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A Path-analytic Study of Coping with

and Recovery from Surgical Hospitalization

May Wong

A Thesis

in

The Department of Psychology

Presented in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy at
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ABSTRACT

A Path-analytic study of coping with
and recovery from surgical hospitalization

May Wong, Ph.D.
Concordia University, 1990

Surgical hospitalization can be a highly stressful event that

compromises both the physical and psychological well-being of a patient.

Current correlational evidence suggests that certain psychological

characteristics and coping strategies shown by patients may be

predictive of poor postsurgical adjustment including physical

complications (e.g., bleeding or infection) and extended length of

hospital stay, as well as pain and emotional distress. This evidence

underscores the need to identify antecedent factors that may eventually

be used to facilitate postsurgical adjustment. Accordingly, the present

study examined the types of hospital events that individual surgical

patients perceive as stressful, the appraisal and emotional responses

elicited by these events, and the types of coping strategies used to

deal with them. These variables were assessed at multiple points before

and after surgery so that prospective relationships could be examined.

The principle aim was to identify variables that were most predictive of

postsurgical recovery.

Data were collected on a series of 52 male and 23 female adult

patients admitted for elective general surgery at the Royal Victora

Hospital in Montreal, Quebec. At four assessment points, all patients

reported their appraisal, emotional, and coping responses to three types

of individualized events during a specified period during their

hospitalization: 1) the most unpleasant event that they had personally

encountered, 2) the least unpleasant event, and 3) a preselected pain event. Outcome and recovery measures included medication use, physiological state, incidence of complications, and length of postsurgical stay. Path analysis (LISREL) for responses pertaining to the pain event revealed that appraisal, emotion, and coping variables loaded highly on a single construct (Psycho-affective Response) which, in turn, was predictive of a single construct (Outcome) that was found to represent recovery and physiological measures. LISREL results revealed that patients who endorsed a cognitive coping strategy subsequently demonstrated better courses of recovery (e.g., less use of analgesics, shorter postsurgical stay). Moreover, patients who endorsed a challenge appraisal of the pain events subsequently had less need for postsurgical analgesics and fewer pain reports. Multivariate analyses of covariance (MANCOVAs), controlling for type of surgery, that were conducted on patients' endorsements for the most unpleasant events confirmed the association between good outcome with both a challenge appraisal and cognitive coping method. These and related findings suggest potential targets for intervention aimed at improving patients' hospitalization experience and subsequent recovery from surgery.

Acknowledgement,

During the years spent on preparing this dissertation, I have been assisted by many people. First and foremost, my thanks to Dr. Danny Kaloupek for his support and invaluable contribution to this project. I am grateful to the doctors and nurses at the Royal Victoria Hospital who assisted in the collection of the data. In particular, I wish to thank Dr. Lloyd MacLean, Director of Surgery, for permitting me to conduct the study at the Royal Victoria Hospital. This study could never have been conducted without the generous contribution of time and effort by the individuals who consented to participate in the study. I thank them for taking the time to advance knowledge that can help to alleviate the stress of hospitalization for others.

During the time spent on data analysis and writing, friends and colleagues have been generous in their support and interest. Most particularly, I am grateful to Dr. Peter Henderson and Dr. Tak Fung for their suggestions and assistance.

Dedications

This dissertation is dedicated to my family:

To Daniel

who has always believed in me

To Mom, Lily, and Meighan

who have taught me courage and determination

and

In Memory of Father and Jessica

whose dignity have inspired me.

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Discussion

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Although surgical interventions generally improve patients' quality of life, these medical procedures nonetheless exact significant costs. For example, general health care consumes a significant portion of Canada's gross national product (Warner and Luce, 1982) and expenses directly associated with surgical procedures contribute to hospitals' utilization of approximately 40% of the national health care budget (Auer, 1987). It is noteworthy that the cost per day to maintain a surgical patient in hospital has tripled over the past decade (Dickinson and Hay, 1988), a statistic which underscores the need to identify the most cost-effective means by which surgical interventions can be implemented. In this regard, Troidl et al. (1987) have observed that surgical procedures must be evaluated with due consideration to both the psychological impact of surgery on patients and the effect of patients' psychological responses on treatment outcome. Torrance (1987), among other health-care analysts, concurs that the traditional emphasis on improvement of surgical technology has tended to minimize the role of humanistic factors in determining surgical outcome (Hollandsworth, 1988; O'Young and McPeek, 1987; Spitzer, 1987).

The Psychophysiological Impact of Surgical Hospitalization

There is much evidence to suggest that surgical hospitalization is an extremely stressful experience for most individuals and is associated with marked disruptions in patients' psychophysiological equilibrium. As early as 1958, Janis documented the relationship between patients' presurgical affective states and their subsequent course of recovery.

On the basis of interview data and observations from doctors and nurses regarding 23 general surgery patients, Janis found that highly anxious patients tended to have more emotional outbursts and show greater resistance to routine postsurgical care. Recent studies provide further evidence that patients' negative emotional responses during surgical hospitalization can adversely affect their emotional and behavioral adaptation to the procedures. For example, Ray and Fitzgibbon (1981) found that among 36 cholecystectomy patients, individuals who exhibited high levels of preoperative distress subsequently reported greater distress and more pain following surgery.

Physiological consequences of presurgical distress have also been reported. Genzdilov, Alexandrin, Simonov, Evtjuhin, and Bobrov (1977) studied 82 individuals who underwent surgical treatment for rectal cancer and found that the 38 patients who demonstrated high preoperative levels of anxiety and depression tended to exhibit marked disturbances in their sympathetic-adrenal functioning. Specifically, the levels of catecholamine in the urine and 11-oxycorticosteroids in the blood samples of these 38 patients were high before surgery and only decreased on the sixth day after the operation. Genzdilov et al. proposed that these physiological disruptions could be manifested in postsurgical complications such as patients' decreased tolerance for pain.

More recently, Linn, Linn, and Klimas (1988) presented evidence that positive relationships exist among patients' negative affective states prior to surgery, physiological disruptions, and postoperative complications. The authors studied the effects of stress on the immune functioning of 24 men who underwent elective inguinal herniorraphy.

Lymphocyte blastogenesis and neutrophil chemotaxis were measured from blood samples drawn from the patients the day before surgery, and 3 and 30 days postsurgery. Patients' psychological stress response levels were determined by the degree of life stressors that they had encountered during the 6-month period prior to hospitalization. Physiological reactivity to stress was measured by patients' blood pressure and pulse rate responses to a cold-pressor test administered prior to surgery. Results indicated that degree of life stress was directly associated with anxiety about impending surgery. Furthermore, patients who scored high on both the psychological and physiological stress measures had lower lymphocyte counts preoperatively and immediately following surgery. They also required more narcotics and longer postsurgical hospital stay. A notable conclusion from this study is that disruption in immune function associated with higher stress levels prior to surgery was related to poorer outcome among relatively healthy patients undergoing a fairly minor surgical procedure.

