

PSYCHOLOGICAL PREDICTORS OF SURGICAL OUTCOME:

ANXIETY AND ACTIVE COPING

by

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Review of Literature

Much has been written about the psychological aspects of surgery. It is generally well accepted that the psychological well-being of an individual is critical to his recovery, and therefore must not be left to chance. Yet there is little agreement as to what constitutes effective psychological preparation for surgical patients in order to facilitate their recovery. The reasons for this confusion is the lack of recognition of individual differences that may make one presurgical intervention appropriate for one person and inappropriate for another, and the difficulty of adequately assessing both presurgical emotional states and postoperative recovery.

Janis (1958) states ". . . carefully planned presurgical communication, individually hand tailored, in private interviews, conducted by the patient's physician or a professional counselor will probably be required in order to take account of individual differences in personality tendencies" (p. 402). Although Janis makes this comment in reference to one class of patients (those with very low anxiety), one is left to conclude that individual differences demand personal attention in all cases.

However, in current research individual differences may be ignored in the search for the perfect, all-purpose intervention. The assignment of patients to treatment groups tends to be based on random selection (Langer, Janis, & Wolfer, 1975) or perhaps one personality disposition such as coping style (Andrew, 1973). The majority of the population cannot afford the type of medical care to which Janis refers, and at

the same time, the physician cannot afford to ignore the individuality of his patient. An emphasis on efficient evaluation is essential for effective treatment in the general hospital setting where the time available with the patient will be minimal. Wolfer and Visintainer (1975) note that techniques proposed to improve the care of (pediatric) patients must be both appropriate and feasible given the normal operations in a hospital where there may be a scarcity of "human and material resources" (p. 244).

In order to guide an individual's affective processes and thought sequences so that the patient will be able to maximize his psychological readiness for surgery, several aspects must be considered. The following review will examine two of the numerous psychological variables, anxiety and active coping responses, that must be integrated into a clinical picture that may aid in determining an individual's presurgical treatment.

Janis' (1958) classic work with surgery patients provides a logical point from which to begin to examine the variables of interest. His major premise deals with the patient's level of anticipatory fear and his subsequent adjustment to stress i.e., surgery. That investigation has spawned the following hypotheses which are consistent with the emotional drive theory of Miller and Dollard (1941):

Persons who display a moderate degree of anticipatory fear before being exposed to physical stress stimuli (pain, bodily discomforts, and severe deprivations) will be less likely to develop emotional disturbances during or after the stress exposure than those persons who display either a very high degree or a very low degree of anticipatory fear.

Persons who display an extremely high level of anticipatory fear or anxiety during the "threat" period will be more likely

than others to display intense fear of body damage during the subsequent crisis period, when exposed to actual stress stimuli.

Persons who display an extremely low degree of anticipatory fear or anxiety during the "threat" period will be more likely than others to display reactions of anger and resentment toward danger-control authorities during the subsequent crisis periods when exposed to actual stress stimuli (Janis, 1958, p. 396).

Additionally, Janis (1958) notes that several other psychological variables tend to be associated with adjustment to postoperative stress. His observations indicate how the low, moderate, and high fear groups may differ in: their mode of reassurance, defense mechanisms used to control emotional reactions, and their exposure to authoritative communications which may have an effect not only on the level of anticipatory fear, but also on the emotional impact of the surgical stress. The groups may also differ in personality predispositions which may determine their responsiveness to situations involving physical danger. Janis' summary of group differences includes some experimentally derived generalizations and interpretive hypotheses, all of which need further research in order to be rigorously verified.

There are numerous problems in designing adequate psychological preparations for surgery. Janis (1958) uses evidence he has collected concerning the effect of preoperative communication on postoperative emotional reactions to generalize about the probable effects preparatory communications. He states:

. . . if a person's anticipatory fear is stimulated to a moderate degree by impressive warnings or by other forms of information, the probability that he will subsequently overreact emotionally to actual stress stimuli and develop sustained attitudes or resentment toward danger control authorities will be markedly lower than if his anticipatory fear is not at all stimulated during the precrisis period (Janis, 1958, p. 401).

This process of mentally rehearsing the impending stressful situation and developing realistic expectations that reduce the emotional shock of the stress event when it occurs termed by Janis "work of worrying" (Janis, 1958, p. 401).

According to Janis, the crux of the problem then is to handle each individual in such a way, based on the amount of anxiety he already has, that his level of anxiety will be optimal for good postsurgical adjustment.

Consideration of the level of anxiety is pervasive in surgical literature. The physical and emotional symptoms associated with anxiety are of concern because they are believed to influence the patient's reactions to the surgical procedures and affect postoperative recovery. For example, Drellich, Bieber, and Sutherland (1956, in Auerbach, 1973) as well as Janis (1958) have stressed the significance of anxiety to recovery while others have concluded that anxiety always impedes the patient's recovery and should be reduced (Elder, 1962; Giller, 1963; in Auerbach, 1973). Williams, Jones and Williams (1975) demonstrated that a high level of preoperative anxiety has an adverse and even dangerous effect on the patient's physiological status at the time of surgery. This negative effect can persist into the recovery period (in Williams, Jones, Workhoven & Williams, 1975).

However, Rothberg (1965, as cited in Auerbach, 1973) conducted an investigation of the relationship between presurgical anxiety as measured by the 16 Personality Factor Questionnaire (Cattell, Saunders & Stice, 1957) and postoperative recovery as measured by gastric, urinary, and bowel function. The measured level of trait anxiety was not related

to measures of recovery. Likewise, Haselhorst (1970, in Auerbach, 1973) found no relationship between the level of A-trait in heart surgery patients as measured by the State-trait Anxiety Inventory (Spielberger, Gorsuch & Lushene, 1970) and surgical outcome measured by the relative success of the operation.

The experimental design employed by Janis (1958) consisted of preoperative and postoperative interviews with 22 surgical patients and a retrospective survey with 149 students who had experienced surgery. It was upon the data gathered in these investigations that he based the hypothesis that a moderate level of anxiety was optimal for good convalescent adjustment. Leventhal (1963, in Johnson, Leventhal & Dabbs, 1971) conducted preoperative and postoperative interviews with surgical patients. Additionally, he related 11 measures of preoperative emotionality to postsurgical adjustment. He failed to replicate Janis' hypothesis that patients with moderate levels of preoperative anxiety exhibit fewer negative emotional disturbances postsurgically than did those who exhibited either extreme of preoperative anxiety. Leventhal reported a linear relationship as patients who were the lowest in preoperative anxiety were the lowest in postoperative distress. (Note: A weakness in the procedure employed by Janis was that he personally conducted the interviews both pre and postsurgically and, as he comments, may have inadvertently biased the data.)

Several studies (Egbert, Battit, Welch & Bartlett, 1964 & Johnson, 1966) dealing with patient preparation inspired by Janis' work do not clearly support the idea that the stimulation of anxiety which causes the work of worry to occur is the explanation for the earlier discharge

of the experimental groups. Illustrative of this finding is the study by Johnson (1966) who compared the level of postoperative distress in patients who received information about their impending postoperative discomfort with the recovery course of patients who received no forewarning. The prepared experimental groups were discharged earlier, but there was no difference between prepared and unprepared patients in their reports of postsurgical pain. Johnson, Leventhal and Dabbs (1971) cite this as evidence that there was no difference between the groups in emotional reactions. However, the use of such indirect measures of anxiety may lead to confusion. Bruegel (1971) administered the Institute for Personality and Ability Testing Anxiety Scale questionnaire (IPAT Anxiety Scale) (Cattell & Scheier, 1961) to patients prior to surgery. No relationship could be shown between anxiety level and perceived pain as measured by both subjective pain ratings and the number of analgesics received. Bruegel (1971) notes that this may be due to the use of a trait anxiety measure rather than a state anxiety measure. She concludes that characteristic levels of trait anxiety do not seem to affect pain perception.

Langer, Janis and Wolfer (1975) report a study in which they compared types of presurgical intervention; one of which was imparting information. The information had the initial effect of raising preoperative anxiety which, while it had apparently dissipated by the time of the postoperative anxiety measure (nurse's ratings), did not correlate with a positive postoperative effect. Note, however, that individual differences in presurgical anxiety were not taken into account and may have been obscured in the group data. The subjects were assigned to

treatment groups on a stratified random basis. If a patient with high anxiety was stimulated to worry more, he might exhibit effects that could overshadow the positive effects shown by those in his group who were low or moderate in anxiety level.

Johnson, Leventhal and Dabbs (1971) found relatively little support for the idea that a moderate level of anxiety is necessary prior to surgery in order for the work of worry to occur. Rather the relationships between preoperative anxiety and postoperative distress were generally linear with those persons who exhibited the greatest pre-surgical anxiety reporting the greatest amount of negative emotional states during the postoperative period. Those who were low or moderately anxious prior to surgery reported low levels of emotional disturbance postoperatively. In addition to the measures of emotional responses, they report no significant relationship between preoperative fear and the objective measures of surgical recovery - number of analgesics and number of postoperative days in the hospital. Thus, this study offers no support for the curvilinear relationship between presurgical anxiety and postsurgical outcome; patients who expressed moderate fear or worry before the surgery did not show a recovery course that was superior to patients with low presurgical anxiety. The relationship was linear.

The findings of Johnson, Leventhal and Dabbs (1971) are consistent with those of Wolfer and Davis (1970). The predicted curvilinear relationship between preoperative anxiety and postoperative emotional state was not found.

Auerbach (1973) reports mixed results in regard to the prediction that there is a curvilinear relationship between presurgical anxiety

and postsurgical adjustment. Preoperative A-state (as measured by the STAI Anxiety Scale) was found to be inversely related to scores on the Hospital Adjustment Inventory which was made up of items relating to worries about the hospital experience. That patients who were higher in A-state prior to surgery expressed more worry postoperatively does not support Janis' prediction of a curvilinear relationship between preoperative anxiety and postoperative adjustment. But these results are in line with the aforementioned studies (Wolfer & Davis, 1970; & Johnson et al., 1971).

Auerbach (1973) reanalyzed his data and considered the relationship between postsurgical adjustment and delta A-state scores. The delta score is the elevation in A-state over an individual's normal A-state, and is computed by subtracting the patient's A-state score prior to surgery from his A-state level during the convalescent period. Based on delta scores, a significant curvilinear relationship was obtained with a self report measure of postsurgical adjustment (The Patient's Opinion Form). However, it must be noted that the use of difference scores has been questioned. Keppel (1973) states that they are insensitive and "more unreliable than either the original or final scores alone" (p. 513).

There is considerable confusion in the literature concerning the effects of the level of anxiety present in the patient prior to surgery. This is reflected in both the emotional reactions to the stress and the more objective measures of recovery such as the number of days the patient remains in the hospital after his surgery.

One possible way of resolving the confusion about surgical recovery is offered by Johnson, Leventhal and Dabbs (1971) in what they term the "parallel response model" which was proposed by Leventhal (1970). In this model emotion is considered to be a response rather than a drive. Thus, many of the instrumental acts of recovery may be performed independently of, and not because of, the emotional state of the patient. Johnson et al. (1971, p. 57) state, "For example, to reduce the possibility of complications, a patient will ambulate and will do so whether his fear level is low, moderate, or high". Thus, presurgical measures of anxiety may accurately predict emotional responses during recovery, but not more instrumental or objective responses. This may be even more true when the objective criteria of recovery are not basically under the control of the patient: his biological condition and/or days in the hospital which are frequently determined by the physician's policy (Wolfer, 1973). Wolfer (1973) asserts that surgical recovery as it has been traditionally used in literature is an ambiguous term. He suggests considering "recovery" to be a set of biological processes and considered separately from patient "welfare" or the psychological components of a patient's response to the surgical experience. Both aspects of recovery are important and perhaps should be considered separately before trying to deal with their interactions.

In part, the confusion that surrounds the effect of presurgical anxiety upon recovery may also be explained in terms of the measures of anxiety employed and/or the type of anxiety assessed. Spielberger (1972) has distinguished between state and trait anxiety in an effort to reduce the confusion surrounding the construct of anxiety. This

confusion, he asserts, is caused by the indiscriminate use of the term anxiety to refer to these two different concepts.

State anxiety is defined as an emotional reaction "consisting of unpleasant, consciously perceived feelings of tension and apprehension, with associated activation or arousal of the autonomic nervous system" (Spielberger, 1972, p. 29).

Trait anxiety is defined as individual differences in anxiety proneness, i.e., the individual's predisposition to respond with A-state when stressed. According to Spielberger (1972), persons high in A-trait are self-deprecatory and are therefore concerned with a fear of failure. As such, they are individuals who respond with higher A-state in ego involving stress situations than do persons of low A-trait. When the situation is neutral or non-ego-involving, their elevation in A-state does not differ from persons with low A-trait.

In support of the state-trait anxiety theory, Spielberger (1972) cites studies that examined the effect of stressor stimuli that are threats to self esteem and personal adequacy (ego-involving). Rappaport and Katkin (1972); O'Neil, Spielberger and Hansen (1969); and Hodges (1968) found differential responding on A-state for high and low A-trait individuals when the stressor posed a threat to the ego. Similar differential responding on A-state did not occur in situations involving physical danger. Hodges and Spielberger (1966) found that while the threat of shock produces elevations in A-state, the changes were not related to A-trait. That physical danger does not cause differential responding on A-state by persons high and low in A-trait is also supported by Spielberger, Gorsuch and Lushene (1970).

Similar results have been found in studies of anxiety in surgical patients. Spielberger, Auerbach, Wadsworth, Dunn and Taulbee (1973) investigated the effect of impending surgery (a physical threat) on A-state for persons of high and low A-trait. They report that while the high A-trait patients exhibited a higher A-state than the low A-trait patients both before and after surgery, both groups exhibited a similar decline in A-state scores. These results were also obtained by Auerbach (1973) and Johnson, Dabbs and Leventhal (1970). It may be concluded from these results that a stressor which does not pose a threat to the individual's self esteem, such as physical danger, is not regarded as more threatening by high A-trait persons than by those of low A-trait (Shedletsky & Endler, 1974; Spielberger, Auerbach, Wadsworth, Dunn & Taulbee, 1973).

Frequently studies that examine anxiety employ the Taylor Manifest Anxiety Scale (Taylor, 1953) or the A-trait scale included in the State-Trait Anxiety Inventory (Spielberger, Gorsuch & Lushene, 1970). Examples include: Hodges (1968), Spielberger et al. (1973) and Rappaport and Katkin (1972) (cited in Endler, 1975). This has also been the case in surgical studies such as Spielberger et al. (1973), Auerbach (1973), and Johnson et al. (1970). However, there is an alternative method that seems more appropriate for the study of anxiety in the surgical situation.

The S-R Inventory of Anxiousness (Endler, Hunt & Rosenstein, 1962) was used by Endler and Shedletsky (1973) as a measure of trait anxiety in conjunction with the STAI A-state scale as a measure of state anxiety. Using this measure, they found that under the threat of physical danger

(shock) persons high in A-trait reported higher A-state than did those who were low in A-trait.

Endler and Shedletsky (1973) argue that the most likely explanation for their unexpected results is that the Taylor MAS and the STAI for A-trait are unidimensional measures of A-trait and are thus restricted to measuring trait anxiety that is associated with interpersonal stress or ego threat. When an ego threatening situation occurs, there is an interaction with the interpersonal measure of A-trait and the differential A-state changes for high and low interpersonal A-trait subjects may be observed. However, when a stressful situation occurs that involves physical threat, the interaction with the interpersonal A-trait measure does not produce differential changes in A-state. On the other hand, the S-R Inventory of Anxiousness is purported to be a multidimensional measure which allows assessment of A-trait associated with interpersonal (ego), physical danger, and ambiguous threat situations. It is therefore a more global measure of trait anxiety than the MAS or the STAI (Shedletsky & Endler, 1974). The multidimensional aspect of the S-R Inventory permits an evaluation of the interaction between that measure of A-trait and the threat of physical danger that would evoke differential A-state changes (Shedletsky & Endler, 1974; Endler, 1975).

