.

I). Blood in Urine, Vomiting, NG Tube Bleeding, or Other Minor Complications.

- recorded if one of these was charted.

J). Continuous Complaints.

- recorded only if continuous complaints were made and a doctor was called.

K). Returned to Operating Room or to SICU.

- recorded if patient returned to OR while in SICU or returned to SICU after he had left it.

L). Other

- recorded if a complication arose that required some attention other than those listed above. E. g., "Pt left hospital- hospital police notified," bacteria infection, consult to neurology.

APPENDIX J

Medications

APPENDIX J

MEDICATIONS

All medications patients received were recorded for purposes of this study except: (1) those routinely prescribed for all patients (e.g., morphine sulfate the first few days after surgery); and (2) those not considered particularly relevent to recovery for heart surgery (i.e., laxitives, antibiotics, multivitamins, and anti-acids). Medications which were generally prescribed for all patients, but on a PRN basis, were also included. Specifically, these were Phenophen for pain and Nembutal for sleep. Listed below are those medications used.

A. Lasix
B. Digoxin
C. Phenophen
D. Nembutal
E. Xylocaine/Lidocaine
F. Inderal/Isotyle
G. $FeSO_4$
H. Dalmane
I. Tylenol
J. Valium
K. Librium
L. Coumadin
M. Decadron
N. Chloral hydrate
O. Quinadine
P. "Others" - aquamephyton, methyl cellulose, etc.
R. Isordil/Aldomet
S. Mannitol
T. Pronestyle/Cholestyle
U. Darvon/Demeral
V. Nitroglycerin
W. $NaHCO_3$
X. Protamine
Y. Aramine
Z. Haldol

APPENDIX K

MEANS AND STANDARD DEVIATIONS FOR MEDICAL RECOVERY VARIABLES

APPENDIX K

MEANS AND STANDARD DEVIATIONS
FOR MEDICAL RECOVERY VARIABLES

Variable	Group I	II	III	IV
Hours in SICU	81.22	87.78	90.44	92.00
	23.90	24.76	24.51	35.94
Days to discharge	10.56	12.22	12.78	12.78
	1.130	2.167	4.658	2.048
Units of blood in surgery	1.778	1.222	2.000	3.556
	.8333	.8333	.7071	424
Units of blood in SICU	1.444	4.000	2.333	2.000
	1.010	5.222	1.225	1.225
Hours to return of normal V.S.	20.78	30.22	34.89	24.11
	13.37	28.45	28.12	10.30
Oral intake (12-hr. periods)	2.778	2.333	2.889	3.222
	.9718	1.000	1.167	1.787
Blood values (12-hr. periods)	4.444	4.556	6.667	7.889
	3.206	4.304	2.828	4.540
Up and about (hours)	157.7	176.0	166.1	218.7
	41.19	74.20	74.42	95.59
Complications in SICU	3.222	2.444	2.444	3.333
	1.394	1.424	1.810	2.500
Complications after SICU	1.222	1.667	1.333	1.778
	1.302	2.872	1.225	1.563
Medication events in SICU	5.778	3.889	2.444	11.00
	5.357	2.261	2.297	11.94
Medications after SICU	19.44	23.56	25.78	19.11
	7.601	2.392	1.820	1.262
Discharge medications	1.667	1.444	1.444	1.555
	1.118	1.014	1.333	1.509