While a positive association between patients' negative emotional states and risk for postsurgical complications during hospitalization is well-documented (e.g., Graham and Conley, 1971; Langer, Janis, and Wolfer, 1975; Schmitt and Wooldridge, 1973), recent evidence suggests that post-procedural risk can extend several months following discharge from hospital. For example, Shaw et al. (1986) studied the relationship between preoperative anxiety and medical complications following discharge among 97 patients who underwent percutaneous transluminal coronary angioplasty for treatment of narrowed arteries. Patients' presurgical anxiety level was assessed with the state form of the State-

Trait Anxiety Inventory (STAI) the evening before the procedure, and their adjustment 6 months following discharge was determined via assessment of physical (e.g., renarrowing of arteries), psychological (e.g., Profile of Mood States total score), and social (e.g., level of involvement in work) functioning. Assessment of psychosocial functioning was not conducted prior to surgery. Results showed that patients who scored high on state anxiety prior to surgery demonstrated poor social functioning at 6-month follow-up. Moreover, highly state-anxious patients who also had a large number of narrowed arteries prior to surgery reported a high degree of mood disturbance 6 months after the procedure. The authors proposed that patients who were highly state-anxious before the procedure were also anxious about their physical condition and maintained this concern during the 6 months following discharge, regardless of the technical success of the procedure. Patients' excessive worry was then associated with mood disturbance and impaired social functioning during the post-discharge period.

It, therefore, appears that individuals who demonstrate high levels of distress prior to surgical interventions may be at risk for psychophysiological difficulties following the procedure. Unfortunately, studies regarding the relationship between psychological factors and surgical outcome have tended to focus on patients' affective responses directly associated with the procedure (e.g., preoperative anxiety) rather than individual differences variables (e.g., trait anxiety) as predictors of adaptation. For example, given the high levels of anxiety maintained by Shaw et al.'s (1986) state-anxious coronary patients during a 6-month period, it is important to determine

whether or not these individuals are more accurately identified as highly trait-anxious. Assessment of trait anxiety might then represent an important procedure in identifying individuals at risk for both distress prior to surgery and complications following the procedure. Individual differences factors in patients' responses to surgical procedures can also impact on the efficacy of psychological interventions. For example, a highly trait-anxious patient might require more intensive psychological treatment (e.g., cognitive restructuring of a belief system) than a highly state-anxious individual (e.g., relaxation training). In short, while more information is needed regarding the types of individuals at risk for negative psycho-affective responses to surgical hospitalization, there is consistent evidence for a positive relationship between patients' negative psychological responses to surgery and poor outcome.

Preparatory Interventions

Given that patients' psychological responses during surgical hospitalization have important consequences for their postsurgical well-being, research has attempted to identify means by which individuals can be made more psychologically prepared for invasive medical procedures. Forms of preparation include the provision of information about postoperative exercises (e.g., coughing, diaphragmatic breathing) to individuals prior to their admission (Mikulaninec, 1987), and crisis-intervention counselling that encourages patients to verbalize their negative emotional reactions during hospitalization (e.g., Sands, 1983; Viney and Benjamin, 1983). Preparatory programs are generally based on the premise that hospitalized individuals are faced with acute stressors

that seriously challenge their abilities to cope. In most

conceptualizations of stress management, a stressor is any event that

disrupts the psychophysiological equilibrium that maintains a state of

well-being for the individual (e.g., Burchfield, 1979; Gatchel and Baum,

1983) whereas coping refers to any cognitive or behavioral effort made

by the individual to minimize the negative psychophysiological impact of

a stressor (e.g., Billings and Moos, 1981; Folkman and Lazarus, 1980;

Lazarus, 1975). The general aim of most preparatory procedures is to

encourage patients to engage in certain types of coping behaviors that

are assumed to be effective in managing negative responses to the

hospitalization experience.

There are a number of excellent reviews regarding the theoretical

bases for and effectiveness of procedures that have been used to

psychologically prepare individuals for surgery (e.g., Gil, 1984;

MacDonald and Kuiper, 1983; Reading, 1979; Wilson-Barnett, 1984). The

general consensus is that preparatory interventions help patients

minimize their negative responses by enhancing their sense of

predictability and control regarding the acute aversive situations

encountered during surgical hospitalization. Most procedures can be

identified as one of three basic intervention types: 1) information

provision, 2) relaxation, and 3) cognitive-behavioral therapy (cf.

Ludwick-Rosenthal and Neufeld, 1988).

Information provision is among the oldest and most standard forms

of preparatory interventions used with surgical patients. It is also

one of the few procedures that was developed from a theoretical

formulation based on naturalistic observations of patients' behaviors

during hospitalization. In Janis' (1958) landmark study of general surgery patients, he reported a curvilinear relationship between preoperative level of fear and subsequent recovery. Specifically, patients who exhibited too little or too much fear prior to the surgical procedure had poorer recovery than did individuals who demonstrated a moderate amount of anxiety. Based on these findings, Janis suggested that patients who experience a moderate degree of preoperative fear are motivated and able to engage in cognitive rehearsal of coping strategies in preparation for surgery. Too little fear may not adequately energize individuals to engage in this preparatory behavior while too much fear might interfere with the cognitive activities.

Although questions have been raised about the generality of a curvilinear association between fear and surgical outcome (e.g., Reading, 1979; Wallace, 1986), the rationale for information provision remains that patients are provided with expectations about the surgical process that then allow them to psychologically prepare for the event. Information can be presented about the procedure itself (e.g., Kendall et al., 1979), the sensations associated with the procedure (e.g., Wilson, 1981), or a combination of both procedural and sensory details (e.g., Scott and Clum, 1984). As a result of their meta-analysis of outcome studies regarding information provision for stressful medical procedures, Suls and Wan (1989) concluded that a combination of both procedural and sensory information is generally most effective in reducing patients' negative affective responses and pain reports.

Relaxation training is a fairly standard component of anxiety-management interventions. Muscular relaxation and diaphragmatic

breathing skills are used to counteract the psychophysiological concomitants of anxiety (Wolpe and Lazarus, 1966). Physiological benefits of muscular relaxation for surgical patients might also include decreased resistance to procedures that require the individual to remain alert and cooperative (e.g., sigmoidoscopy, endoscopy), and minimization of postsurgical pain associated with muscle tension (e.g., Kaplan, Atkins, and Lenhard, 1982). Psychologically, relaxation skills can provide the patient with a sense of control over the psychophysiological discomforts associated with surgical procedures.