Support for this argument may be found in results reported by Hodges and Felling (1970), Spielberger, Gorsuch and Lushene (1970), Endler and Okada (1975). Specifically, Hodges and Felling (1970) and Spielberger et al. (1970) report that they obtained greater correlations between STAI A-trait and STAI A-state scores in ego threat situations than in situations composed of physical threat. Endler and Okada (1975)

reported that the STAI A-trait scale yielded higher correlations with interpersonal-ego threat scale than with the physical danger or ambiguous threat scales of the S-R Inventory of Anxiousness.

Therefore, it seems that the STAI is a specific measure of trait anxiety and

. . . that the relationship between A-trait, A-state and type of threat, as suggested by the Spielberger (1972) state-trait anxiety theory is somewhat restrictive. The assumptions of the state-trait theory that the intensity and duration of A-state reactions are dependent upon the degree and persistence of threat confronting an individual remain unquestioned (Shedletsky & Endler, 1974, pp. 519-520).

It is the assumption that persons of high and low A-trait evaluate threats of physical danger equally that is questioned.

The results obtained by Endler and Shedletsky (1973) do not negate the importance of a person's past experience or his dispositional level of anxiety on his A-state reactions. Their findings "suggest that anxiety may not be solely a reflection of individual differences in response to threats to personal adequacy or self-esteem, but may also be a function of individual differences in responding to physical danger" (Shedletsky & Endler, 1974, p. 520). Anxiety appears to be multidimensional and this must be taken into account when attempting to examine the person by situation interaction (Endler, 1975).

With the exception of Wolfer and Davis (1970), past studies which have employed the multidimensional S-R Inventory of Anxiousness have based the results and conclusions on a single, total anxiety score (Endler, Hunt & Rosenstein, 1962; Endler & Shedletsky, 1973). Because that score is composed of input from three areas: interpersonal, physical danger, and ambiguous threat situations, this may be a misleading

and confusing practice. Endler (1975) suggests that a preferred method of measuring trait anxiety would be to obtain three separate trait anxiety measures for those components. It would then be possible to use the most congruent and specific measure of anxiety for the experimental situation and thus obtain the person (A-trait) x threatening situation interaction that would reveal differential changes in A-state (Endler, 1975). This would allow emphasis to be placed on the situational aspects of anxiety when attempting to explain or predict individual behavior (Endler & Okada, 1975).

The multidimensional S-R Inventory of General Trait Anxiousness (S-R GTA) by Endler and Okada (1974) was developed to maximize the effects of individual differences and to minimize the effects due to specific situations. Thus, in designing experiments dealing with surgical patients, one can take into account the evocative situation (surgery) and the facet of anxiety that would be aroused i.e., personal, physical danger. The use of the restrictive measure of A-trait (the STAI) seems to explain why Auerbach (1973) and others did not obtain differential A-state scores for high and low trait anxiety patients.

However, even the more specific assessment of trait anxiety does not always produce the desired straight forward results. Wolfer and Davis (1970) combined six situations of the S-R Inventory of Anxiousness (Endler, Hunt & Rosenstein, 1962) to measure patient's psychological reactions to the possibility of physical danger. They hypothesized that persons who had a greater fear of physical harm might also have a more complicated recovery from surgery. While the patients who had high scores on fear and anxiety measures taken on the night before surgery

tended to have higher scores on the S-R Inventory of Anxiousness (particularly on one of the measures of physical danger, a specific surgery situation added by the Authors) and to have more unfavorable attitudes toward hospitalization and surgery, these premeasures were not significantly correlated with the physical and emotional aspects of recovery.

Wolfer and Davis (1970) note the possibility that these results may be explained in part by individual differences in the patient's "stress-coping ability" (p. 411). They state that it may be possible that:

. . . within the high anticipatory fear group, individual differences in coping ability reduce the possibility for a linear correlation between degree of preoperative fear and some measure of postoperative recovery because high fear-effective copers tend not to have unusual postoperative physiological and psychological difficulties whereas low fear-ineffective copers may have such difficulties.

The most specific way to assess a person's situational anxiety is to ask the subject directly to rate his fear of the impending situation. This method was successfully employed by Hodges and Spielberger (1966) and Martinez-Urrutia (1975) to predict anxiety differences in shock and surgery situations respectively. Wolfer and Davis added a specific surgery situation to the S-R Inventory of Anxiousness as noted above. They found a higher correlation between the state-anxiety type responses with the specific measure than they did with the total S-R Inventory of Anxiousness scores. While these correlations were not significant at the .05 level, they were in the expected direction. Auerbach, Kendall, Cuttler and Levitt (1976) found that a measure of "generalized" level of dental anxiety, Corah's (1969) Dental Anxiety Scale, which was obtained

24 days prior to dental surgery predicted differential state anxiety scores when the patient was actually in the dental situation.

The question is thus raised as to how efficiently a non-specific measure of physical danger can predict state anxiety responses across the full range of possible physical threat situations. Auerbach et al. (1976) assert that the generalized measures of physical danger do not seem to predict differential A-state scores in specific situations. For example, it is reported in Auerbach et al. (1976) that Auerbach (1972) employed a non-specific measure of physical harm anxiety (The Harm Avoidance Scale from the Personality Research Form, Jackson, 1967). It did not predict state anxiety differences when the impending threat was surgery. Thus, even here there are conflicting reports about the efficacy of generalized versus specific measures of trait anxiety. This is especially true when the question of how to facilitate surgical recovery arises.

There is a need to ascertain whether Endler's 1976 (personal communication) measure of physical danger is congruent and specific enough for the surgical situation or whether a more specific and straight forward type of question is the most efficient way to predict presurgical state anxiety. The goal is that with the most congruent measure of anxiety, it may be possible to improve the prediction of presurgical anxiety, clarify the relationship of level of anxiety to outcome and thus make more accurate predictions about how a person may respond to surgery in order to develop an individualized but efficient program of intervention.

Coping Mechanisms: Problems in Definition

Coping, the second variable under consideration in this study, is frequently defined in an intuitive sense which then relies on the context to make the meaning clear. The concept of coping ranges from dealing with situations which can be termed realistic problem solving to serious and even pathological efforts to escape or avoid real or imagined dangers. When the situation is one of minimal stress with relatively low stakes involved, problem solving is the form of coping that is generally called into play. However, as the degree of threat intensifies, and the stakes increase, the focus of the coping is likely to shift to more rigid and less realistic efforts to handle the stress. Under circumstances of high threat, defense is a term often used to denote efforts to master the situation and/or the emotions that have been aroused.

The preceding definition of coping is too broad to be of any value in attempting to specify the meaning of coping for the purpose of research. An adequate system of classification of coping styles does not exist. However, some limited schemes do exist that deal with defenses. One example is where the defenses are divided into defensive polarities such as repression and sensitization or isolation (Lazarus, Averill & Opton, 1974).

Historically, perceptual defense provided a framework within which these defensive processes have been studied. The basic premise of that orientation was that the perception of threatening stimuli depends upon and can be predicted by the method of defensive coping employed by the subject. Persons who utilize repressive, avoidant styles of defense tend not to perceive or recall the threatening material while those

persons who employ defenses of intellectualization and undoing recall the threatening stimuli better than neutral stimuli. Interest in this type of research has waned primarily because the concepts of coping and defense do not require that the effects be on perception, but rather that they alter the way in which a person assesses and responds to a threatening situation (Lazarus, 1966).

Research on the defensive polarities may, according to Lazarus, Averill and Opton (1974), be divided into three approaches. These approaches employ different assessment instruments and terminology, and have a different conceptual focus. However, they share a common bias in that they consider the defenses as personality traits or dispositional attributes that lead to a defensive response rather than viewing the defensive reaction as a response. These three defensive polarities are: repression-sensitization, repression-isolation, and avoider-coper.

The repression-sensitization dimension is closely identified with Byrne's (1961, cited in Lazarus, et al., 1974) scale (based on MMPI items) although others have interpreted similarly constructed questionnaires in different ways. On the Byrne scale, one pole (repression) is the

. . . hypothetical tendency to deal with threat by not admitting (that is by denying) evidence of poor functioning, emotional disturbance, and socially undesirable traits or impulses; at the other end (sensitization) is the tendency to concede such traits readily, and to be oriented toward (sensitized to) the dysphoric or threatening aspects of living (Lazarus, Averill & Opton, 1974, p. 252).

A second approach to coping styles is the dichotomy between two opposing modes of defense based on Rappaport's (1967) tradition of diagnostic psychological testing and ego psychology as described in

Lazarus et al. (1974). Assessment is typically based on Rorschach ink-blot responses. Patterns of thinking and perceiving which tended toward "construction of ideation, naivete, relatively unmodulated affect, unreflectiveness, and the absence of intellectualizing tendencies (analysis, qualification, giving alternatives, and so forth)" were considered to compose the repressive disposition. A generally opposite pattern with the addition of responses characterized by "rumination about symmetry, intellectualization, and a high form quality" was considered evidence of isolation (Lazarus et al., 1974, p. 253).

The third approach to coping dispositions is that of Goldstein (1959) who devised a sentence completion test which placed persons in one of three groups: Avoiders, copers, and nonspecific defenders.

Avoiders are said to avoid threatening content, while copers are like sensitizers in being hyper-alert to the threatening aspects of their environment, neutralizing threat by intellectualized means; non-specific defenders are persons who emphasize neither type of defense to the exclusion of the other, presumably being capable of using whichever is appropriate at the moment (Lazarus, Averill & Opton, 1974, p. 253).

The literature in the area of personality is replete with a casual attitude toward the use of the terms associated with coping styles. Yet there is considerable doubt as to whether the different tests employed to measure the dispositions mentioned above are in fact measuring the same psychological tendency. Levine and Spivack (1964) provide the only direct evidence concerning this problem. They report a failure to find a significant relationship between their Rorschach measure of repression-isolation and several MMPI based scales. Other less direct evidence casts further doubt on the meaning of the questionnaire measures of coping styles. Conversely, there is some evidence to support the idea

that there is some overlap in the coping dispositions assessed by different measures. Examples include: Mendelsohn and Griswold (1967) and Luborsky, Blinder and Schimek (1965). Therefore, the similarity between the coping processes is not firmly supported by empirical evidence. Yet various terms are linked together because, by definition and when associated with specific situations and persons, it makes intuitive sense (Lazarus et al., 1974).

There is a tendency to confuse coping dispositions or traits with responses. Much of the research on coping has been concerned with coping traits - the tendency to respond in a characteristic way under stress regardless of the specific situation or source of that stress. A somewhat different point of view is set forth by Lazarus and his colleagues (Lazarus, 1966 & Lazarus, Averill & Opton, 1974). Their theoretical stance emphasizes the cognitive process of appraisal in which the situation at hand is evaluated in terms of its threatening or beneficial components.

Coping processes are not viewed as primarily a response designed to reduce an emotional mediator, as is traditionally argued, but rather as a response to the perception of some threatening condition and of potential avenues of solution or mastery. In short, they are designed to actualize some promise or to take the organism out of some jeopardy, as judged or cognitively appraised by the individuals (Lazarus et al., 1974, p. 259).

This is not to say that the reduction of an emotion is not sometimes the object of coping; it is to clarify that coping is not limited to that process.

By means of appraisal, the stakes or the probable consequences of a situation and its meaning to an individual are evaluated. This individual evaluation is partly based on the situation, but it is also

influenced by the perceiver's personal dispositions and life long belief systems. Both rational, problem solving coping responses and irrational, defensive coping responses are set in motion by the cognitive appraisal.

Thus, according to Lazarus et al. (1974), coping involves two main modes of expression: those modes which are composed of overt action and those which are intrapsychic. There are certain conditions and situations which do not allow much direct action on the environment. In these situations, an intrapsychic mode of coping is fostered. An example of a situation where a person is relatively helpless to directly alter the threat is in the death of a loved one or in cases of personal injury and surgery. When opportunities for coping by direct action do not exist, the only alternative is to engage in one or another form of intrapsychic coping - even though these cognitions cannot change the objective situation.

As we have noted, most of the research that has been done in the area of coping has been concerned primarily with personality structure or traits. This involves predictions about how a person will respond in a wide variety of situations based, for example, on his responses on a questionnaire or to a projective test.

However, it is more realistic to refer to coping as "a transaction between a person and the environment" and one cannot be separated from the other except to specify relevant variables for research (Lazarus, Averill & Opton, 1974, p. 303). Psychologists have tended to separate the person's traits from situational variables, but it is the person and his set of beliefs interacting that determine the meaning of a situation. Thus, on the basis of motives and beliefs, one person will appraise a situation differently than will another.

In order to be accurate, the study of coping should include situational variables and personality variables. The coping response is not dependent on either one alone, but on the interaction between the two. As Averill, Olbrich and Lazarus (1972, p. 29) comment, "Again and again, investigators have obtained what appears to be stable correlations between stress reactions and personality variables only to have them disappear when tested in a slightly different setting". One possible explanation is that a personality variable accounts for only a small part of the variance in behavior (Averill, Olbrich & Lazarus, 1972). The other possible sources of variance arise from the situation, the nature of the responses chosen to be measured, and their interaction with the traits of the person involved. The confusion in the coping literature, and the failure to replicate experimental findings may be due to changes in the interaction when any one of the variables is altered. Averill et al. (1972, p. 29) suggest that a change in strategy is needed in the study of coping behavior. Endler (1975) offers such a strategy. He emphasizes the specific sources of variance operating in a situation rather than transsituational personality traits. However, he cautions that while the attempt to prove traits the prime determinants of behavior has not been a productive strategy, an approach that focusses on situations alone will not clarify the problem. "A specific consideration of interactions would improve personality description". . . . (p. 19) "by emphasizing what kinds of responses individuals make with what intensity in various kinds of situations" (Endler & Hurt, 1966, p. 336). Phrased another way by Lazarus, Averill and Opton (1974, p. 307),

Because situational variables interact with personality variables, a new integrative unit of analysis is needed to supplant reference to the two separate classes of variables, which for want of a better term we have called the appraised significance of the situation. Because appraisal is a function of both situational and personality variables, this unit expresses the transaction between the person and the environment in terms of the cognitive process by means of which a given type of person processes and evaluates information about the environment.

Anxiety, Coping Process and Surgery

Several studies dealing with coping processes and the adjustment to the stress evoked by surgery illustrate both the differences in methodology and the confusion in results which has been referred to above.

Recall that Janis (1958) observed that those persons who manifested very low anxiety presurgically often used the defense of denial. This defense prevented their obtaining information that would help them develop realistic expectations about the impending stress. A consequence of their defensive orientation was a recovery period marked by negative emotional responses i.e., poor psychological adjustment. The method of data collection employed by Janis was primarily personal interviews and the criteria of postsurgical adjustment was emotional reactions to the surgical situation.

Another similar set of observations and conclusions is offered by Boyd, Yeager, and McMillan (1973). In this study, 27 mentally healthy males were divided postoperatively into good adjustment and poor adjustment groups. Adjustment is defined here as the rapidity with which the patients were able to return to an active life following their heart surgery. This was reviewed independently of medical recovery.

All of the subjects were examined by in-depth psychiatric interviews and psychological tests both preoperatively and postoperatively. The psychological tests included the Rorschach, the Thematic Apperception Test, the Rosenzweig Picture Frustration Test, and the Thaler Doctor-Patient Relationship Test. There were follow up interviews and tests at intervals of three, six and twelve months.

The most significant differences in these patients' adjustment lay in their stress coping styles. These coping styles were assessed by the Rosenzweig Picture Frustration Test and the Doctor Relationship Scale as well as the investigator's observations over the twelve month follow up.

On the Rosenzweig Picture Frustration Scale, the good adjustment group tended to make direct confronting attempts to cope with the problem situation. The poor adjustment group tended to deny the frustration depicted in the test stimuli. That is, their characteristic coping style would be to avoid or gloss over stress.

This same trend or pattern of coping style was reflected in the Doctor-Patient Relationship Scale. In the hypothetical test situations, the patients in the good adjustment group tended to be more active and direct in seeking information about the doctor's recommendations and took an active part in the communication between themselves and the doctor. They assumed equal responsibility with the doctor for good communication as well as for cooperating with the doctor in order to facilitate their recovery.

The poor adjustment group revealed a different pattern of interaction with the doctor. In the hypothetical test situation, only one in ten of the subjects in this group saw the patient actively seeking

information or clarification of the communication between the doctor and the patient. The subjects displayed a bland and passive stance and would comment, "He would tell the patient if he wanted him to know." or "I would be afraid to ask too much - I worry a lot." (Boyd, Yeager & McMillan, 1973, p. 35).

The patient responses throughout the follow up intervals revealed that the good adjustment group was characterized by a tendency to ask direct questions in order to clarify any aspects about which they were in doubt. They used "anxiety as a signal to get prepared for the approaching stress". They also "tended to assert some control over frustration rather than feeling helpless in the face of duress" (Boyd et al., 1973, p. 36). This good adjustment group was more flexible in their coping style than the poor adjustment group which enabled them to restore the equilibrium that had been disturbed by the surgery more readily than the poor adjustment group who tended to see the doctor as an omnipotent figure or parent.

The poor adjustment group did not seek information and rather than "mobilizing anxiety and sharpening perception of stress when signaled by the arousal of anxiety, they tended to stunt their perception" of the surgery and rely on denial (Boyd et al., 1973, p. 36). Thus, they attempted to gloss over or avoid the threat. They were able to narrow the stress to a level that would not overwhelm them, but this prevented their dealing adaptively with their fears. Frequently, they showed depression after surgery (Boyd et al., 1973).

As has been previously noted, Janis (1958) observed that surgery patients who tended to be defensive or engage in denial-avoidance

responses had a poor postsurgical adjustment. Burstein and Meichenbaum (1974, in Meichenbaum, Turk & Burstein, 1975) found that children who were high in defensiveness as measured by the Wallack and Kogan (1965) defensive questionnaire and who avoided playing with stress (hospital) related toys reported more anxiety and postsurgical distress than a group who was low in defensiveness and who actively played with the stress related toys.

Andrew (1970) describes a procedure for examining coping styles and the use of preparatory information for presurgical treatment in an effort to reduce the distress of surgery and foster recovery. A critical question was posed: Do all surgical patients benefit from a single given procedure? In order to examine possible answers to this question, the patients were divided into groups based on their responses to a sentence completion test (Goldstein, 1959). The test divided the patients into three groups of coping styles. Sensitizers were designated as those who had completions that were personalized, specific, and acknowledged feelings. Avoiders were those subjects who made stereotyped responses and who denied or distanced feelings. A neutral group was designated as those who scored in the midrange.

The hypothesis was that surgical patients whose preferred coping style was that of intellectualizing and vigilance toward rather than avoidance of aversive stimuli should welcome information about impending stress, learn the information, and thus reduce their stress (A-state). The reduction in anxiety should result in recovery from surgery in fewer days and the patient should require fewer medications for pain. The patients whose coping style was that of avoidance should respond in the

opposite way. The neutral group should be intermediate in its recovery process. Control groups were established for each coping style which received no presurgical instructions.

The results showed that in no group was learning of objective information a significant factor. An unexpected result was that the neutral group (the non-specific defenders) with instructions, recovered in the least amount of time and required the fewest medications. The avoiders, when instructed, required more medications as expected, but did not take longer to recover than the control group. The sensitizers, who were expected to show the greatest amount of improvement when given instructions did not differ from their control group (Andrew, 1970).

Andrew (1970) states that, in general, it can be seen that psychological preparation for surgery does make a difference; and that the specific results obtained here may be explained as follows: Sensitizers may have failed to show the expected improvement as a result of being exposed to the factual information because they had already had scanned their environment, acquired information, and integrated it. The information tape did not contain sufficient additional data to effect a change. On the other hand, avoiders probably would have acquired minimal information about their surgery prior to hearing the tape. They may have had their anxiety aroused as a result of hearing the tape, and did not have enough time to work through that anxiety, integrate the information, and thus complete the work of worry. Therefore, in this case the information could not decrease postsurgery anxiety and aid in recovery.

The explanation for the neutral's better recovery from the surgery is complex to explain. Neutrals with instruction may have shown the

most improvement because, due to their arousal (as exhibited by their repression pattern when learning the threatening material presented in the information tape), they had an optimal anxiety level which allowed them to engage in the constructive work of worry which in turn, enabled them to withstand the postoperative shock better than the other groups.

Another explanation Andrew (1970) offers for the data is that of adaptation. Goldstein, Jones, Clemens, Flagg and Alexander (1965) examined skin conductance and adaptation measures. His groups and their responses were as follows: Neutrals (non-specific defenders) were the most aroused by the first stimuli, but adapted the most rapidly. Avoiders were not initially aroused, but increased in reactivity to the second stimulus. Sensitizers showed the lowest arousal to the initial stimulus and minimal change in the presence of the second stimulus. This may be related to surgical outcome when considered in Janis' (1965) emotional role playing framework. This is the mechanism by which exposure to stress related stimuli or inoculation can produce behavior change. It may be translated to Goldstein's terms. That is, hearing the information tape served as the initial exposure to the anxiety arousing situation, so that the actual surgery could be the second exposure and be adapted to beforehand by the subjects who could integrate the experience and adapt (Andrew, 1970). It appears that non-specific defenders are examples of psychological health and reasonably conflict free. They may respond initially quite intensely to a stressful stimulus, but may adapt to the situation and be less reactive on their second exposure. The markedly defended person may, however, use his defense and "short circuit" his emotional reactions initially only to experience

more intense arousal during a second exposure (Goldstein et al., 1965). This may be viewed as support for Janis' hypothesis dealing with the optimal level of anxiety prior to surgery.

Other studies have examined coping styles, or the subject's characteristic method of dealing with stressful situations. Goldstein, Jones, Clemens, Flagg and Alexander (1965) exposed subjects twice to a stressful film and found that the amount of adaptation that took place depended on the subject's coping style. Other researchers such as Lazarus and Alfert (1964) and Speisman, Lazarus, Mordkoff and Davison (1964) have also demonstrated that prestress preparation should be compatible with the patient's coping style.

Cohen and Lazarus (1973) offer a somewhat different approach to the attempt to assess the role of coping and its importance in affecting recovery from surgery. In a sense, the types of coping examined are analogous to state and trait measures of anxiety in that the coping measurements are of on-going coping activity (state coping) and dispositional coping (trait coping).

Cohen and Lazarus (1973) note that generally several types of coping styles have been assessed in the past: repression-sensitization; repression-isolation, and avoidance-coping. While, as noted above, there is no empirical link between these terms, Cohen et al. (1973) state that all three appear to be of a general type which they term avoidance-vigilance.

The aforementioned types of coping are supposedly traits in that they represent the individual's predisposition to respond to threat with one or another of the coping styles. However, whether or not a person

will respond to a specific threat in a characteristic manner depends on the generality of that disposition, the intensity of the stress, and the relevance of the threat or stress situation to the coping disposition (Averill & Opton, 1968; cited in Cohen & Lazarus, 1973). It is possible to examine individual coping styles in the stress situation by observing the behavior of the individual in the specific stress situation. This procedure yields an assessment of the active coping process being employed by the individual. In this way the dispositional and active, situationally specific coping styles can be compared, and their relationship to the outcome of surgery examined (Cohen et al., 1973). If one or the other is a better predictor of outcome and thus a better aid in prescribing a presurgical intervention, then a step toward efficient diagnosis has been achieved.

Cohen and Lazarus' (1973) main finding was that the on-going style of coping (vigilance or avoidance) with presurgical stress just prior to the surgery was related to the various indices of recovery. The patients who employed a vigilant mode of coping generally had the most complicated recovery. Avoiders generally had the best recovery although they did not differ from the group who employed a combination of coping methods.

That the vigilant group, the group that knew the most about their operations, experienced the most complicated recovery from surgery is in contradiction to what was expected (Cohen & Lazarus, 1973). They account for this by raising the possibility that vigilant persons are the type who try to control their worlds in an active way. This was exhibited by their search for information prior to the surgery. However, the post-operative situation is one which is marked by a personal loss of control

over many factors. It is possible that the loss of control resulted in a loss of self esteem and increased sense of vulnerability which adversely affected recovery. The sense of personal vulnerability might be increased due to the fact that the vigilant patients had more detailed information about their surgery which usually included the possible negative complications (Cohen et al., 1973).

That perhaps the very vigilant patient has a great deal of information about the possible negative consequences that might occur during and after the surgery has support from Janis (1958). In general, Janis advocates the giving of detailed information to the patient about the impending surgery, but he makes specific recommendations about the content and tone of that information. The information should deal primarily with the stimuli that the patient is likely to perceive so that he can anticipate accurately and become psychologically prepared for the stressful events and the normal hospital routine. This information should be given in the context of strong reassurances to the patient. Background information about the medical aspects should be given only to the extent that they prevent or correct the patient's misconceptions about what is happening to him. While it appears that familiarity with an impending stressful stimulus tends to aid a person's adjustment, there is evidence from case studies that detailed medical knowledge does not necessarily contribute to adjustment and recovery from surgery.

Too much information about the medical aspects of one's own case can create an attitude of sustained hypervigilance that serves no constructive purpose and that may increase one's sensitivity to adverse events. These negative consequences are suggested by the case study material from a number of well informed and well educated surgical patients (Janis, 1958, p. 371).

The primary example used by Janis to make his point was the case study of a physician. Physician patients represent an extreme quality of knowledge, but it is of interest to note in Cohen et al. (1973) that "Years of schooling showed a significant relationship with two recovery variables, days in the hospital, and number of negative psychological reactions" (p. 382).

Cohen's results seem in opposition to Janis (1958) who implies that those who utilize avoidant coping styles should show the poorest recovery from surgery as this form of defense prevents the constructive work of worry which allows psychological preparation for the impending stressful situation.

A possibility that may be explored due to the inconsistent results noted in studies of coping strategy and stressful situations is the idea that certain coping strategies are adaptive in one type of situation and maladaptive in other types of situations of varying duration and intensity. Chodoff, Friedman and Hamburg (1964) report that in the case where children are dying from leukemia, many parents profit from avoidant denial defenses before the child's death, but if the avoidance is extreme, they tend to suffer more after the death. On the other hand, severely burned patients profitably use denial defenses until the reality of the situation had been tempered to a more bearable stage (Hamburg, Hamburg, & de Goza, 1953, in Meichenbaum, Turk & Burstein, 1975). Again, these studies reinforce the idea that coping techniques that are adaptive cannot be identified without taking into account the variance due to the individuals, the situation, and the interaction between them (Meichenbaum et al., 1975).

Cohen and Lazarus (1973, p. 385) suggest that "It is possible that surgery is one of those stressful occurrences that can be more effectively dealt with by avoidant-denial forms of coping than by vigilant ones, since although many threats exist in the surgical context, few actually materialize". Hackett and Weisman (1964, cited in Cohen et al., 1973) report that they observed that patients profit more from denial if the probability of a positive outcome is high rather than low such as in terminal cancer. Based on the data from other studies, this may not be a complete enough explanation. The relevant variable could just as well be the type of communication received by the patient prior to the surgery and the degree to which he is able to assimilate the information and reassurances offered due to his characteristic way of viewing the world i.e., his personality traits.

The importance of the type of communication offered to a patient is supported by Johnson and Leventhal (1974) and Johnson (1975). They report that the essential feature of the medical experience that should be communicated to the patient is an accurate picture of the sensations that he will actually experience. "Congruency between expected and experienced sensations results in low emotional response during the encounter with the threatening event" (Johnson, 1975, p. 375). The reduction in distress was not significant when only information about the environment, phases of the treatment, and the equipment used was offered. All of the patients were visited by the physician prior to a gastro-intestinal endoscopic examination who explained the general procedure and purpose, and answered questions posed by the patients (Johnson, Morrissey, & Leventhal, 1973, in Johnson, 1975). Again, in this study

we see the criteria set forth by Janis (1958) for effective stress reducing communication: that basic medical information be given which stresses the aspects the patient will actually perceive. Johnson has refined this idea to focus on the sensations the patient will experience. Although this study, and one conducted dealing with the stress of cast removal (Johnson, Kirchhoff & Endress, 1975, in Johnson, 1975) deal with the actual impact period of the stressful experience, the extension to what she terms the post impact phase (which for our purposes could be the surgical recovery period) seem reasonable. It is also reasonable to suppose that the very vigilant patient may assimilate information about his condition and impending surgery that would serve no purpose and indeed cause him unnecessary anxiety.

Cohen and Lazarus (1973) report an additional finding which is relevant to this discussion. She states that the dispositional coping modes "do not appear to be clearly or consistently associated with the course of recovery, or even strongly correlated with the active coping processes although one might have assumed they should be" (Cohen & Lazarus, 1973, p. 386). Since Cohen's major conclusions are based on active coping responses rather than the dispositional coping styles, she points out that her study is not directly comparable with those of Andrew (1970) and Delong (1970) since the coping styles assessed in those instances were of a dispositional nature. But it should also be noted that according to Cohen and Lazarus (1973), Andrew's and Delong's results were not entirely consistent in the pattern of the relationship between dispositional coping style and recovery from surgery. It is again clear that behavior is multidetermined. The mode of coping employed by a

person and the consequences of that mode are determined by numerous factors which include the nature of the stressful situation and the internal dynamics of the individual involved.

Given the amount of confusion surrounding the variables of anxiety and coping and their relationship to surgical outcome, there seemed to be a need to reassess these variables in a slightly different way. Therefore, in attempting to assess the psychological variables that influence an individual's recovery from surgery, this study focused on process (situational) coping responses on the avoidance-vigilance continuum (Cohen, 1970); state anxiety; and trait anxiety in response to physical danger (Endler, 1976). Additionally, an even more specific assessment of anxiety aroused by impending surgery was made by means of the Fear of Surgery Scale (Martinez-Urrutia, 1975).

The following hypotheses were purposed:

1. Of the five subscales composing the S-R Inventory of General Trait Anxiousness (Endler, 1976), it is expected that the subscale focusing on the fear of physical danger will have a greater correlation with surgical recovery as measured by a Recovery Index than the other four situational subscales which focus on anxiety aroused by interpersonal interactions, evaluation by others, experiencing novel or unfamiliar situations, and being involved in one's daily routines. The relationship will be linear.

2. Patients' scores on the Present Reactions Affect Questionnaire (Endler, 1976) which is the measure of state anxiety will have a positive and linear correlation with indices of the Recovery Index.

3. There will be a positive and linear correlation between scores on the Fear of Surgery Scale (Martinez-Urrutia, 1975) and indices of the Recovery Index.

4. There will be a positive, linear correlation between the patient's coping style and surgical recovery such that the more vigilant patients will have the poorest surgical recovery as measured by the indices of the Recovery Index.