Cognitive-behavioral interventions often include relaxation training, but they also focus on management of anxiety-provoking cognitions via strategies such as calming self-talk and distraction (e.g., Fuller, Endress, and Johnson, 1978; Kendall et al., 1979; Meichenbaum and Turk, 1976). Essentially, this form of psychological preparation directs patients to alter their cognitions and appraisals about a stressful event so that the situation is perceived as being more manageable. In their review of outcome studies, Ludwick-Rosenthal and Neufeld (1988) concluded that cognitive-behavioral interventions have beneficial effects on both behavioral and self-report measures of anxiety and adjustment associated with stressful medical procedures.

Person Variables in Coping Outcome

While preliminary evidence supports the use of all three forms of preparatory training (Ludwick-Rosenthal and Neufeld, 1988), little is known about variables that identify the most effective intervention for an individual undergoing a particular medical procedure. Results from preparatory studies indicate the need to examine the impact of

individual differences on coping outcome. For example, Martelli, Auerbach, Alexander, and Mercuri (1987) identified an interaction effect of preparatory intervention (i.e., problem- or emotion-focused stress management) and untrained coping style (i.e., low or high information-preference) on recovery from preprosthetic oral surgery. Problem-focused stress management involved provision of both procedural and sensory information about the surgery, instruction in calming self-statements, and rehearsal of coping behaviors. The emotion-focused intervention included training in relaxation, calming self-talk, and distraction but did not provide information about the surgery. The high and low information-preference dimension of coping refers to an individual's tendency to deal with a stressor by either actively seeking information about it or avoiding acknowledgement of it, respectively. Results indicated that patients who had a high preference for information and were given a problem-focused intervention reported minimal pain and were rated as having good postsurgical adjustment. The same positive outcome was found for low information-preference patients who were given an emotion-focused preparatory procedure. Thus, preparatory outcome was associated with patients' preferred coping styles.

Affective state is another individual difference variable that can determine the value of a given preparatory procedure for an individual. For example, Wilson (1981) examined the effects of both preparatory intervention (i.e, information provision that informed patients they could request medications) and preoperative affective state (e.g., self-reported aggressiveness) on surgical outcome among 70 patients who

underwent either a cholecystectomy or hysterectomy. Seventeen patients were presented with an audiotape that described the sensations associated with abdominal surgery and informed them that they could request medications for pain. Results indicated an affect-by-treatment interaction such that among patients who were presented information, those who reported high levels of aggressiveness reported less pain and had less need for analgesics following surgery than did those reporting low degrees of aggressiveness. Wilson speculated that the information encouraged and normalized the overt expression of pain for low-aggressive patients who typically respond to stress without direct expression of affect.

Further evidence reveals that preparatory outcome can also be influenced by gender-based social roles. Viney, Benjamin, Clarke, and Bunn (1985) studied the short- and long-term effects of crisis-intervention counselling on recovery among 1480 female and 99 male medical and surgical patients. An average of two individual counselling sessions was provided which encouraged patients to communicate distress about their hospitalization to others and to actively seek information about their treatment. Results indicated that all counselled patients demonstrated good psychological adjustment during hospitalization (e.g., low anxiety and depression). However, at 12-month follow-up, females continued to exhibit good adjustment while the males tended to express more feelings of helplessness. Viney et al. proposed that upon discharge and return to their mining community where expectations exist for men to be confident and independent, males who continued to openly express distress received negative feedback, thus resulting in increased

negative emotions. Thus, it appears that individual difference factors such as preferred coping style, affective state, and gender can moderate coping outcome.

Situation Variables in Coping Outcome

A second factor that has received little attention in coping interventions pertains to specific situational features of the stressor. It has generally been assumed that the surgical procedure represents the most stressful situation encountered by patients during their hospitalization. However, Lucente and Fleck (1972) surveyed 408 medical and surgical patients and found that these individuals were distressed by a variety of situations such as having difficulty sleeping, lack of privacy, and dealing with hospital schedules. Similarly, a London-based survey of 1348 patients in ten hospitals revealed that boredom, noise, and sleep problems were among the most unpleasant events encountered during hospitalization (Raphael, 1977).

Conceptualization of hospitalization stress has been greatly advanced by the research of Volicer (1978) who identified a number of universal dimensions that seem to characterize hospital events. Volicer (1973) developed a measure to assess patients' stress ratings of various hospital events. Initially, a total of 216 patients, nurse, and physicians were asked to list events that occur during hospitalization and that require some form of adaptation by the patient. The final version of the event schedule, the Hospital Stress Rating Scale (HSRS), is comprised of 49 events that represent psychosocial stressors for most patients and includes items such as "having strangers sleep in the same room with you" and "thinking you might have pain because of surgery or

test procedures" (Volicer, Isenberg, and Burns, 1977). Factor-analytic results from HSRS ratings provided by 261 medical and surgical inpatients revealed nine factors including unfamiliarity of surroundings, loss of independence, separation from spouse, and isolation from other people.

The HSRS has been a useful tool in identifying specific types of hospital events that are most stressful for surgical patients. For instance, a sample of 252 surgical inpatients reported distress about the unfamiliarity of the surroundings, loss of independence, and threat of severe illness (Volicer et al., 1977). Specific HSRS items that surgical patients rated as most stressful included "being awakened in the night by nurses", "having to be assisted with bathing", "thinking you might have pain because of surgery or test procedures", and "knowing you have to have an operation". Ross and McKay (1986) identified similar HSRS responses among 41 cardiac surgery inpatients who rated threat of severe illness, lack of information, and loss of independence as the most stressful types of hospital events.

Person and Situation Variables in Surgical Outcome

It is of interest that few studies have actually examined the types of situations that surgical patients find stressful, their emotional responses to these situations, and the methods by which they attempt to cope with these events (cf. Chaves and Brown, 1987). One exception is Vogele and Steptoe's (1986) study of coping behaviors among 8 hip-replacement patients during 11 days of hospitalization. Results indicated that while patients consistently engaged in a rational-cognitive coping method (e.g., "I try to step back from the situation

and be more objective"), they less frequently responded with denial (e.g., "I try to go on as if nothing happened"). While these observations are informative about patients' coping responses during hospitalization, the study suffers from a small sample size and overly general instructions for self-reports of coping. Patients were asked to summarize their coping behaviors across all situations they had encountered in one day, thus, information was not available regarding specific types of stressful situations patients encountered and how they coped with these stressors.

Given the limited information about the impact of individual differences and situational variables on coping outcome in medical settings, preparatory interventions may have been implemented somewhat prematurely and on the basis of questionable assumptions regarding psychological responses to surgical hospitalization. A data base is needed for types of stressful situations encountered by surgical inpatients, their emotional and coping responses to these situations, and the effect of their coping behaviors on psychophysiological outcome. It is precisely this caveat in the coping research that has prompted a call for less emphasis on experimental studies and greater attention to naturalistic observation of individuals' behaviors in hospital settings (e.g., Kaloupek, 1987; Lazarus, 1975; Ludwick-Rosenthal and Neufeld, 1988; Peterson, 1989), with the research being guided by a theoretical conceptualization of coping.