5. Patients who have high scores on the S-R Inventory of General Anxiousness subscale for fear of physical danger will have significantly higher presurgical state anxiety scores when postsurgical scores have been controlled for than will patients who have lower S-R GTA fear of physical danger scores. These differences will not obtain for the other four S-R GTA subscales.

6. The state measure of anxiety (PARQ) will show a decline in anxiety from presurgical level to postsurgical level, but the S-R GTA will reflect the stability expected in a measure of trait anxiety. Fear of Surgery Scale scores will also remain stable across periods.

In addition the three premeasures of anxiety which should best predict surgical outcome (the measure of fear of physical danger from the S-R Inventory of General Trait Anxiousness, the Present Affect Reactions Questionnaire, and the Fear of Surgery Scale) the coping style rating, and the interaction between coping style and each measure of anxiety will be combined in multiple regression equations to see which of the predictors or interaction of predictors best forecasts surgical outcome as measured by the Recovery Index.

Biographical information such as age, sex, education, marital status, number of previous surgeries, surgeon, and hospital will be examined to determine their relationship to the patient's anxiety, coping style, and course of recovery.

Statement of Purpose

The underlying purpose of this study was to identify presurgical predictors of surgical recovery; to this end, various presurgical anxiety and coping style measures were examined. Additionally, an effort was made to redefine the indices of surgical recovery by means of factor analysis.

Anxiety has frequently been of concern to surgeons and psychologists in terms of its effect on the recovery course of surgical patients; but historically there has been confusion about the appropriate type of anxiety one should attempt to assess. An effort was made in this study to examine Endler's (1976) multifactor trait anxiety scale, the S-R Inventory of General Trait Anxiousness (S-R GTA) in terms of its usefulness in assessing anxiety in surgical patients. Specifically, the focus was on the situation of fear of physical danger (S-R GTA-PD-1) in terms of its congruence with the surgical situation and its relationship to surgical recovery as compared to the other four scales in the S-R GTA (anxiety in situations of interpersonal interaction, novel and ambiguous experiences, daily routines, and ego threat). The relationship between trait anxiety as measured by the Fear of Surgery Scale (Martinez-Urrutia, 1975) (FSS1) and state anxiety as measured by the Present Affect Reactions Questionnaire (Endler, 1976) (PARQ1) and surgical recovery were also examined.

Active coping style as defined by Cohen and Lazarus (1973) has been cited by Cohen as an important predictor of surgical recovery (Cohen et al., 1973). The relationship between the rating of coping style (Avsens) and surgical outcome was examined in this study.

The purpose was also to develop a prediction paradigm for each criterion of recovery utilizing anxiety measures, coping style ratings, and their interactions. In this way, the most efficient way to predict the individual indices of the Recovery Index was proposed.

In an effort to improve the measurement of recovery, a factor analysis was made of the relevant data available from the hospital records. A multiple index was developed, based on the factors derived. Each component was considered separately in analysis.

Method

Subjects

Forty-eight patients who were admitted for elective cholecystectomy were the participants in this study. Thirty-nine patients were hospitalized in Lewis-Gale Hospital, Salem, Virginia and nine were patients in Montgomery County Hospital in Blacksburg, Virginia. There were 39 females 9 males whose ages ranged from 21 to 73. The mean age was 45. None of the patients had a medical history of organic brain damage, mental retardation, or any other salient psychological disturbances. Patients were referred in the order in which they were scheduled for surgery and were asked to participate in the study if they were physically able to do so.

Measures

The S-R Inventory of General Trait Anxiousness (Endler, 1976). The S-R GTA is composed of five subscales which measure anxiety in specific situations. The subscales deal with anxiety aroused in the interpersonal situation (S-R GTA-IP), in situations of physical danger (S-R GTA-PD), in situations that are perceived as novel or ambiguous (S-R GTA-Amb), in an individual's daily routines (GTA-DR), and anxiety that is activated by being evaluated by others (S-R GTA-Eval). Factor analysis of the S-R GTA yields two situational anxiety factors: interpersonal-ego threat and physical danger. The ambiguous situation is based on a threat factor which was reported by Endler, Hunt and Rosenstein (1962) from a factor analysis of the S-R Inventory of Anxiousness. The S-R GTA is therefore considered a multidimensional measure (see Appendix C).

Present Affect Reactions Questionnaire (Endler, 1976). The PARQ, a revision of the Behavioural Reactions Questionnaire (Hoy & Endler, 1969) consists of 24 modes of response to the instruction, "Please circle a number from 1 to 5 for each of the 24 items to indicate how you feel at this particular moment". The patient is to rate the intensity of his personal experience of the 24 anxiety responses ranging from not at all to indications of very much (see Appendix D).

Fear of Surgery Scale. The FSS was devised to measure individual differences in anxiety aroused for a specific situation, surgery. The question is framed as follows: "In general, how much fear or concern do you have about surgical operations?" The patients were instructed to rate themselves on a six point scale which ranged from "no fear" to "extreme fear" (Martinez-Urrutia, 1975) (see Appendix E).

Avoidance Sensitization Process Rating (Cohen, 1970) (AVSENS).

Avoidance and sensitization were treated as extremes of a single dimension and rated on a scale from 1 to 10 with the higher scores implying sensitization and the lower scores implying the avoidant coping mode. Ratings were made by two individuals after listening to a taped interview of the patient. The raters were two psychology graduate students who were blind as to the hypotheses of the study. The criteria used in determining the process rating may be found in Appendix F; the format of the semi-structured interview may be seen in Appendix B (Cohen, 1970).

In order to arrive at a single AVSENS score for each patient, the two independent ratings were combined in the following manner: If the scores were within two points of each other, they were averaged. If the

discrepancy exceeded two points, a panel of four judges (the two original raters and two interviewers) listened to the taped interview and independently rated the patient again. If these scores were not within the two point limit, the difference was resolved by discussion. Of the 47 patients for whom interviews were available, 11 were re-rated.

Recovery Index. The Recovery Index is an adaptation of recovery criteria used by Cohen (1970). Numerous criteria related to recovery were included in an initial index which may be found in Appendix G. When the recovery data were collected for all of the patients, the basic index was factor analyzed. The following Recovery Index was developed based on those factors. I. Drugs was composed of the number of drugs received for sleep, constipation and diarrhea as well as the number of tranquilizers. II. Comp (complications) was determined in the following way: If there were no reports of nausea requiring medication, postsurgical antibiotics, diarrhea requiring medication, or notes of having to encourage the patient to cough, deep breath, or take fluids after the first day, the patient was assigned a score of zero. If any of the reports listed above were present, the patient was assigned a one. III. Day was determined as follows: If the patient was hospitalized for seven days or less, he was assigned a zero; if he remained in the hospital for eight or more days, he received a score of one. IV. Paletran consisted of the number of tranquilizers given plus the number of times that it was noted in the nurses notes that the patient looked pale, dizzy, or weak. V. Complaints refers to the number of patient complaints that appeared in the nurses' notes excepting incisional pain. Also included

here were the negative comments or observations about the patients that appeared in the nurses' notes, such as uncooperative, depressed, angry, etc.

Procedure

On the day prior to days when elective surgery could be scheduled, the hospitals were contacted and a list of patients posted for Cholecystectomies the next day was obtained. During the afternoon of the day prior to surgery each patient was approached, the nature of the study was explained as well as the fact that all patients scheduled for cholecystectomy were being asked to participate. If the patients were willing to participate, they were then asked to sign two consent forms which reiterated the purpose and procedure of the study (see Appendix A). There were some refusals to participate due to illness, hospital routine tests, or the presence of visitors as well as some negative, but undefined resistance to participation. Each of the consenting patients was tested twice. The first session was on the afternoon prior to surgery; and the second five days after surgery with the day after surgery being the first postoperative day.

The first testing session consisted of the semi-structured, taped interview to assess the patient's coping style in the presurgical situation (see Appendix B). At the conclusion of the interview, the patients were given the S-R Inventory of General Trait Anxiousness, the Present Affect Reactions Questionnaire, and the Fear of Surgery Scale.

The postoperative testing session consisted of the same anxiety inventories. The patients were then asked if they had any questions about the study and were thanked for their participation.

When the medical records for each patient were available, relevant demographic data were collected and the Recovery Index was completed. Data for completion of the Recovery Index were obtained from records of medications given and the nurses' notes which were entered into the records several times a day. The form used for recording this data may be seen in Appendix G.

Data Analysis

The dependent measures in these analyses were the individual components in the Recovery Index. Numerical scores were assigned to each patient on each index with the higher score indicating a more difficult recovery. The two trait anxiety measures, one state anxiety measure, and the rating of active coping style were entered as predictors into a stepwise multiple regression with the indices of the Recovery Index as the criteria measures. Ordinary multiple regressions were used to assess the contribution to the variance in recovery made by various nominal variables; this is equivalent to an Eta correlation between nominal and continuous variables. Heirarchical multiple regressions were performed to determine whether a curvilinear relationship existed between the indices of recovery and the three anxiety measures, FSS1, PARQ1, and S-R GTA-PD-1. Additionally, Pearson Product-Moment correlations were obtained for the predictor variables and the criteria measures. In order to assess the differential state anxiety for those patients high in fear of physical danger (S-R GTA-PD-1) as opposed to those with low scores on the S-R GTA-PD-1 and those high and low on the other four S-R GTA measures, an analysis of covariance was executed with presurgical

state anxiety (PARQ1) serving as the dependent variable while controlling for postsurgical state anxiety (PARQ2) which was taken as the baseline measure. A series of partial correlations between the five situational measures of the S-R GTA and PARQ1 was completed. Selected pairs of correlations were then tested to determine if significant differences existed between them. T-tests were performed to evaluate whether trait scores remained stable across the pre and postsurgical periods while state anxiety scores showed a decline from the pre to postsurgical period. T-tests were also used to assess any sex differences in the pre and postsurgical measures as well as the indices of the recovery index.

Results

Changes in Anxiety

A series of two-tailed t-tests was performed to determine whether anxiety scores changed systematically from presurgery to postsurgery. These results are summarized in Table 1. There was no significant difference between pre and post scores on the Fear of Surgery Scale (FSS1, FSS2) ($t = 1.38, p > .05$). Of the five subscales composing the S-R Inventory of General Trait Anxiousness (S-R GTA), only the subscale entitled "You are in situations involving interactions with other people" (S-R GTA-IP-1 and S-R GTA-IP-2) showed a significant pre and post difference ($t = -2.30, p \leq .05$). There was a significant difference between the presurgical and postsurgical scores obtained on the Present Affect Reactions Questionnaire (PARQ1 and PARQ2) ($t = 2.40, p \leq .05$), the state anxiety measure.

In order to determine whether patients who had a high score on the S-R GTA-PD-1 subscale (anxiety in situations of physical danger) had higher presurgical state anxiety as measured by PARQ1 than did patients who had low S-R GTA-PD-1 scores, an analysis of covariance was performed. The independent variables were the S-R GTA subscales divided into high and low groups by a median split. The dependent variable was presurgical state anxiety (PARQ1) and the covariate was postsurgical state anxiety (PARQ2). There was a significant difference between the high and low trait anxiety groups as measured by the S-R GTA-PD-1 in presurgical state anxiety ($F = 7.80, p \leq .01$). It was hypothesized that this difference would not be obtained with the other four trait measures. However, when

Table 1
Results of T-Tests for Differences in Presurgical
and Postsurgical Anxiety

Variables	Pairs	N	Means	<u>F</u> Value	2-tail Prob
FSS1*		48	3.1250	1.38	.175
FSS2**			2.8958		
PARQ1		48	51.8333	2.40	.020
PARQ2			45.4167		
S-R GTA-IP-1		48	31.2292	-2.30	.026
S-R GTA-IP-2			36.4583		
S-R GTA-PD-1		48	60.1042	1.20	.236
S-R GTA-PD-2			62.3125		
S-R GTA-Amb-1		48	46.2500	0.56	.576
S-R GTA-Amb-2			47.7292		
S-R GTA-DR-1		48	27.6042	-0.85	.399
S-R GTA-DR-2			29.4583		
S-R GTA-Eval-1		48	42.4583	-0.26	.799
S-R GTA-Eval-2			43.0208		

*One refers to presurgical measure.

**Two refers to postsurgical measure.

the same analysis was applied to the relevant data, significant differences in presurgical state anxiety were found for S-R GTA-Amb-1 ($F = 6.03$, $p \leq .05$); S-R GTA-DR-1 ($F = 7.94$, $p \leq .01$); and S-R GTA-Eval-1 ($F = 9.88$, $p \leq .01$). No significant difference was found for S-R GTA-IP-1. These results are summarized in Table 2 and indicate that the S-R GTA-PD-1 the only predictor of elevated state anxiety in the surgical situation. High scores on the S-R GTA-Amb-1, S-R GTA-DR-1, and S-R GTA-Eval-1 predicted an increase in state anxiety as well. The same analysis was applied with the Fear of Surgery Scale (FSS1) as the independent variable. The results, which are included in Table 2 are significant ($F = 7.03$, $p \leq .01$) and indicate that high FSS1 scores also predict elevated state anxiety.

When a partial correlation was done between presurgical state anxiety (PARQ1) and each of the five trait measures controlling for postsurgical state anxiety, each trait measure was significantly correlated with presurgical anxiety. These results are summarized in Table 3. Selected t-tests were performed to see if there were significant differences between these partial correlation coefficients. There were no significant differences. These results are summarized in Table 4

Inter-rater Reliability of Avoidance-Sensitization

In order to determine the reliability of the raters of coping style, two Pearson correlations between the two independent ratings of patient coping style were obtained. The first correlation was between the ratings as they were originally made regardless of the discrepancy between the scores. The correlation was significant ($r = .50$, $p \leq .001$, $N = 47$), but this is considered to be low to moderate reliability. A second

Table 2
 Results of Analysis of Covariance: Levels of
 Trait Anxiety by Presurgical State Anxiety
 Controlling for Postsurgical State Anxiety

Source	Sum of Squares	<u>df</u>	Mean Square	<u>F</u>	Prob
S-R GTA-IP-1*	4.114	1,47	4.114	.013	.909
S-R GTA-PD-1	2088.68	1,47	2088.68	7.80	.008
S-R GTA-Amb-1	1670.71	1,47	1670.71	6.03	.018
S-R GTA-DR-1	2119.76	1,47	2119.76	7.94	.007
S-R GTA-Eval-1	2546.21	1,47	2546.21	9.88	.003
FSS1	1910.029	1,47	1910.092	7.03	.011

*One refers to presurgical measure.

Table 3
 Partial Correlation Coefficients Between Presurgical State
 Anxiety (PARQ1) and Trait Anxiety (S-R GTA) Controlling
 for Postsurgical State Anxiety (PARQ2)

	PARQ1
S-R GTA - IP-1	.2698
	$p = .033$
S-R GTA - PD-1	.4207
	$p = .002$
S-R GTA - Amb-1	.4065
	$p = .002$
S-R GTA - DR-1	.3604
	$p = .006$
S-R GTA - Eval-1	.4622
	$p = .001$
Partial correlation coefficient between presurgical state anxiety (PARQ1) and fear of surgery schedule (FSS1) controlling for postsurgical state anxiety (PARQ2)	
FSS1	.4527
	$p = .001$

Table 4
 T-Tests for the Differences Between
 Partial Correlation Coefficients

Variables	t Value	<u>df</u>	Prob
S-R GTA - IP-1	-.8709	42	NS
S-R GTA - PD-1			
S-R GTA - PD-1	.1053	42	NS
S-R GTA - Amb-1			
S-R GTA - PD-1	.3531	42	NS
S-R GTA - DR-1			
S-R GTA - PD-1	.2911	42	NS
S-R GTA - Eval-1			
S-R GTA - IP-1	-1.54	42	NS
S-R GTA - Eval-1			
S-R GTA - Eval-1	.0696	42	NS
FSS1			

Pearson correlation was performed between the scores of subjects whose two ratings were not more than two points different in either direction. The correlation was significant ($r = .84$, $p \leq .001$, $N = 36$).

Factor Analysis of the Recovery Index

Each patient's hospital record was consulted and data were collected on 21 variables (see Appendix H). A varimax rotated factor analysis was performed. Based on these factors, a Recovery Index was developed according to the following criteria: The cut off level for including a variable in a factor was .30. Consideration was also given to whether the variable which was included in a factor lent itself to being totaled with the other variables. Finally, a variable was excluded if it had a very low frequency in the sample. The terms assigned to the components of the Recovery Index and their composition are as follows: Drugs - refers to the number of tranquilizers and medications for sleep, constipation and diarrhea. Day - indicates whether or not the number days in the hospital after surgery exceeded seven, i.e., if days were ≤ 7 , day was coded 0. Comp - indicates complications and denotes whether or not there was any report of nausea requiring medication, postsurgical antibiotics given, diarrhea requiring medication, or if the patient had to be encouraged to cough, deep breath, ambulate, or take fluids. Complain - indicates the number of complaints made by the patient that were recorded in the nurses notes except complaints about incisional pain. This factor also includes the number of negative comments or observations about the patient recorded in the nurses' notes such as uncooperative, depressed, or angry. Paletran - is composed of the number of tranquilizers given

and the number of times that it is reported in the nurses's notes that the patient seemed pale, dizzy, or weak.

Effects of Sex Differences on Anxiety and Criterion Measures

Two-tailed t-tests were performed to determine if any sex differences in the anxiety measures, coping style rating, Recovery Index or various demographic variables (age, education, and number of previous surgeries) were present; and the following significant results were obtained: The number of prior surgeries was significantly different with females having a history of more surgeries ($t = -4.00, p \leq .001$). The scores on the avoidance-sensitization scale were significantly different with females having the higher scores ($t = 2.68, p \leq .01$). This indicates that females tend to be more sensitizing than males as measured by this rating. Additional t-tests determined the following significant sex difference in the components of the Recovery Index: Females had significantly more complications ($t = -2.26, p \leq .05$). All results for these analyses are reported in Table 5.

Predicting Recovery

Pearson correlations of all of the predictor variables (AVSENS, S-R GTA-IP-1, S-R GTA-PD-1, S-R GTA-Amb-1, S-R GTA-DR-1, S-R GTA-Eval-1, FSS1, and PARQ1) with the Recovery Index factors produced results that are included in Table 6. Of those correlations, the following were significant. Drugs was significantly correlated with FSS1 ($r = .35, p \leq .01$). Complaints (Complain) were significantly correlated with S-R GTA-IP-1 ($r = .41, p \leq .01$); S-R GTA-PD-1 ($r = .25, p \leq .05$); S-R GTA-Amb-1 ($r = .41, p \leq .01$); S-R GTA-DR-1 ($r = .26, p \leq .05$); and

Table 5
Results of T-Tests for Sex Differences

Variable	Groups	N	Means	t Value	2-tail Prob
AVSENS	Male	9	3.61	-2.68	.010
	Female	38	5.22		
FSS1	Male	9	2.44	-1.86	.069
	Female	39	3.28		
FSS2	Male	9	1.89	-2.33	.024
	Female	39	3.13		
PARQ1	Male	9	41.55	-1.77	.084
	Female	39	54.21		
PARQ2	Male	9	36.78	-1.84	.072
	Female	39	47.41		
S-R GTA-IP-1	Male	9	29.22	-0.54	.590
	Female	39	31.69		
S-R GTA-PD-1	Male	9	53.67	-1.85	.071
	Female	39	61.59		
S-R GTA-Amb-1	Male	9	39.33	-1.63	.111
	Female	39	47.85		
S-R GTA-DR-1	Male	9	23.33	-1.86	.074
	Female	39	28.59		
S-R GTA-Eval-1	Male	9	35.89	-1.42	.163
	Female	39	43.97		
S-R GTA-IP-2	Male	9	38.11	.30	.768
	Female	39	36.08		

Table 5 (continued)

Variable	Groups	N	Means	t Value	2-tail Prob
S-R GTA-PD-2	Male	9	52.44	-1.69	.125
	Female	39	64.59		
S-R GTA-Amb-2	Male	9	42.89	-0.71	.494
	Female	39	48.85		
S-R GTA-DR-2	Male	9	31.22	.31	.755
	Female	39	29.05		
S-R GTA-Eval-2	Male	9	38.44	-.78	.442
	Female	39	44.08		
Drugs	Male	9	4.78	.19	.854
	Female	39	4.26		
Comp	Male	9	.11	-2.26	.029
	Female	39	.51		
Day	Male	9	.44	.62	.540
	Female	39	.33		
Complain	Male	9	2.44	-0.30	.765
	Female	39	2.77		
Paletron	Male	9	2.78	.12	.908
	Female	39	2.49		
ABE	Male	8	49.13	.95	.349
	Female	39	43.80		
Surgnum	Male	9	1.67	4.00	.000
	Female	39	2.64		
Education	Male	9	4.11	-0.47	.638
	Female	39	4.41		

Table 6
 Results of Pearson Correlations Between Predictor
 Variables and Criterion Variables

	Drugs	Day	Comp	Complain	Paletran
AVSENS	.07	.18	.03	-.02	.08
FSS1	.35**	.21	-.05	.15	.37**
PARQ1	.22	.13	-.03	.31*	.29*
S-R GTA-IP-1	.03	.06	.01	.41**	.02
S-R GTA-PD-1	.11	.24*	.006	.25*	-.01
S-R GTA-Amb-1	.11	.10	.003	.41**	.15
S-R GTA-DR-1	-.08	.09	-.04	.26*	.05
S-R GTA-Eval-1	.21	.18	-.09	.11	.19

* $p \leq .05$

** $p \leq .01$

PARQ1 ($\underline{r} = .31, \underline{p} \leq .05$). Paletran was significantly correlated with PARQ1 ($\underline{r} = .29, \underline{p} \leq .05$); FSS1 ($\underline{r} = .37, \underline{p} \leq .01$). Day was significantly correlated with S-R GTA-PD-1 ($\underline{r} = .24, \underline{p} \leq .05$).

An examination of the possibility of a nonlinear relationship among coping style, congruent measures of anxiety, and indices of the Recovery Index was examined as follows: The coping style rating (AVSENS), the FSS1, PARQ1, and S-R GTA-PD-1 scores were squared and entered in a hierarchical multiple regression to determine whether a significant amount of variance was contributed by the curvilinear component above the linear component of each. The results of these regressions may be seen in Tables 7, 8, 9, and 10. There was no significant contribution made by the curvilinear component.

To evaluate the effect of the nominal variables surgeon, hospital, marital status, and level of education on the indices of the Recovery Index; use was made of dummy coding in order to examine the effect by means of multiple regression. Each level of each of the nominal variables listed above was recoded as a vector with the level of interest being assigned a one; all of the other levels were made equal to zero. These dummy variables (one less than the original number of levels in the nominal variable) were entered in an ordinary multiple regression analysis with the indices of the Recovery Index as the criterion. A multiple \underline{R} was obtained which is equivalent to the conventional eta (correlation ratio) between nominal and continuous variables (SPSS, 1975). The results may be seen in Table 11. The only significant relationship was between hospital and drugs with patients at Montgomery County Hospital receiving more drugs ($\underline{R} = .37, \underline{p} \leq .01$).

Table 7

Results of Hierarchical Multiple Regression for
Coping Style-Avoidance-Sensitization Rating

Criterion	Step	Variable	F Ratio	Multiple R	R Square	RSQ Change	Beta
Drugs	1	AVSENS	0.21191	0.06846	0.00469	0.00469	0.82965
	2	(AVSENS) ²	0.8018	0.15114	0.02284	0.01816	-0.77303
Day	1	AVSENS	1.50799	0.18007	0.03242	0.03242	1.05787
	2	(AVSENS) ²	1.1023	0.23784	0.05657	0.2414	-0.89145
Comp	1	AVSENS	0.04684	0.03225	0.00104	0.00104	0.17114
	2	(AVSENS) ²	0.2586	0.04055	0.00164	0.00060	-0.14105
Complain	1	AVSENS	0.02524	0.02367	0.00056	0.00056	0.07424
	2	(AVSENS) ²	0.00129	0.02934	0.00086	0.00030	-0.09943
Paletran	1	AVSENS	0.29692	0.08096	0.00656	0.00656	0.17979
	2	(AVSENS) ²	0.01434	0.08283	0.00686	0.00031	-0.10037

Table 8

Results of Hierarchical Multiple Regression for
Present Affect Reactions Questionnaire

Criterion	Step	Variable	F Ratio	Multiple R	R Square	RSQ Change	Beta
Drugs	1	PARQ1	2.84063	0.24367	0.05938	0.05936	-0.15652
	2	(PARQ1) ²	.2885	0.25620	0.06564	0.00626	0.40794
Day	1	PARQ1	1.23934	0.16372	0.02680	0.02680	0.56475
	2	(PARQ1) ²	.2800	0.18190	0.03309	0.00629	-0.40880
Comp	1	PARQ1	0.00045	0.00317	0.00001	0.00001	1.32906
	2	(PARQ1) ²	3.1663	0.26214	0.06872	0.06871	-1.35155
Complain	1	PARQ1	6.42660*	0.035351	0.12497	0.12497	1.17135
	2	(PARQ1) ²	1.3242	0.38873	0.15111	0.02614	-0.83368
Paletran	1	PARQ1	4.90493*	0.31351	0.09829	0.09829	0.05447
	2	(PARQ1) ²	.1254	0.31766	0.10091	0.00262	0.26405

*p ≤ .05

Table 9

Results of Hierarchical Multiple Regression
for the Fear of Surgery Scale

Criterion	Step	Variable	F Ratio	Multiple R	R Square	RSQ Change	Beta
Drugs	1	FSS1	6.10600*	0.34565	0.11948	0.11948	0.13958
	2	(FSS1) ²	.1176	0.34917	0.12192	0.00244	0.21192
Day	1	FSS1	2.01055	0.20680	0.04277	0.04277	-0.15655
	2	(FSS1) ²	.3439	0.22442	0.05036	0.00760	0.37366
Comp	1	FSS1	0.14994	0.05763	0.00332	0.00332	-0.44369
	2	(FSS1) ²	.3765	0.10907	0.01190	0.00858	0.39701
Complain	1	FSS1	1.05578	0.15141	0.02292	0.02292	0.62964
	2	(FSS1) ²	.5872	0.18996	0.03608	0.01316	-0.49180
Paletran	1	FSS1	7.08712*	0.36887	0.13606	0.13606	-0.26279
	2	(FSS1) ²	1.1774	0.39877	0.15902	0.02296	0.64957

*p ≤ .05

Table 10

Results of Hierarchical Multiple Regression for the
 S-R Inventory of General Trait Anxiousness
 (Subscale for Physical Danger S-R GTA-PD-1)

Criterion	Step	Variable	F Ratio	Multiple R	R Square	RSQ Change	Beta
Drugs	1	S-R GTA-PD-1	0.62970	0.11747	0.0138	0.01380	-0.07671
	2	(S-R GTA-PD-1) ²	.0313	0.12048	0.01452	0.00072	0.19602
Day	1	S-R GTA-PD-1	3.07431	0.25288	0.06395	0.06395	0.73623
	2	(S-R GTA-PD-1) ²	.1982	0.26150	0.06838	0.00443	-0.48791
Comp	1	S-R GTA-PD-1	0.01980	0.02097	0.00044	0.00044	-0.67083
	2	(S-R GTA-PD-1) ²	.3948	0.09759	0.00952	0.00908	0.69834
Complain	1	S-R GTA-PD-1	3.61803	0.27280	0.07442	0.07442	-0.21476
	2	(S-R GTA-PD-1) ²	.2103	0.28094	0.07893	0.00451	0.49217
Paletran	1	S-R GTA-PD-1	0.00232	0.00719	0.00005	0.00005	0.54626
	2	(S-R GTA-PD-1) ²	.2511	0.07659	0.00587	0.00581	-0.55868

Table 11
 Results of Ordinary Multiple Regression
 with Nominal Variables

Criterion	Nominal Variable	Multiple <u>R</u>	<u>R</u> Square	<u>F</u> Ratio	Prob
Drugs	Education	.41339	.17089	1.40842	NS
	Surgeon	.45652	.20841	2.21154	NS
	Marital Status	.06667	.00444	0.10044	NS
	Hospital	.37074	.13745	7.33001	.01
Day	Education	.28817	.08304	0.61882	NS
	Surgeon	.31357	.09833	0.91601	NS
	Marital Status	.06461	.00417	0.09432	NS
	Hospital	.02093	.00044	0.02015	NS
Comp	Education	.38470	.14800	1.18698	NS
	Surgeon	.31274	.09780	0.91061	NS
	Marital Status	.05634	.00317	0.07166	NS
	Hospital	.11432	.01307	0.60915	NS
Complain	Education	.37631	.14161	1.12730	NS
	Surgeon	.19510	.03807	0.33240	NS
	Marital Status	.14024	.01967	0.45142	NS
	Hospital	.13776	.01898	0.88991	NS
Paletran	Education	.33222	.11037	0.84774	NS
	Surgeon	.31560	.09960	0.92920	NS
	Marital Status	.08842	.00782	0.17729	NS
	Hospital	.16241	.02638	1.24615	NS

Multiple Regression - Predicting Recovery

In order to construct a prediction paradigm based on coping style (AVSENS), presurgical anxiety [trait anxiety in situations of physical danger (S-R GTA-PD-1), Fear of Surgery (FSS1), and state anxiety (PARQ1)], and the interactions between coping style and anxiety; a series of stepwise multiple regressions was performed.

The first set of regressions was to determine which of the three anxiety measures, when entered with coping, would account for the most variance in each of the indices of the Recovery Index. The a priori assumption was made that a person's coping style has some effect of the anxiety he manifests, therefore coping was entered in these regressions to allow it to account for as much variance as possible. The criterion for choosing the best anxiety measures for each criterion variable (Recovery Index) was to select the measure with the greatest R square, i.e., the variable which was entered first in the equation. Table 12 summarizes the relevant results of these regressions.

The next step was to examine interactions between coping style and each type of anxiety by entering the three interactions in stepwise multiple regression equations to determine which accounted for the most variance in each of the indices of the Recovery Index. The interactions were as follows: Interaction A = coping style x state anxiety (AVSENS x PARQ1); Interaction B = coping style x fear of surgery (AVSENS x FSS1); Interaction C = coping x fear of physical danger (AVSENS x S-R GTA-PD-1). Again, the criteria for choosing the best anxiety measure for each criterion variable (Recovery Index) was the interaction with the greatest R square; the variable which was entered first in the equation. The

Table 12
 Results of Stepwise Multiple Regression to
 Determine the Best Anxiety Predictor,
 When Entered with Coping Style,
 for Surgical Recovery

Criterion	Step	Variable
Drugs	1	FSS1
	2	AVSENS
	3	PARQ1
	4	S-R GTA-PD-1
Day	1	S-R GTA-PD-1
	2	FSS1
	3	AVSENS
Comp	1	FSS1
	2	S-R GTA-PD-1
Complain	1	PARQ1
	2	AVSENS
	3	S-R GTA-PD-1
Palettran	1	FSS1
	2	S-R GTA-PD-1
	3	PARQ1
	4	AVSENS

order of entry for each predictor variable for each criterion variable may be seen in Table 13.