A Conceptual Model of Coping
Person-Situation Interaction as a Determinant of Behavior

The preceding review of preparatory outcome studies suggests that a

conceptual model of coping by surgical inpatients must address the interaction between individual differences and situation variables in determining coping responses. Person-situation interaction models of behavior have gained credibility due to their greater predictive power than either person- or situation-based models alone (e.g., Endler, 1975; Endler and Magnusson, 1976). For example, Vitaliano, Russo, and Maiuro (1987) found that 433 medical students' cognitive appraisals of stressful life events were better predicted by the interaction of person (i.e., locus of control) and situation (i.e., type of stressor) factors than by either factor alone. Similarly, Bowers (1973) reviewed 11 studies in which analyses of variance were used to assess the predictive validity of person and situation variables in determining subjects' degree of anxiety or aggressiveness. Results indicated that percentage of variance due to person (12.7%) and situation (10.2%) variables alone was much lower than the amount of variance accounted for by the interaction effect (20.8%).

Argyle (1977) proposed that Lewin's (1935) simple equation for person-situation interactions can be used to generate predictive rules about behavior:

$$B = f (P,S)$$

where B refers to the quantity of a specified dimension of behavior (e.g., degree of behavioral avoidance), P is a stable aspect of the individual (e.g., neuroticism), and S pertains to specific properties of the situation (e.g., unfamiliar surroundings). An important component in this equation is "f" which specifies the functional relationship between the person and situation variables that ultimately determines

the behavior. The specific nature of this functional relationship, however, remains to be identified.

Mischel (1977) proposed that the functional relationship is truly interactional in that the individual shapes the situation as much as the situation impacts on the individual. He further proposed that an important mediating factor in person-situation interactions is the individual's cognitive representation of the event (Mischel, 1984). He illustrated this functional relationship with an examination of the effects of children's cognitive activities on their ability to delay gratification. Children instructed to cognitively distract themselves (e.g., think about fun activities) were able to delay eating their marshmallow even though the treat was placed in their view. Conversely, children who were instructed to imagine a marshmallow could not wait long before eating their treat even though it was not placed in their view. Mischel's interactional model of behavior, therefore, proposes that individuals respond not simply to objective properties of a situation but rather to their cognitive representations of the event.

A Cognitive-Phenomenological Model of Coping

The hypothesis that person-situation interaction influences behavior primarily through cognitive representation is a basic premise in the cognitive-phenomenological model of coping developed by Lazarus and his colleagues (e.g., Folkman and Lazarus, 1980; Lazarus, 1975). Even more than this, Lazarus and Launier (1978) proposed that coping behavior is determined not merely by person-situation _interactions_ but rather by multiple and bidirectional _transactions_ between individuals and their environment. A continuous feedback system is postulated

between the objective situation and an individual's cognitive-affective
responses to it. According to this model, stressors refer to events
that are appraised by individuals as taxing or exceeding their resources
and endangering their well-being (Lazarus and Folkman, 1984). Coping
pertains to cognitive and behavioral efforts to manage the external
and/or internal demands that are appraised as stressful. During a
stressful encounter, coping behaviors can vary as a function of the
individual's changing cognitive representations of the person-
environment relationship.

The cognitive mediation process in coping takes two forms. Primary
cognitive appraisal refers to individuals' assessment of a situation as
either: 1) irrelevant, 2) benign-positive, or 3) stressful (Lazarus and
Folkman, 1984). Stressful events, in turn, can represent either harm
(i.e., physical and/or psychological hurt), loss, threat (i.e.,
anticipated harm or loss), or challenge (i.e., potential for growth or
mastery). In this theoretical framework, coping responses are elicited
most directly by situations appraised as stressful.

Secondary appraisal refers to individuals' evaluations of personal
abilities and/or external resources available to help them deal with the
stressor. The psychophysiological impact of an event is then influenced
by the individual's continuous appraisals and reappraisals of the
stressful encounter (Folkman and Lazarus, 1988a). For example,
hospitalized patients might initially experience anxiety about impending
physical harm associated with a surgical procedure (i.e., primary
appraisal) but then determine that they can use a relaxation exercise to
ease the pain (i.e., secondary appraisal), which leads to both re-

assessment of the pain experience as a challenge to relaxation skills

(i.e., primary re-appraisal) and decreased levels of anxiety.

Mediating and Moderator Variables in Coping

A number of mediating and moderator variables can impact on the

person-situation transaction that determines coping responses.

Mediating variables are generated during the stressful situation and

alter the original relationship between antecedent and outcome variables

(Folkman and Lazarus, 1988b). For example, coping behaviors are

generated during a stressful encounter and these responses can then

change the individual's original emotional reactions to the situation.

Conversely, moderator variables are antecedent factors (e.g.,

personality characteristics) that individuals bring into person-

environment transactions. Research on coping has focused particularly

on the mediating roles of social support and personal control, and on

moderating effects of trait anxiety, chronic depression, and generalized

beliefs regarding determinants of health.

Social support refers to interpersonal means of stress-attenuation

through emotional support, assistance, and information provision

(Dunkel-Schetter, Folkman, and Lazarus, 1987). Social support is

postulated to be a buffer in minimizing the negative impact of stressors

on individuals' health and well-being (e.g., Berkman, 1985). For

example, DeLongis, Folkman, and Lazarus (1988) examined the relationship

between emotional support and mood disturbance associated with daily

hassles among 75 married couples. Results showed that individuals who

perceived little emotional support from their partners tended to report

significant mood disturbances not only during a stressful day but also

on the following day. Using the same sample of married couples, Dunkel-Schetter et al. (1987) identified correlates associated with receipt of social support. Results indicated that social support receipt was more significantly associated with coping behaviors than with situation variables. That is, individuals who engaged in coping behaviors such as seeking social support and problem-solving strategies tended to receive emotional support and information from their spouses. Billings and Moos (1981) similarly found that, among 338 subjects, individuals who engaged in avoidant coping generally received less social support. Thus, coping responses can influence both the elicitation and form of support provided by social networks which, in turn, can mediate the negative impact of stressful person-situation transactions.

In regard to surgical hospitalization, individuals' social environment can influence their affective responses to and subsequent recovery from surgery. For example, an important aspect of the hospital social milieu is room assignment; that is, whether a patient is in a private room or in an open ward. Evidence suggests that patients look to their roommates for cues regarding appropriate behaviors (e.g., Kulik and Mahler, 1987) and to compare how well they themselves are coping with hospitalization (cf. Jenkins and Pargament, 1988).