Finally, for each of the indices for the Recovery Index, a prediction paradigm which was composed of the best anxiety predictor, the best interaction predictor and coping style was compiled. These variables were entered into stepwise multiple regressions to determine the measure or measures that would account for the greatest proportion of variance, so that each facet of recovery might be most efficiently predicted. Results of these stepwise multiple regressions may be seen in Table 14.

It may be noted in Table 14 that four of the five dependent variables have significant predictors: Drugs may be predicted by FSS1 ($F = 5.91, p < .05$); Day by the interaction between AVSENS and S-R GTA-PD-1 ($F = 4.73, p < .05$); Complain by PARQ1 ($F = 4.33, p = .05$); and Paletran by the FSS1 ($F = 7.02, p = .05$). Only the number of complications (Comp) does not have a significant predictor.

Table 13
 Results of Stepwise Multiple Regression to Determine
 the Best Predictor Interaction Between Coping
 Style and Three Anxiety Measures

Criterion	Step	Variable
Drugs	1	Inter B
	2	Inter C
Day	1	Inter C
	2	Inter B
	3	Inter A
Comp	1	Inter A
	2	Inter C
	3	Inter B
Complain	1	Inter C
	2	Inter B
	3	Inter A
Paletran	1	Inter B
	2	Inter C
	3	Inter A

Interaction A = State Anxiety (PARQ1) x Coping (AVSENS)

Interaction B = Fear of Surgery (FSS1) x Coping (AVSENS)

Interaction C = Trait Anxiety in physical danger (S-R GTA-PD-1) x

Coping (AVSENS)

Table 14

Results of Stepwise Multiple Regression to Determine
a Prediction Paradigm for Surgical Recovery

Criterion	Step	Variable	F Ratio	Multiple R	R Square	RSQCH	Beta
Drugs	1	FSS1	5.91228*	.34077	.11613	.11613	.43067
	2	AVSENS	1.3165	.37726	.14232	.02620	-.21886
	3	Inter B	1.4593	.41361	.17107	.02875	-.17291
Day	1	Inter C	4.73223*	.30847	.09515	.09515	-.27504
	2	AVSENS	.2392	.31667	.10028	.00512	.05349
	3	S-R GTA-PD-1	.0696	.31901	.10176	.00149	.05093
Comp	1	Inter A	1.03916	.15024	.02257	.02257	-.16578
	2	FSS1	.0225	.18230	.03323	.01066	-.12137
	3	AVSENS	.0435	.18501	.03423	.00099	.03668
Complain	1	PARQ1	4.32845*	.29622	.08775	.08775	.34779
	2	AVSENS	1.990	.35774	.12797	.04023	-.22839
	3	Inter C	2.0156	.40974	.16788	.03991	-.20111
Paletran	1	FSS1	7.01855*	.36732	.13492	.13492	.44806
	2	AVSENS	1.122	.39572	.15660	.02167	-.18959
	3	Inter B	.5960	.41046	.16848	.01188	-.11116

* $P \leq .05$

Discussion

The purpose of this study was to examine some predictors of surgical recovery in an effort to delineate those that would best predict a patient's recovery course. Both the level and type of pre-surgical anxiety and the patient's active mode of coping with that level have been considered important components of the patient's psychological profile. Therefore, this study had a dual focus: presurgical anxiety and active coping style and their relationship to surgical recovery.

Level of presurgical anxiety has been a controversial issue as the optimal relationship with recovery has been reported to be both curvilinear (Janis, 1958) and linear (Johnson, Leventhal, & Dabbs, 1971). The results of this study clearly demonstrate that, when it was evident, the relationship between anxiety and recovery, as those concepts were defined in this context, is linear. This supports the notion that, as a general rule, anxiety reduction is an appropriate focus for presurgical interventions to assume.

Three measures of presurgical anxiety were employed in this study: two trait measures, the S-R Inventory of General Trait Anxiousness (S-R GTA) and Fear of Surgery Schedule (FSS1) and a state anxiety measure, the Present Affect Reactions Questionnaire (PARQ1). Endler and Okada (1975) have conceptualized trait anxiety as a multidimensional entity. It is composed of interpersonal or ego threat anxiety, and physical danger and ambiguous threat anxiety. They assert that if the assessment of trait anxiety is to be meaningful and predictive of state anxiety in a specific situation, the measure of trait anxiety must be congruent

with the facet of trait anxiety that would be activated in the specific situation. If the measure of trait anxiety is not congruent with the situation, it will not be predictive of an increase in state anxiety by the individual. Based on this theoretical idea of a person by situation interaction, the S-R Inventory of General Trait Anxiousness (Endler, 1976) was examined in this study with the major a priori hypothesis focusing on the subscale which purports to measure trait anxiety in situations of physical danger (S-R GTA-PD-1). It was hypothesized that the S-R GTA-PD-1 would predict elevations in state anxiety (PARQ1) in the surgery situation while the other trait measures would not do so. In this sample, such was not the case. The other subscales (excepting S-R GTA-IP-1 - the subscale dealing with interpersonal threat) also predicted significantly different levels of presurgical state anxiety. Partial correlations with state presurgical anxiety and trait anxiety controlling for postsurgical state anxiety also failed to support Endler's theory. All the correlations were significant. The S-R GTA-PD-1 did not have the highest correlation with state anxiety indicating that it alone does not predict state anxiety in the surgical situation. Indeed when selected correlations were tested to see if significant differences were present, there were none.

Perhaps fear of physical danger is not the only facet of trait anxiety activated by the surgical situation. The ambiguous - novel aspects of the hospital may also arouse state anxiety. This is in line with the factor analysis of the S-R GTA which produced two main factors: physical danger to which the physical danger situation and the ambiguous situations are related; and the interpersonal threat factor to which the

ambiguous situation is also related as well as the interpersonal and innocuous (Daily Routines) situations. A fifth situation (Endler, 1976) was used in this study which has not been included in the factor analysis. It was an ego threat situation which involved being evaluated by others. Clearly this is considered a measure of interpersonal threat, since the basic interpersonal threat factor in the S-R GTA has been termed "interpersonal ego threat" by Endler, Magnusson, Ekehammar, and Okada (1976, pp. 91 & 95). The source for this trait situation apparently was included in a study reported by Endler et al. (1976) in which they state

In the present study physical danger A-trait profile is not predictive of A-state. This is not surprising since there was no anticipation of physical danger in the present study. (A-state data were collected in the classroom, an interpersonal threat situation, i.e., being evaluated by others). When a facet of multidimensional A-trait is congruent to A-state it is possible to predict A-state; when they are not congruent, A-state and A-trait are not related (p. 95).

Therefore, while the prediction of A-state in the surgical situation by the ambiguous-novel subscale can be somewhat accounted for within the framework advanced by Endler, the predictive ability of the subscales involving daily routines and observations by others cannot. It is evident that the two basic predictive factors, interpersonal threat and physical danger, have some validity. When they are measured by those two specific subscales the distinction is supported in the literature (Endler & Okada, 1975) and by this study in that the subscale for interpersonal threat did not predict levels of state anxiety when the analysis was an analysis of covariance utilizing dichotomous data, high and low A-trait. However, the distinction breaks down when the scale is extended beyond those fundamental measures, or when partial correlations between the variables are the analysis of choice.

One can advance intuitive arguments explaining why the assessment of trait anxiety in daily routines and evaluation by others predicted state anxiety in the surgical situation. Daily routines is significantly correlated with all of the presurgical anxiety measures except that for physical danger. A possible conclusion is that individuals who report anxiety in such a benign situation are likely to be anxious in virtually all situations. Additionally, being hospitalized is a severe interruption of ones daily life and the extent to which the individual is anxious about the consequences of that interruption may be reflected in this measure. It is also possible to argue that the hospital is an extremely complex situation involving all facets of anxiety including ego threat - being observed by others. Anxiety may be aroused by the medically evaluative nature of the interactions with the staff. In short, the hospital situation may activate all facets of anxiety to the extent that the trait measures do not differentially predict in that situation. This line of reason, however, only weakens the usefulness of a generalized situation measure in a clinical setting. If the various situational subscales reliably and differentially predict state anxiety only in the laboratory, the use of the S-R GTA is sharply restricted.

The strong effect that situations may have on trait measures is illustrated in the comparison of the pre and postsurgical measures of the S-R GTA interpersonal anxiety subscale (S-R GTA-IP-1 & IP-2) which were significantly different with patients being more anxious postsurgically. The stability of trait anxiety has been questioned by Kendall, Finch, Auerbach, Hooke and Mikulka (1976) who report that A-trait as

measured by the STAI (Spielberger, Gorsuch & Lushene, 1970) differed significantly across administrations. This was the finding when the measures were completed in different settings, the classroom and the student's home. This is cited as evidence for the situational variability in trait anxiety that has been suggested by Endler and Okada (1975).

While the patient's location (hospital room) typically does not change pre and postsurgically, surgery may effect a change in the patient's perception of his situation. More anxiety may be aroused postsurgically in the patients interactions with others as a function of his dependency on the care and attention of the hospital staff. The demand characteristics of the hospital are to be the "good patient" but ones physical or psychological needs may be in conflict with that demand. The effort to determine ways to satisfy both may arouse anxiety. Additionally, Janis (1958, p. 91) comments on the increase in the arousal of affiliative needs in the surgical situation "An unusually high need to be reassured that he is affectionately regarded by love objects and by other persons upon whom he is emotionally dependent."

The Fear of Surgery Scale (Martinez-Urrutia, 1975), another trait measure, was included in this study to test whether this brief and more specific measure would predict recovery as well or perhaps better than the measure of general physical danger (S-R GTA-PD-1). This hypothesis is consistent with the basic premise advanced by Endler and Okada (1975) and is supported by Auerbach, Kendall, Cuttler and Levitt (1975) who found that differential elevations in state anxiety in the dental surgery situation were predicted by the level of dental anxiety reported

by patients on an average of 24 days before the actual dental surgery. Analysis of the data collected during the current study indicated that scores on the Fear of Surgery Schedule predicted the level of presurgical state anxiety.

Presurgical state anxiety, the level of anxiety reported by the individual when he is asked how he feels at "this particular moment" (PARQ1) is the type of anxiety one typically considered in the clinical evaluation of a surgical patient. It is the level of anxiety that he is considered to have when he enters the operating room and thus should be intimately tied to his response to the surgery. If it is true that level of anxiety is important in the patient's recovery, the state anxiety measure (PARQ1) should be significantly related to the measures of outcome. This was not totally true; some reasons for the relationship not being as straight forward as one might expect are explored below.

Based on the theoretical positions delineated above, the S-R GTA for physical danger, the Fear of Surgery Scale and the Present Affect Reactions Questionnaire were the a priori choice of measures to utilize in predicting surgical outcome. Prior to discussion of the actual predictive ability of each measure, it is necessary to consider what is meant by surgical recovery, outcome, or response to surgery.

Janis (1958) considered the emotional response to the postsurgical situation as outcome, while others have considered more concrete outcome criterion such as days of hospitalization, number of drugs, and sundry medical complications. Objective indices as well as subjective self report measures have been employed. Much of the confusion existing in

the literature is due to these very different outcome variables being subsumed under the term recovery. Wolfer (1973) addresses this problem and underscores the need to consider the distinction between patient "recovery" and "welfare". Recovery is defined by physical criterion; measures of those processes which are generally biological in nature. Predominate factors determining the smoothness and duration of recovery by this definition include the patient's type of illness (surgery), his general physical condition, and the quality of the physical care he receives. Wolfer (1973) considers variables such as signs of infection, bowel and respiratory complications, and to some degree the postoperative days in the hospital and the number of sleep and pain medications as physical recovery measures and indicative of the effectiveness of medical procedure designed to improve the physical condition of the patient.

On the other hand, Wolfer (1973) describes patient "welfare" as the "complex, multidimensional, and changing affective and cognitive state of an individual as he undergoes hospitalization and surgery" and this refers to variables which are indicative of, describe, or evaluate a patient's psychological state.

Physical recovery is subject to numerous situational variables such as surgeon and nursing skill, duration of anesthesia as well as physician and hospital policy. Days of hospitalization, time to ambulation and number and types of drugs may be primarily determined by such policy (Wolfer, 1973). Although this study controlled for type of operation, no attempt was made to control for the patient's physical state prior to surgery or for seriousness within the surgical type. For this sample, there was a significant difference in the number of drugs (as defined by

the Recovery Index) given at one hospital. Although there were only nine patients at this hospital, a trend is present due to the fact that the same relationship existed for the independent measure of number of analgesics (Scott, 1977). Additionally, while Days could be predicted, the best predictor accounted for only 9.5% of the variance. This indicates that much of the variance in this criteria may be due to extraneous factors. Based on a study of cholecystectomy patients, Bultz (1975, p. 3571-B) states that, "days postoperatively hospitalized was purely an administrative function and could not be considered a valid criterion of recovery". For the sample considered in this study, the range of postoperative days was from 5 to 10 with 7 being the mean. When asked presurgically how long they expected to be hospitalized, the majority of the patients indicated about one week. Physician policy was clearly evident also in that patients in their twenties were routinely discharged after five days.

Johnson, Leventhal and Dabbs (1971), based on the parallel response model, state that while anxiety may color a patient's attitude, it does not necessarily correlate with his overt actions in the hospital which are directed toward recovery such as ambulation or deep breathing exercises. In the present study, the index Comp included having to encourage the patient to cough, deep breath, or ambulate. This was the only index that did not have a significant predictor.

A final note must be made about the recovery measures used in this study. All of the data for the recovery indices were taken from the nurses' notes and as such are affected by the degree of care with which these records were kept, and the nurses' perceptions of the patient.

These perceptions may be biased by how well the patient was liked by the nurse and/or how well the patient conformed to the "good" patient role. Thus, it may be noted that only a portion of the total variance in the indices was free to vary as a function of presurgical anxiety and the patient's mode of coping with that anxiety.

Based on Wolfer's (1973) concept of recovery and welfare the Recovery Index used in this study may be grossly divided such that Day, Drugs and Comp(lications) are considered recovery variables in the biological sense and Complaints and Palettran may be considered welfare variables as they are more obviously linked with psychological responses.

Basic to the construction of the prediction paradigm was evidence presented by Cohen and Lazarus (1973) and Cohen (1976), that active coping style would be an important predictor of the indices of recovery. Such was not the case. In no instance was coping style (AVSENS) entered first in the stepwise regressions and therefore never accounted for a significant amount of variance in the criterion measures. Only in the final prediction regression when the criteria was Day was coping style evident. The interaction between AVSENS and S-R GTA-PD-1 was the significant predictor accounting for 9.5% of the variance. This does not necessarily rule out the consideration of mode of coping as an important variable. In this study, it is possible that two factors were responsible for AVSENS' poor predictive power. First, there were only four sensitizers in this sample of 47 patients. The majority of the sample fell in the midrange, while 10 patients were avoiders. The scale was truncated at both ends. Secondly, the ratings given to the patients were a function of the information they possessed as well as their

psychological stance toward the surgery. With an initial rater reliability of .50, only tentative interpretations should be based on this measure. Future use of the mode of active coping should clarify the criteria used in assigning ratings and control for the patient's level of information. Along this line, it is interesting to note that level of education was significantly correlated with coping style with the more educated individuals tending to be sensitizers ($r = .35$, $p = .01$). This is consistent with the finding reported by Cohen and Lazarus (1973).

The expected unique relationship between the S-R GTA for physical danger and the indices of recovery was not found. While fear of physical danger was significantly correlated with Day and Complaints, it was not entered first in the final prediction regressions except in interaction with AVSENS to predict Day.