The perception of personal control also serves as a mediating factor in stressful encounters. Jenkins and Pargament (1988) examined the effect of perceived personal control on psychological adjustment among 62 individuals who had a minimum 3-month history of cancer. Subjects who perceived a high degree of self-control over their cancer tended to report less psychological disturbance about their illness

which, in turn, was associated with greater likelihood for successful recovery. An even stronger predictor of psychological adjustment to the illness was perceived control over one's emotional responses. Specifically, individuals who reported a high degree of control over their own emotional reactions to the illness demonstrated high levels of self-esteem and good psychosocial adjustment.

Folkman (1984), however, cautioned that perceived control does not necessarily serve a positive mediating role in stressful transactions, particularly in cases where the expectation for control does not match the objective reality of the situation. As an example, Folkman described how the Three Mile Island residents who attempted to directly confront chronic, objectively uncontrollable problems associated with the nuclear accident in their area subsequently reported greater psychological disturbances than did those who directed coping efforts at emotional self-control. Hence, the attentuating effects of perceived control on stress responses appear to be associated with the goodness-of-fit between coping and situation variables.

Moderator variables such as chronic anxiety and depression have also been identified as important correlates of coping responses during stressful transactions. Boyd, Yeager, and McMillan (1973), for example, studied the relationship between generalized anxiety and coping behaviors among 27 male patients scheduled for reconstructive cardiovascular surgery. Patients' mood and coping responses were assessed by in-depth psychiatric interviews and projective tests. Results indicated that the 11 individuals who subsequently demonstrated poor psychosocial adjustment (e.g., failure to return to work) at 1 yr

postsurgery were characterized by chronic, free-floating anxiety. Moreover, the group of poor adjusters tended to rely on avoidant types of coping strategies such as denial and repression. Conversely, the well-adjusted individuals were able to express their anxiety more freely and generally coped by directly confronting (e.g., problem-solving) stressors associated with their illness.

In regard to the relationship between depression and coping, Billings and Moos (1984) examined differences in types of strategies used to deal with acute and chronic life stressors among 424 individuals suffering from either major or minor depressive disorders and a sociodemographically matched group of nondepressed controls. Results revealed that depressed individuals made greater use of information-seeking (e.g., tried to find out more about the situation) and emotional discharge (e.g., tried to reduce tension by smoking), and less use of problem-solving responses (e.g., made a plan of action and followed it) than did the nondepressed group. Moreover, use of emotional discharge strategies was associated with higher levels of depression, and more physical symptoms such as asthma and ulcers.

Individuals' generalized beliefs regarding determinants of their health (i.e., health locus of control) represent another moderator variable in the cognitive appraisal of and coping responses to stressors. Health-externals perceive outside forces (e.g., doctors, fate) as prime determinants of their health while health-internals believe that staying or becoming healthy is a direct result of their own behaviors (Wallston, Wallston, and DeVellis, 1978). Hence, health-internals are more likely to take responsibility for their actions and

to take steps to alter an aversive situation (Strickland, 1978).

Johnson, Dabbs, and Leventhal (1970) found that patients who

demonstrated an internal locus of control tended to request analgesic

medications more frequently in the 24-hr period following surgery than

did externally-focused patients. The authors suggested that requesting

analgesics may have been an active, confrontative means by which

internally-focused patients coped with postsurgical pain. Similarly,

Lamontagne's (1984) study of 51 children scheduled for minor elective

surgery revealed that patients who reported an internal locus of control

tended to engage in active coping strategies such as seeking information

about their surgery.

In summary, Lazarus et al.'s cognitive-phenomenological model of

coping provides a conceptual framework from which to derive guidelines

for the study of patients' coping responses during surgical

hospitalization. Specifically, patients' coping behaviors can be

understood in relationship to the type of stressful situation

encountered, and the individual's cognitive appraisal of and emotional

responses to the situation. In addition, the mediating and moderator

roles of social support, perceived personal control, trait anxiety and

depression, and health locus of control can be identified as potential

correlates of patients' coping responses. While the Lazarus et al.

model provides a conceptual framework for the examination of coping,

there are no universally-accepted methods for the assessment of such

stress-management behaviors (cf. Fleishman, 1984). Therefore, discussion

now turns to methodological issues in the measurement of hospitalized

patients' coping behaviors.

Assessment of Coping Responses

Given the guiding model proposed by Lazarus et al., the assessment of coping should be able to reflect the changing relationship between individuals (e.g., surgical inpatients) and their (hospital) environment. To this end, a comprehensive assessment should provide information about patients' coping responses across time and in regard to a variety of different situations. Folkman and Lazarus (1985), for example, assessed the coping process during three stages of a midterm examination among 108 college students. The anticipatory stage represented the time during which students prepared for their test, the waiting stage was after the exam but before grades were announced, and the outcome stage occurred when students were informed about their grades. Students were asked to report their primary appraisals of and coping responses at each stage. Results indicated significant changes in appraisal and coping responses across the three time periods. That is, students tended to appraise the test situation as either a threat or challenge during the anticipatory stage but the predominant appraisal then shifted to either harm or benefit following announcement of grades. It appears that students generally focused on psychologically preparing themselves for the demands associated with the exam during initial stages and then shifted their focus to evaluating consequences once the test results were announced. In regard to coping, students generally engaged in efforts to deal with the exam itself during the anticipatory stage but then most shifted to a distancing strategy (e.g., trying to forget the whole thing) during the waiting stage. The shift from active to more passive strategies makes intuitive sense since students could do

nothing but wait to learn their grades during this second phase. This process study provides a clear illustration of the dynamic shifts in coping responses to changing situational demands.

Process coping measures have similarly been applied to studies of individuals' responses to invasive medical procedures (cf. Kaloupek, 1987). Kaloupek, White, and Wong (1983), for example, examined temporal shifts in individuals' coping responses at two separate points during a blood donation procedure. The findings suggested that some blood donors demonstrated flexibility in their coping strategies when shifting from the anticipatory to donation period. In anticipation of needle insertion, these individuals attempted to learn more about the procedure but they then avoided focusing on the procedure once the needle was inserted. Avoidant coping strategies (e.g., thinking of more pleasant activities) may have been particularly adaptive during the donation stage since donors could do little to alter the stressful situation apart from physically leaving.

Wong and Kaloupek (1986) found that dental patients also demonstrate selectivity in their coping strategies as a function of changing situational demands during treatment. The majority of 50 patients undergoing amalgam restorations engaged in an avoidant coping strategy (e.g., not thinking about unpleasant things) during anticipation of treatment and then used a behavioral strategy (e.g., trying to prepare oneself for treatment) during the anesthetic injection. Essentially, then, naturalistic process studies can reveal the flexible and adaptive means by which individuals cope with the changing demands of dynamic person-environment transactions.

Another important methodological issue is the identification of a measure that can adequately assess the key dimensions of coping. Given the need for multiple coping assessment, a truly parsimonious measure should be broad-band in scope while still being minimally time-consuming for respondents. Measures that are based on a multidimensional conceptualization of coping may be sufficiently broad-band but not time-efficient due to the large number of test items (e.g., Folkman and Lazarus, 1980). Alternatively, assessment tools that are based on a more simple two-dimensional formulation of coping may be too limited in their scope. For example, Byrne's (1961) Repression-Sensitization scale was based on the formulation of an approach-avoidance gradient in coping responses. The limitation of this basic paradigm is exemplified when an individual actively seeks information about impending surgery in an effort to attenuate anxiety about the procedure. In this situation, the individual demonstrates approach behavior in dealing with the problem itself but, at the same time, attempts to ultimately avoid negative emotional consequences associated with the problem. Essentially, this individual's coping method is characterized by behavioral monitoring (i.e., approach) but the focus of coping is avoidance of emotional distress.

A simultaneous consideration of both the method and focus of stress responses is presented in Billings and Moos' (1981) model of coping (Table 1). In their formulation, methods of coping include: 1) behavioral strategies that attempt to deal directly with the stressor or its emotional consequences, 2) avoidance which is characterized by attempts to not actively confront the stressor or its emotional

Table 1

Billings and Moos Coping Formulation

Coping Method

1. Behavioral – overt behavior to deal directly with the stressor or its emotional consequences

    Examples: a. Trying to find out more about the situation.
    b. Trying to relax.

2. Avoidant – attempts to avoid actively confronting the stressor or its emotional consequences

    Examples: a. Denying the presence of a negative emotional or physical state.
    b. Thinking about being elsewhere.

3. Cognitive – attempts to manage one's appraisal of the stressor or its emotional consequences

    Examples: a. Trying to see the positive side of the situation.
    b. Drawing on past experiences in similar situations.

Coping Focus

1. Problem-Focused – attempts to modify or eliminate the sources of stress

    Example: a. Takings things one step at a time.

2. Emotion-Focused – attempts to manage the emotional consequences of stressors and maintain emotional equilibrium

    Example: a. Trying to calm oneself.

consequences, and 3) cognitive strategies which attempt to manage

appraisals of the stressor or its emotional consequences. The focus of

coping behavior can be on the problem itself or on negative emotions

resulting from the stressful encounter (Moos and Billings, 1982).

Combinations of method and focus of coping are then possible,

exemplified by a surgical patient who appraises the medical procedure as

a means of prolonging life (i.e., cognitive coping method) in order to

manage anxiety associated with the invasive intervention (i.e.,

emotional focus). The behavioral and avoidant coping methods are

conceptually similar to the approach-avoidance concept that is basic to

most coping formulations (cf. Roth and Cohen, 1986). The cognitive

coping method is a significant addition to the basic paradigm because it

directs attention to individuals' potential to cognitively shape

stressful transactions. The Billings and Moos' formulation, therefore,

provides a simple but adequately broad conceptual base from which to

develop measures for the cognitive-phenomenological experience of

coping.

The Present Study

In summary, consistent evidence indicates that patients' negative

emotional responses during hospitalization have adverse impact on their

psychophysiological outcome. Preparatory psychological interventions

have been developed in order to help patients minimize their negative

emotional responses to surgical hospitalization; however, outcome has

been inconsistent. This inconsistency is the result of inadequate

attention to the interaction of person and situation variables in the

implementation of psychological interventions. Therefore, guiding

principles are needed to determine the most effective type of psychological preparation (i.e., coping strategy) for an individual patient undergoing a particular medical procedure. To this end, basic information is needed about types of stressful situations that patients encounter during their hospitalization, and their psycho-affective responses to these situations. Moreover, examination of the relationship between patients' coping strategies and psychophysiological outcome would provide information about effective stress-management interventions for hospital-related distress.

Whereas previous studies have separately identified types of stressful situations encountered during hospitalization and types of coping responses used by patients, the aim of the present study was to conduct a comprehensive examination of the relationships among three factors: 1) types of stressful situations that patients encounter during hospitalization, 2) their self-reported coping strategies in regard to these situations, and 3) their physiological condition and recovery. The study of patients' psycho-affective responses to hospitalization was guided by the Lazarus et al. cognitive-phenomenological model of coping and involved a process-oriented assessment methodology. Specifically, surgical patients were asked to report their primary cognitive appraisals of, emotional and coping responses to, and perceived control over events that they encountered during four stages of their hospitalization experience. It was of particular interest to then examine the relationship of patients' coping behaviors with both their physiological condition and surgical outcome during hospitalization.

In summary, the purposes of the present investigation were to:

1) examine the relationship between patients' self-reported coping behaviors and their psychophysiological adaptation during surgical hospitalization, and

2) provide information about types of untrained coping strategies that surgical patients report during the course of hospitalization.

Method

Subjects

Subjects were recruited through the department of surgery at the Royal Victoria Hospital during a 5-month period in 1986. Eligibility was based on four criteria: 1) age between 18 and 70 years, 2) scheduled for elective surgery, 3) attended the standard pre-admission clinic, and 4) demonstrated comprehension of English. A total of 25 surgeons provided written consent for their patients to participate (Appendix A), but surgical scheduling resulted in participation by patients of only 16 surgeons. This group included one orthopedic surgeon, three cardiologists, four urologists, and eight general surgeons.

All individuals who met the inclusion criteria were contacted by the experimenter and asked to participate when they attended the pre-admission clinic. The aim of the study was described as an examination of the ways in which patients deal with situations they encounter during hospitalization, with the eventual goal of using this information to understand how the stresses of hospitalization might be minimized. A

consent form was presented which outlined the goals, briefly described the measures to be administered, and clearly stated that participants could withdraw at any point in the study without adverse effects on their subsequent treatment and care (Appendix B). Participants were also informed that coded subject numbers would ensure their anonymity and that all information they provided would remain confidential.

A total of 106 patients were asked to participate, of which 17 (mean age = 53.5 yr) refused, due primarily to lack of time needed to complete the various assessments. Of the remaining 89 who initially volunteered, 14 subjects (mean age = 48.5 yr) were eliminated due to: a) withdrawal from participation upon admission to hospital (n = 3), b) inability to contact the patient prior to admission (n = 1), or c) postponement of surgery beyond the data collection period (n = 10).

The final sample, therefore, consisted of 52 male and 23 female elective surgery patients (mean age = 48.8 yr). Surgical procedures were classified according to the International Classification of Diseases (ICD-9), with some medically similar problems combined in order to ensure an adequate sample for those particular classifications. The six groups were: 1) musculoskeletal-integumental (n = 13; e.g., orthopedic repair), 2) gynecological-urological (n = 17; e.g., transurethal prostatic resection), 3) inguinal hernia repair (n = 15), 4) digestive-endocrinological (n = 17; e.g., cholecystectomy), 5) minor cardiovascular (n = 8; e.g., varicose vein stripping), and 6) major cardiovascular (n = 5; e.g., mitral valve replacement). Patients were admitted to a total of nine hospital wards, including six open and three private units.