The Fear of Surgery Scale is the trait anxiety measure that is most specific to the surgery situation and as such should be reliably related to surgical recovery. It was significantly correlated with the number of Drugs and Paletran; and when entered in a stepwise multiple regression accounted for significant amounts of variance. In terms of predicting more Recovery Indices (2) and in percent of variance accounted for it is the best predictor of recovery. However, it should be noted that Drugs and Paletran share a component; the number of tranquilizers given. The value of the FSS1 is enhanced because it predicts state anxiety which tends to predict outcome.

State anxiety (PARQ1) was not as reliable a predictor as was expected. While it was significantly correlated with Complaints and Paletran, it was entered in the regression equation first only for

Complaints and in that final prediction equation accounted for 8.7% of the variance. It is possible that state anxiety is a better predictor of at least emotionally based recovery variables than these results would suggest. The situation, as it is phrased to the patient concerns "How you feel at this particular moment". The patient, on various occasions would request clarification as to what this "particular moment" meant, and state that while he was anxious about the surgery, he was not as anxious in the present interview situation. A more sensitive measure of state anxiety might be to have the patient answer the same question when he is alone on the night prior to or on the morning of surgery. This procedure might tap a level of anxiety that would be more related to the outcome variables.

That surgical outcome falls into two basic components as conceptualized by Wolfer (1973) tends to be supported in this study. While Drugs, Day and Complications certainly have some psychological aspects, the number of Complaints and Paletan are more clearly psychologically based. These two outcome variables also correlate with more measures of anxiety, therefore lending support to the parallel response model (Johnson, Leventhal & Dabbs, 1971) which maintains that presurgical anxiety is related to postoperative emotional states but not necessarily to indices based on the patient's participation in activities to prevent complications and hasten physical recovery nor to more biological or policy determined variables.

The suggested dichotomy in surgical outcome raises a philosophical question. If much of the effect of psychological intervention is to reduce anxiety, and this in turn has its primary effect on postsurgical

emotional states rather than clearly on physical outcome, is this result worth the effort in the hospital setting where traditionally the focus has been on physical recovery? Wolfer (1973) affirms the value of such intervention: "Patient-centered nursing would seem to hold that relief of emotional distress is a desirable outcome in itself regardless of whether it leads to an improved physical status".

A reasonable conclusion based on the results of this study is that some aspects of surgical outcome are predictable. In terms of efficiency, the best predictor seems to be the Fear of Surgery Scale. This trait measure is brief, specific, can be given prior to hospitalization, is directly related to two of the recovery indices in this study (Day and Paletran), and due to its significant correlation with elevated state anxiety is indirectly predictive of a third index (Complaints). High scores on the FSS may be used to alert the physician to the possibility that the individual may react adversely to the surgical situation - emotionally, physically or both.

While a holistic view of man maintains that psychological well being and physical condition are inseparable (i.e., the concept of psychosomatic disorders), this is more apparent at the extremes of the psychological continuum (Wolfer, 1973). The nature and extent of the relationship between psychological state and physical well being for the large middle group (low to moderate anxiety) is much less clear. For the middle group, the parallel response model may account for the low correlations between anxiety and the Recovery Index. For the extreme cases, however, the connection between anxiety, physical recovery and behaviors linked to recovery may be critical. The accurate assessment

of a patient's level of fear of the surgical situation is important so that the extreme cases can be identified far enough in advance for an effective intervention technique to be employed. While extensive interventions may not be so critical for the low and moderate anxiety groups, interventions will help assure that their anxiety in the surgical situation is maintained at the desired low level.

The tentative conclusion reached here, that the FSS is the most efficient predictor of surgical outcome, must be tested in future research in conjunction with an outcome index that fully exploits the dichotomy in outcome, welfare and recovery; and with an improved method of assessing coping style.

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APPENDIX A

CONSENT FORM FOR PSYCHOLOGICAL TESTING

CONSENT FORM FOR PSYCHOLOGICAL TESTING

I, _____, understand that I am participating in a study that is authorized by Lewis-Gale Hospital and my surgeon. This study is designed to evaluate patient's reactions to surgery and will require examination of my hospital medical records as well as answers to questionnaires concerning my adjustment to the hospital and the surgical experience, the amount and type of pain I am undergoing, and the amount of anxiety I experience in general. These questionnaires will be administered in two short sessions, the first on the day prior to surgery and the second approximately five days after surgery. No drugs or procedures will be administered and the information from the questionnaires and medical records will be kept strictly confidential. I understand that my participation in this study is purely voluntary and my decision to participate will in no way affect the quality of the care I receive.

Signature

Witness

Date

CONSENT FORM FOR PSYCHOLOGICAL TESTING

I, _____, understand that I am participating in a study that is authorized by Montgomery County Hospital and my surgeon. This study is designed to evaluate patient's reactions to surgery and will require examination of my hospital medical records as well as answers to questionnaires concerning my adjustment to the hospital and the surgical experience, the amount and type of pain I am undergoing, and the amount of anxiety I experience in general. These questionnaires will be administered in two short sessions, the first on the day prior to surgery and the second approximately five days after surgery. No drugs or procedures will be administered and the information from the questionnaires and medical records will be kept strictly confidential. I understand that my participation in this study is purely voluntary and my decision to participate will in no way affect the quality of the care I receive.

Signature

Witness

Date

APPENDIX B
INTERVIEW

INTERVIEW

1. Have you ever had an operation before? What kind? When?

2. What has your doctor told you about your medical problem that you're here in the hospital for now?

Has he told you anything else about it?

Has he told you anything about how the operation itself will be performed?

Have you tried to obtain information about your operation?

What do you expect this operation to accomplish for you, in your particular case? (In other words, how do you expect to benefit from having this operation?)

3. When your doctor first told you that you needed surgery, what was your first reaction?

4. When you think about having this operation, what thoughts or ideas do you have about it? How does it make you feel?

(How do you deal with your feelings about it?)

(Do you try not to think about it?)

5. (Asked very rarely) If this were a serious operation (if they deny that their operation is serious), how would you feel about coming into the hospital?

What do you think you would do to deal with those feelings?

6. I'd like you to tell me what you think will happen tomorrow, starting from the time you wake up in the morning until you're back in your room again after your operation, as far as the procedure and things like that. What procedures do you expect tonight?

Do you think you'll feel any discomfort while you're in the operating room?

How do you think you'll feel when you wake up after your operation?

What kind of pain do you expect to experience after surgery?
Where?

Will it be aggravated by anything in particular?

7. How long do you expect to stay in the hospital for your surgery?

8. What have other people told you to expect about your operation?

Have you talked with others about it? Does their information agree with what your doctor told you?

What are some of the complications or problems that sometimes occur after surgery.

9. Do you feel that you have as much information about your operation as you would like to have? (If not) What other kinds of information would you like to know?

10. When was the first time you saw Dr. _____? How did you feel about your visit with him?

Has he ever operated on you before or on anyone that you know?

11. What does your wife (husband) think about your having this operation?

12. How are you feeling now?

13. How worried or concerned about your operation are you? If I asked you to rate yourself on a 10 point scale, with 1 being not very worried or concerned at all and 10 being very worried or upset about your operation, where would you put yourself from 1 to 10?

14. What was the last grade you completed?
15. What is your religious affiliation?
16. What is your occupation?

APPENDIX C

INVENTORY OF ATTITUDES TOWARD GENERAL SITUATIONS

(S-R INVENTORY OF GENERAL TRAIT ANXIOUSNESS)

INVENTORY OF ATTITUDES TOWARD GENERAL SITUATIONS

Please answer each question by circling the appropriate number.

This inventory represents a means of studying people's reactions to and attitudes towards various types of General situations. On the following pages are represented five general kinds of situations which most people have encountered. For each of these general kinds of situations certain common types of personal reactions and feelings are listed. Indicate in the alternatives, representing the five points on the scale shown in this booklet, the degree to which you would show these reactions and feelings in the situations indicated.

Here is an example:

"You are getting ready to start the day"

Feel uncomfortable	1	2	3	4	5
	Not at all				Very uncomfortable

If you feel very uncomfortable in this situation you would circle alternative 5 (see A below); if you feel somewhat uncomfortable you would circle either alternative 2, 3, or 4 depending on how uncomfortable; if in this situation you do not feel uncomfortable at all, you would circle alternative 1 (see B below).

If you have no questions, please turn to the items on the following pages.

EXAMPLES:	A	1	2	3	4	5
	B	1	2	3	4	5

"YOU ARE IN SITUATIONS INVOLVING INTERACTION WITH OTHER PEOPLE"

(We are primarily interested in your reactions in General to those situations that involve interacting with other people. This includes situations that involve friends, family, acquaintances, strangers, etc.)

Circle one of the five alternatives for each of the following 15 items.

- | | | | | | |
|--------------------------------------|------------------|---|---|---|--------------|
| 1. Seek experiences like this | 1 | 2 | 3 | 4 | 5 |
| | Very much | | | | Not at all |
| 2. Feel upset | 1 | 2 | 3 | 4 | 5 |
| | Not at all | | | | Very upset |
| 3. Perspire | 1 | 2 | 3 | 4 | 5 |
| | Not at all | | | | Very much |
| 4. Feel relaxed | 1 | 2 | 3 | 4 | 5 |
| | Very relaxed | | | | Not at all |
| 5. Have an "uneasy feeling" | 1 | 2 | 3 | 4 | 5 |
| | Not at all | | | | Very much |
| 6. Look forward to these situations | 1 | 2 | 3 | 4 | 5 |
| | Very much | | | | Not at all |
| 7. Get fluttering feeling in stomach | 1 | 2 | 3 | 4 | 5 |
| | Not at all | | | | Very much |
| 8. Feel comfortable | 1 | 2 | 3 | 4 | 5 |
| | Very comfortable | | | | Not at all |
| 9. Feel tense | 1 | 2 | 3 | 4 | 5 |
| | Not at all | | | | Very tense |
| 10. Enjoy these situations | 1 | 2 | 3 | 4 | 5 |
| | Very much | | | | Not at all |
| 11. Heart beats faster | 1 | 2 | 3 | 4 | 5 |
| | Not at all | | | | Much faster |
| 12. Feel secure | 1 | 2 | 3 | 4 | 5 |
| | Very secure | | | | Not at all |
| 13. Feel anxious | 1 | 2 | 3 | 4 | 5 |
| | Not at all | | | | Very anxious |
| 14. Feel self-confident | 1 | 2 | 3 | 4 | 5 |
| | Very much | | | | Not at all |
| 15. Feel nervous | 1 | 2 | 3 | 4 | 5 |
| | Not at all | | | | Very nervous |

"YOU ARE IN SITUATIONS WHERE YOU ARE ABOUT TO
OR MAY ENCOUNTER PHYSICAL DANGER"

(We are primarily interested in your reactions in General to those situations that involve dealing with potentially dangerous things or objects.)

Circle one of the five alternatives for each of the following 15 items.

- | | | | | | |
|---------------------------------------|------------------|---|---|---|--------------|
| 16. Seek experiences like this | 1 | 2 | 3 | 4 | 5 |
| | Very much | | | | Not at all |
| 17. Feel upset | 1 | 2 | 3 | 4 | 5 |
| | Not at all | | | | Very upset |
| 18. Perspire | 1 | 2 | 3 | 4 | 5 |
| | Not at all | | | | Very much |
| 19. Feel relaxed | 1 | 2 | 3 | 4 | 5 |
| | Very relaxed | | | | Not at all |
| 20. Have an "uneasy feeling" | 1 | 2 | 3 | 4 | 5 |
| | Not at all | | | | Very much |
| 21. Look forward to these situations | 1 | 2 | 3 | 4 | 5 |
| | Very much | | | | Not at all |
| 22. Get fluttering feeling in stomach | 1 | 2 | 3 | 4 | 5 |
| | Not at all | | | | Very much |
| 23. Feel comfortable | 1 | 2 | 3 | 4 | 5 |
| | Very comfortable | | | | Not at all |
| 24. Feel tense | 1 | 2 | 3 | 4 | 5 |
| | Not at all | | | | Very tense |
| 25. Enjoy these situations | 1 | 2 | 3 | 4 | 5 |
| | Very much | | | | Not at all |
| 26. Heart beats faster | 1 | 2 | 3 | 4 | 5 |
| | Not at all | | | | Much faster |
| 27. Feel secure | 1 | 2 | 3 | 4 | 5 |
| | Very secure | | | | Not at all |
| 28. Feel anxious | 1 | 2 | 3 | 4 | 5 |
| | Not at all | | | | Very anxious |
| 29. Feel self-confident | 1 | 2 | 3 | 4 | 5 |
| | Very much | | | | Not at all |
| 30. Feel nervous | 1 | 2 | 3 | 4 | 5 |
| | Not at all | | | | Very nervous |

"YOU ARE IN A NEW OR STRANGE SITUATION"

(We are primarily interested in your reaction in General to novel or unfamiliar situations, including those where you are uncertain as to what to expect. These may involve either people or objects or both.)

Circle one of the five alternatives for each of the following 15 items.

31. Seek experiences like this	1	2	3	4	5
	Very much				Not at all
32. Feel upset	1	2	3	4	5
	Not at all				Very upset
33. Perspire	1	2	3	4	5
	Not at all				Very much
34. Feel relaxed	1	2	3	4	5
	Very relaxed				Not at all
35. Have an "uneasy feeling"	1	2	3	4	5
	Not at all				Very much
36. Look forward to these situations	1	2	3	4	5
	Very much				Not at all
37. Get fluttering feeling in stomach	1	2	3	4	5
	Not at all				Very much
38. Feel comfortable	1	2	3	4	5
	Very comfortable				Not at all
39. Feel tense	1	2	3	4	5
	Not at all				Very tense
40. Enjoy these situations	1	2	3	4	5
	Very much				Not at all
41. Heart beats faster	1	2	3	4	5
	Not at all				Much faster
42. Feel secure	1	2	3	4	5
	Very secure				Not at all
43. Feel anxious	1	2	3	4	5
	Not at all				Very anxious
44. Feel self-confident	1	2	3	4	5
	Very much				Not at all
45. Feel nervous	1	2	3	4	5
	Not at all				Very nervous

"YOU ARE INVOLVED IN YOUR DAILY ROUTINES"

(We are primarily interested in your reactions in General to those situations that you usually and typically encounter in your daily life. That is, how do you generally or typically or usually feel.)

Circle one of the five alternatives for each of the following 15 items.

46. Seek experiences like this	1	2	3	4	5
	Very much				Not at all
47. Feel upset	1	2	3	4	5
	Not at all				Very upset
48. Perspire	1	2	3	4	5
	Not at all				Very much
49. Feel relaxed	1	2	3	4	5
	Very relaxed				Not at all
50. Have an "uneasy feeling"	1	2	3	4	5
	Not at all				Very much
51. Look forward to these	1	2	3	4	5
	Very much				Not at all
52. Get fluttering feeling	1	2	3	4	5
	Not at all				Very much
53. Feel comfortable	1	2	3	4	5
	Very comfortable				Not at all
54. Feel tense	1	2	3	4	5
	Not at all				Very tense
55. Enjoy these situations	1	2	3	4	5
	Very much				Not at all
56. Heart beats faster	1	2	3	4	5
	Not at all				Much faster
57. Feel secure	1	2	3	4	5
	Very secure				Not at all
58. Feel anxious	1	2	3	4	5
	Not at all				Very anxious
59. Feel self-confident	1	2	3	4	5
	Very much				Not at all
60. Feel nervous	1	2	3	4	5
	Not at all				Very nervous

"YOU ARE IN SITUATIONS WHERE YOU ARE BEING EVALUATED BY OTHER PEOPLE"

(We are primarily interested in your reactions in General to those situations where you are being evaluated or observed by other people. This includes situations at work, school, in sports, social situations, etc.)