Materials

Personal Information and Hospitalization History

A Background Information Sheet was used to record the patient's

sex, age, marital status, and educational level (Appendix C). A history

was also taken of prior surgical hospitalizations, including number of

previous admissions, types of problems which necessitated these

hospitalizations, and duration of and time elapsed since the most recent

hospital stay. Medical reasons for the most recent and present

hospitalization were compared (i.e., similar vs. dissimilar) to

determine whether or not individuals had prior exposure to surgical

procedures for their presenting problems. Patients were also asked to

rate the degree of difficulty and unpleasantness associated with their

most recent hospitalization on 8-point scales (1 = not difficult/not

unpleasant; 8 = extremely difficult/extremely unpleasant). Similar

information was gathered regarding patients' previous medical

hospitalizations. Subjects also reported the number of days they had

been aware of the need for the present surgery.

Individual Differences

Four dimensions related to individual differences were assessed in

order to determine their relationship to patients' general perceptions

of and responses to events during hospitalization: 1) trait anxiety,

2) attitudes regarding personal health and medical procedures,

3) general expectancies of control over health-related events, and

4) depression (Appendix D).

Trait anxiety can be conceptualized as a relatively stable

personality characteristic of anxiety proneness. That is, high trait-

anxious individuals are not necessarily anxious at all times, but rather they are more likely to respond with anxiety to situations (Katkin, 1978). The State-Trait Anxiety Inventory (STAI)-Trait scale is a widely used measure of this predisposition to anxiety (Spielberger et al., 1970). The 20-item trait form asks individuals how they generally feel and each item is rated on a 4-point intensity scale, ranging from "Almost Never" to "Almost Always". Thus, scores on the trait-anxiety scale range from 20 to 80 and higher scores are indicative of an individual who is more prone to respond anxiously in certain situations. The STAI-trait scale has demonstrated suitable psychometric characteristics. For example, the internal consistency of the trait form ranges from a coefficient alpha of .89 to .91, and test-retest reliability for intervals from 1 hr to 104 days ranges from .65 to .86 (Chaplin, 1984). Convergent validity of the trait scale has also been demonstrated with various established anxiety scales, with correlations ranging from .75 to .80 (Dreger, 1978).

While the STAI-trait scale assesses an individual's general predispositon to become anxious, the Personal Illness Questionnaire (PIQ; Kaloupek et al., 1986) measures fears specific to medical procedures and threats to physical integrity. The scale's factor structure was determined from the test responses of 394 university students and replicated with a second sample of 700 students. Principal components analysis revealed that 12 of the 14 PIQ items contributed to three main factors which were labelled Medical Procedure Fear, Disease Fear, and Somatic Sensitivity; each factor consisting of four items. Accordingly, the 12 true/false PIQ items are scored in terms of the

three factors by simply adding the number of respective items endorsed as true, with the possible range of scores for each factor being 0 to 4. In regard to concurrent validity, Somatic Sensitivity and Disease Fear appear to be associated with depression and worry, while Medical Procedure Fear and Disease Fear are related to bodily-injury fear and vasovagal reactions (Kaloupek et al., 1986).

The revised Health Locus of Control (HLC-R; Wallston et al., 1978) was used to assess patients' generalized beliefs regarding factors that determine their personal health. The HLC-R taps the degree to which individuals attribute control of their health to three different sources: 1) their own behaviors (Internal Locus), 2) the actions of other (Powerful Others), and 3) fate (Chance). The present sample was presented Form A which contains 18 statements that describe certain beliefs about who or what controls health-related outcomes. Patients rated their agreement with each item on 6-point scales, ranging from "Strongly Disagree" to "Strongly Agree". Sums of scores, with a potential range from 6 to 36, were then calculated for each of the three subscales. Wallston et al. (1978) reported good concurrent validity between HLC scores and health status in a sample of 125 subjects. The HLC-R is a relatively new measure whose psychometric properties continue to be evaluated with different patient populations (e.g., Larde et al., 1984; Larde et al., 1983).

Patients' depressive symptomatology was assessed with the Self-rating Depression Scale (SDS; Zung, 1965). It is a 20-item inventory which uses 4-point Likert scales to examine the frequency of depressive symptoms, with anchor points ranging from "None Or A Little Of The Time"

to "Most Or All Of The Time". Raw scores, therefore, fall between 20 and 80. An index for the SDS is then derived by dividing the actual raw score by the maximum possible score of 80 and converting this result to a whole number. The resulting standard index, ranging from 25 to 100, permits comparison of scores across subjects. The SDS appears to be a fairly good measure of depression. Schaefer et al. (1985), for example, compared the concurrent validity of the SDS, Beck Depression Inventory, and Minnesota Multiphasic Personality depression scale using a sample of male psychiatric inpatients. A comparison of the three measures revealed that the SDS was most highly correlated with clinicians' global ratings of depression for these patients. In regard to the internal consistency of the SDS, a split-half reliability coefficient of .75 has been reported for odd-even item analysis (Zung, 1974).

The four questionnaires were presented to all patients in a fixed order (HLC-R, STAI-trait scale, PIQ, SDS) and were completed at home.

Present Hospitalization

During the pre-admission interview, patients were asked to rate their satisfaction with the support they received from family and friends to help them deal with their upcoming hospital stay on an 8-point scale, with 1 being "Extremely Satisfied" and 8 being "Not At All Satisfied". Satisfaction with social support was also assessed at discharge, using the same 8-point Likert scale.

Following admission to hospital, information was gathered about whether a patient's room assignment was private or non-private. Details about type and duration of surgery, and method of anesthetic induction were taken from the operating room data sheet. Duration of surgery was

recorded in minutes, indicating the time from beginning to completion of

the procedure. Type of anesthetic was classified into one of four

groups: 1) local-nerve block, 2) local-epidural block, 3) local-spinal

block, and 4) general (e.g., enflurane). This classification represents

a rank ordering of degree of anesthetic induction, with nerve block

being the least potent and general anesthetic the most potent agent. In

conjuction with increased potency, general anesthetics are also

associated with higher risks of side-effects such as hypotension,

emesis, and hypoventilation (Bergersen, 1976).

Measures of Psycho-affective Responses to Hospital Events (Appendix E)

At three assessment points during hospitalization, patients were

asked to provide retrospective reports about their psycho-affective

responses to a standard hospital event and to stressful situations that

they had personally encountered.

Hospital events. At each assessment, all patients were presented

a standard event which was selected from Volicer's (1977) 49-item

Hospital Stress Rating scale and which represents one of the most

unpleasant events reported by surgical patients: "Thinking you might

have pain because of surgery or test procedures". The wording was

modified to read "Thinking about pain connected with surgery or test

procedures" so that the statement would remain grammatically correct at

each assessment period. Patients were then asked to describe the most

and least unpleasant events that they had personally experienced during

each of the three assessment periods. Descriptions of situations were

recorded verbatim. Patients were also asked to rank order the three

events from least to most unpleasant.