Circle one of the five alternatives for each of the following 15 items.

61. Seek experiences like this	1	2	3	4	5
	Very much				Not at all
62. Feel upset	1	2	3	4	5
	Not at all				Very upset
63. Perspire	1	2	3	4	5
	Not at all				Very much
64. Feel relaxed	1	2	3	4	5
	Very relaxed				Not at all
65. Have an "uneasy feeling"	1	2	3	4	5
	Not at all				Very much
66. Look forward to these situations	1	2	3	4	5
	Very much				Not at all
67. Get fluttering feeling in stomach	1	2	3	4	5
	Not at all				Very much
68. Feel comfortable	1	2	3	4	5
	Very comfortable				Not at all
69. Feel tense	1	2	3	4	5
	Not at all				Very tense
70. Enjoy these situations	1	2	3	4	5
	Very much				Not at all
71. Heart beats faster	1	2	3	4	5
	Not at all				Much faster
72. Feel secure	1	2	3	4	5
	Very secure				Not at all
73. Feel anxious	1	2	3	4	5
	Not at all				Very anxious
74. Feel self-confident	1	2	3	4	5
	Very much				Not at all
75. Feel nervous	1	2	3	4	5
	Not at all				Very nervous

APPENDIX D

PRESENT AFFECT REACTIONS QUESTIONNAIRE (PARQ)

Date _____

PRESENT AFFECT REACTIONS QUESTIONNAIRE (PARQ)

Please circle a number from 1 to 5 on this sheet for each of the 24 items to indicate:

"HOW YOU FEEL AT THIS PARTICULAR MOMENT"

- | | | | | | | |
|-----|-----------------------------|---------------|---|---|---|-----------------|
| 1. | Hands feel moist | 1 | 2 | 3 | 4 | 5 |
| | | Not at all | | | | Very moist |
| 2. | Feel relaxed | 1 | 2 | 3 | 4 | 5 |
| | | Very relaxed | | | | Not at all |
| 3. | Hands feel unsteady | 1 | 2 | 3 | 4 | 5 |
| | | Not at all | | | | Very unsteady |
| 4. | Feel self-confident | 1 | 2 | 3 | 4 | 5 |
| | | Very much | | | | Not at all |
| 5. | Stomach feels tense | 1 | 2 | 3 | 4 | 5 |
| | | Not at all | | | | Very tense |
| 6. | Enjoy this situation | 1 | 2 | 3 | 4 | 5 |
| | | Very much | | | | Not at all |
| 7. | Heart beats faster | 1 | 2 | 3 | 4 | 5 |
| | | Not at all | | | | Much faster |
| 8. | Feel calm | 1 | 2 | 3 | 4 | 5 |
| | | Very calm | | | | Not at all |
| 9. | Perspire | 1 | 2 | 3 | 4 | 5 |
| | | Not at all | | | | Very much |
| 10. | Feel comfortable | 1 | 2 | 3 | 4 | 5 |
| | | Very much | | | | Not at all |
| 11. | Mouth feels dry | 1 | 2 | 3 | 4 | 5 |
| | | Not at all | | | | Very dry |
| 12. | Unable to focus my thoughts | 1 | 2 | 3 | 4 | 5 |
| | | Able to focus | | | | Unable to focus |
| 13. | Feel pleasant | 1 | 2 | 3 | 4 | 5 |
| | | Very pleasant | | | | Not at all |
| 14. | Feel nervous | 1 | 2 | 3 | 4 | 5 |
| | | Not at all | | | | Very nervous |

15. Feel throbbing in my head	1	2	3	4	5
	Not at all				Very much so
16. Feel secure	1	2	3	4	5
	Very secure				Not at all
17. Feel upset	1	2	3	4	5
	Not at all				Very upset
18. Hands feel cold	1	2	3	4	5
	Not at all				Very cold
19. Feel good	1	2	3	4	5
	Very good				Not at all
20. Feel anxious	1	2	3	4	5
	Not at all				Very anxious
21. Breathing is irregular	1	2	3	4	5
	Not at all				Very irregular
22. Feel uneasy	1	2	3	4	5
	Not at all				Very uneasy
23. Want to avoid this situation	1	2	3	4	5
	Not at all				Very much
24. Feel lump in throat	1	2	3	4	5
	Not at all				Very much

APPENDIX E
FEAR OF SURGERY SCALE

FEAR OF SURGERY SCALE

In general, how much fear or concern do you have about surgical operations?

- | | |
|------------------|------------------|
| 1. no fear | 4. moderate fear |
| 2. a little fear | 5. strong fear |
| 3. some fear | 6. extreme fear |

APPENDIX F
CRITERIA FOR RATING DEFENSIVE BEHAVIOR
(ACTIVE COPING STYLE)

CRITERIA FOR RATING DEFENSIVE BEHAVIOR

I. Note the following:

knowledge of his medical condition
 how he talks about operation
 his thoughts about operation
 possible consequences of operation
 does he admit threatening aspects of operation situation?
 does he deny them?
 has he talked with others about it? -- what kind of information
 have they given?
 does he want more information about it -- what kind?

II. Avoidance-sensitization dimension, characterized as follows:

Avoider end:

Main characteristic is try to avoid or deny emotional or threatening material. Usually shows restriction of consciousness, reliance on repression or denial as defenses, and avoidance of anxiety-arousing stimuli.

Sensitizer end:

Main characteristic of overly alert to threatening material or seeking such material out, that is, an attempt to reduce anxiety by approaching the stimulus, admitting the threatening aspects of the situation. Usually shows some expansion of awareness, reliance on isolation, ruminative worrying, etc., as defenses.

Middle group:

Show no rigid preference for either avoidance or sensitizing behavior, but rather flexibility in either mode. Usually use both modes to some extent. Characteristic -- find both kinds of defenses without predominance of one kind or other.

III. Characteristics of operations

Several things to be concerned about: death
 pain
 mutilation

Also: possibility of complications after surgery
 fear they will find cancer
 possibility surgery won't cure condition

IV. Discussion of characteristics referring to Avoidance-sensitization dimension:

Death - usually puts one in sensitizing category. Admits possibility of death, worried if will pull through, tells of fatality rate, etc. They can say they feel they'll pull through, since fatality rate is very low and healthy people have excellent chance of surviving operation. Only if overweight is fatality rate higher; in this case, there is more reason to be worried.

Cancer - in essence, cancer is almost equivalent to death, since it leads often to death or slow suffering (but usually not for thyroid, although fear that it can spread is always there). So if mention fears about this usually in Sensitizer category, or toward that end. If mention possibility of cancer, but doesn't admit he could have it, not as sensitizing a response. Is very definite possibility in thyroid operation (about 10%), very rare to find in gall bladder.

Complications - pneumonia, infection, wound not healing, etc., are a distinct possibility after surgery, especially after gall bladder operation. For older people, overweight people, or those with respiratory troubles in the past, these are realistic possibilities. Never sure there will not be complications after any surgery -- always a possibility of infection, etc.

Fears of being cut open - if mention "being under the knife," some expressed fears of death, is admitting it to some extent. In this can also be concern about what else they might find (cancer or other diseases). There are also some neurotic fears being expressed sometimes -- concerned about someone looking into him, feeling loss of control, not knowing what surgeon will do to him (somasochistic thoughts), etc.

Pain - a major fear for some. Especially a concern of gall bladder patients although others too. Consider it a major fear if they talk about it as "pain," rather than "being uncomfortable" or "feeling discomfort."

Mutilation - not of much concern in these operations, except in a neurotic sense among some; manifested by discussion of scar or what knife might do.

Possibility surgery won't cure condition - likely in all operations, although especially so in hernia and gall bladder. Hernia may recur; gall bladder attacks may still occur and person may still have to restrict his diet.

BREAKDOWN OF AVOIDANCE-SENSITIZATION DIMENSION

(For Rating)

Avoider: 1, 2, 3

Categorized by denial of worry, of anything to worry about. Focus on positive aspects -- good doctor, excellent medical facilities, advanced technology. Does not mention pain, but may mention that will be uncomfortable for a few days. Focuses on how simple and minor operation is. States that doesn't want to think about the operation, wants to keep a positive attitude, does not want to know what will happen. If admits being nervous, says as nervous as anyone else would be.

- 1 = total denial. Most likely would never make it to hospital for this type of elective surgery. Tries to get away from the topic, will not discuss the forthcoming operation, knows very little about it and does not want to know more. Tries to cut conversation short or terminate interview. Avoided talking to others about it.
- 2 = denies worry or anything to worry about. Knows little about operation and is content, does not want to know more. But will discuss feelings to some small extent. Avoided talking to others about it, or talked only to relatives.
- 3 = denial of worry or anything to worry about. But focuses on how minor it is, how insignificant, thus giving the impression that underlying what he is saying is the thought that there might be something one could worry about ("I always came through everything before"). Knows a little bit about operation. May have talked to others but denies that their bad stories apply to him, or quotes only good things they said.

Middle group: 4, 5, 6, 7

Categorized by presence of both avoiding and sensitizing responses; for example, will mention fear and then deny it. ("I thought of cancer, but I'm sure that's not it.") Usually states vague fears, without specifying exactly what the fear is about. May mention being scared of the unknown, possibility of things happening without suggesting what they might be, just saying surgery scares them, fear of operating room, of knife, etc.

- 4 = mostly denial, but not as firmly stated as above. Suggestion underlying speech that there may be something to worry about, but this person does not want to know. May mention minor complications such as nausea, discomfort. May focus on question of how long before can get back to normal activities. Knows a little about operation. May have talked to others but denies what they say to talk about good aspects of what they said.

- 5 = a lot of denial, but not so firmly stated. Suggestion underlying speech that there may be something to worry about, but this person does not want to worry. Discusses minor complications and how long before back to normal. Knows a little about operation. May have talked to others. May give fleeting reference or slip of tongue that others may be concerned about possible complications that could occur.
- 6 = mentions a few negative possibilities that could happen -- pain, etc. -- but quickly denies them. Implies there is something one could worry about, but person does not think it helps to worry. Discusses minor complications. Knows something about operation. Talked to others.
- 7 = mentions some negative possibilities that could happen, denies them, often without certainty. Implies things do happen to other people, but feels they won't to him. May tell of trying not to think about negative aspects, but alludes to what those negative aspects are. Knows something about operation, can describe in some small detail. Has talked to others.

Sensitizers: 8, 9, 10

Categorized by mentioning negative aspects possible from operation. Usually mentions or alludes to possibility of death, cancer. Mentions that complications are possible, presence of pain probable. Usually knows a lot about operation and has sought further information; willing to talk about details.

- 8 = mentions negative things that could happen, although probably states that he thinks few of them will happen to him. Describes negative things that may have happened to others. Mentions minor complications. Knows a lot about operation and medical problem and willing to explain. Only a fleeting reference to denial.
- 9 = lists off negative things that could happen to him, including possibility of death, although realistically may state he thinks he will pull through operation. Knows a lot about operation, has sought out information, can explain in much detail, discussing threatening aspects. Mentions complications that occur. May state fatality rate, % of times they find cancer, etc. Obsesses a little in discussing operation and medical details.
- 10 = epitomized by the physician undergoing an operation. Knows every bad thing that could happen to him and obsesses at length about these things, the operation, what will happen to him afterward, etc. Has found out all the information he possibly can.

APPENDIX G
RECOVERY INDEX

RECOVERY INDEX

- I. Days in hospital _____
- II. Total number of pain medications _____
- Total number of sleep medications _____
- III. Minor complications:
- Days of temperature elevation (> 99.6°) _____
- Inability to move bowels, enema given _____
- Nausea requiring medication _____
- Slight headache _____
- Severe headache, persistent _____
- Discomfort requiring hot water bottle _____
- Rectal tube for gas _____
- Special medications given:
- Antibiotics, routine post-op _____
- Antibiotics given to combat fever _____
- To prevent constipation or for urine stimulation _____
- Antacids
- For diarrhea and/or gut irritability _____
- For bronchial spasms (Aminophylline) _____
- Cough medicine (no fever) _____
- Nurses' observation (patient looks pale, dizzy, weak, etc.) _____
- After the first day, having to encourage patients to:
- Cough _____
- Deep breath _____

Ambulate

Take fluids

IV. Special Topics

Days to regular bowel habits

Days to ambulation

Assisted

Unassisted

Incidence of wound infection

V. Negative Psychological Reactions

Number of complaints noted in nurses' and
physician's notes except complaints about
incisional pain

Number of negative comments or observations
about the patient recorded in the notes such
as uncooperative, depressed, angry

Number of tranquilizers

APPENDIX H

RECOVERY VARIABLES INCLUDED IN FACTOR ANALYSIS

RECOVERY VARIABLES INCLUDED IN FACTOR ANALYSIS

1. Days in hospital
2. Total number of pain medications
3. Total number of tranquilizers
4. Total number of sleep medications
5. Number of days temperature in excess of 99.6
6. Number of enemas
7. Number of times medication given for nausea
8. Number of slight headaches
9. Rectal tube for gas, yes or no
10. Number of routine post-op antibiotics given
11. Number of antibiotics for fever
12. Number of drugs given for constipation
13. Number of drugs for diarrhea
14. Number of times nurses note that patient looks pale, dizzy, weak, etc.
15. Nurses note that patient had to be encouraged to cough, deep breath, ambulate, take fluids, etc.
16. Number of days of special diet
17. Number of days to regular bowel habits
18. Number of days to assisted ambulation
19. Number of days to unassisted ambulation
20. Wound infection, yes or no
21. Number of complaints noted in nurses and physicians notes except complaints about incisional pain, number of negative comments or observations about the patients recorded in the notes, such as uncooperative, depressed, angry, etc.

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PSYCHOLOGICAL PREDICTORS OF SURGICAL OUTCOME:

ANXIETY AND ACTIVE COPING

by

Judith Crummett Burnside

(ABSTRACT)

The underlying purpose of this study was to identify presurgical predictors of surgical recovery. The psychological variables of interest were trait and state anxiety and active coping style.

An examination was made of a multifactor trait anxiety scale, the S-R Inventory of General Trait Anxiousness. Specific emphasis was on the subscale related to anxiety aroused in physical danger situations, its relationship to presurgical state anxiety, and to surgical recovery. Two other anxiety measures, as well as a measure of active coping style, were also included as potential predictors of recovery.

Responses to the S-R Inventory of General Trait Anxiousness (S-R GTA), the Present Affect Reactions Questionnaire (PARQ), and the Fear of Surgery Scale (FSS) were obtained from 48 patients on the day prior to their surgery and on the fifth day after surgery. A rating of the patient's active coping style was obtained from an interview taped during the presurgical testing session. The dependent measures were the five individual components of a Recovery Index.

Based on a multiple regression analysis, the Fear of Surgery Scale (FSS) was the most efficient predictor of the indices of recovery. There was no support for the hypothesis that active coping style would be an important predictor of recovery. Despite expectations to the

contrary, the subscale of the S-R Inventory of General Trait Anxiousness (S-R GTA-PD) which measures anxiety in physical danger situations was not a reliable predictor of recovery nor was it the best of the five subscales in predicting state anxiety in the surgical situation.

The recommendation was made that the Fear of Surgery Scale be employed to enable early identification of patients with potentially high state anxiety in the surgical situation in order to make interventions in such a way as to reduce that anxiety and foster a smooth recovery. Various concepts of intervention were discussed as well as recommendations concerning the indices to be considered in evaluating recovery.