In cases where patients had difficulty identifying two events spontaneously, a modified version of the Hospital Stress Rating Scale (HSRS; Volicer, 1978; Volicer et al., 1977) was presented to aid recall. The resulting Hospital Events Schedule (HES) is comprised of 18 items that represent the nine factors (e.g., loss of independence) from the HSRS. Only two patients made use of the HES.

Patients provided a total of 450 most and least unpleasant events that they had encountered during their hospitalization. Verbatim transcripts of patient's responses were presented to three independent judges (Footnote 1) who categorized each event according to the descriptions presented in Table 2 and the coding system summarized in Appendix F. Essentially, raters classified each event in regard to two factors: 1) its interpersonal component, and 2) its primary situational characteristics. The interpersonal factor pertains to whether or not the event involved a social component. The primary event characteristics refer to the negative or positive valence of the situation. For example, events characterized by the presence of restrictions (e.g., Environmental Restrictions) are primarily negative whereas those characterized by the presence of benefits (e.g., Personal Benefits) are primarily positive. According to this criterion, event categories 1 to 4 refer to negative situations and categories 5 to 8 are positive events (Table 2). The primary event characteristics also identified whether the situation pertained to environmental or personal issues. The raters were not given information about the assessment period, or about patients' own rankings of the events from most to least unpleasant.

Table 2

Interpersonal and Primary Characteristics of Event Categories

Interpersonal vs. Non-interpersonal Focus

1. Interpersonal
   - events that involve other individuals in the environment both directly and indirectly (e.g., responses to others, responses of others perceived by the patient, social encounters)

2. Non-interpersonal
   - events that have to do with the environment, or intrapersonal events (e.g., hospital regulations, sensations experienced by the patient)

Primary Event Characteristics

1. Environmental Demands
   - having to do with the demands imposed by the hospital surroundings or procedures

2. Environmental Restrictions
   - having to do with restrictions imposed by or deficits related to the hospital surroundings

3. Personal Demands
   - having to do with physical, emotional, or cognitive reactions experienced by the individual

4. Personal Limitations
   - having to do with an inability to exercise autonomous physical, emotional, or cognitive functioning; issues of dependency

5. Environmental Demands or Restrictions Removed
   - having to do with demands or expectations being removed or not being as bad as expected, or an end to restrictions

6. Environmental Benefits
   - having to do with direct benefits or advantages of being in the hospital surroundings

7. Personal Demands or Restrictions Removed
   - having to do with relief from physical, emotional, or cognitive restrictions because they have been removed or did not occur; return to autonomous functioning

8. Personal Benefits
   - having to do with direct benefits (either physical, emotional, or cognitive) for the individual

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Notes. Events that have both interpersonal and non-interpersonal components are coded interpersonal. Primary event categories 1 to 4 refer to negative (more than positive) events while categories 5 to 8 refer to positive (more than negative) events.

Cognitive appraisal. Patients were asked to report their cognitive appraisals of each hospital event. The Appraisal Form was derived from the descriptions of primary appraisals formulated by Lazarus and his colleagues (e.g., Folkman, 1984; Lazarus and Folkman, 1984). This type of appraisal determines whether the situation is irrelevant, benign-positive, or stressful. Since the focus of the present study was on patients' responses to stressful events, the Appraisal Form consisted of one descriptive statement for each of the four types of stress-related appraisals: 1) harm (i.e., injury or damage already done), 2) loss (that has already occurred), 3) threat (i.e., anticipated harm or loss), and 4) challenge (i.e., opportunity for growth, mastery, or gain). Patients were asked to choose the statement that best described how they perceived the hospital event in question.

Coping response. Patients' coping responses during each hospital event were assessed with the Coping Checklist. This measure is derived from Wong and Kaloupek's (1986) Process Cope scale which, in turn, is based on Billings and Moos' (1981) conceptualization of coping behaviors. Billings and Moos classified coping responses according to the method (i.e., behavioral, avoidant, or cognitive) and focus (i.e., on the problem itself, or on the emotional consequences of the stressor) of the response. A third coping focus category was subsequently identified by Kaloupek et al. (1983) among blood donors who reported that they did not focus on anything in particular during the donation procedure. A No Focus category, therefore, was added to the Process Cope scale.

The original Process Cope scale is comprised of two descriptive statements for each of the three methods of coping and one statement to represent each of the three focuses. In order to minimize administration time, the Coping Checklist consists of only one statement for each coping method, with selection based on frequency of endorsement by Wong and Kaloupek's (1986) dental patients. No changes were made to the coping focus statements. Patients in the present study were asked to endorse one method and one focus statement that best characterized how they dealt with each hospital event.

Affective response. Patients' emotional responses to each hospital event were assessed with the Mood Adjective Checklist (MACL; Lishman, 1972). The MACL is a shortened version of McNair and Lorr's (1964) Psychiatric Outpatient Mood Scale (POMS) which is comprised of 55 adjectives. The MACL retains the original mood factors with a reduced total of 24 adjectives. While the POMS mood scores have demonstrated adequate degrees of internal consistency and test-retest reliability (McNair and Lorr, 1964), the MACL has not yet been fully evaluated. However, Lishman (1972) reported good concurrent validity (r = .64 to .96) between scores on the MACL depression factor and the Beck Depression Inventory among psychiatric inpatients. The MACL was selected for the present study because the administration time is relatively short and the mood adjectives are easily understood by a non-college population.

Patients were asked to report how they felt during each hospital event on the 24 adjective scales, ranging from "Not At All" to "Extremely". Scores were then calculated for each of the six mood

factors by summing the four adjective scores for the factor (Appendix G). A mood factor score, therefore, ranged from 4 to 16.

Situational control rating. Perception of personal control is one aspect of the secondary appraisal process since it is a self-evaluation of one's resources and ability to deal with a stressful situation (Folkman, 1984). It was of particular interest to identify whether appraisals of situational control are associated with attenuation or exacerbation of stress responses. That is, perception of control over situational outcomes can be perceived as either positive (e.g., possibility for mastery), or negative (e.g., demand for active coping efforts). Patients were asked to rate their perceptions of personal control over the hospital event on an 8-point scale, with 1 representing "No Control" and 8 "A Great Deal Of Control".

The four psycho-affective measures were presented to all patients in a fixed order: 1) MACL, 2) Appraisal Checklist, 3) Coping Checklist, and 4) Control Rating Scale. The set of hospital event ratings required approximately 5 min to complete for a given event.

Measures of Patients' Physiological Condition

Information regarding a patient's blood pressure, pulse rate, and body temperature was gathered from the hospital chart (Note 1). In general, vital signs were monitored by nursing staff at 4-hr intervals from 8 A.M. to midnight. Only patients who had undergone major cardiac surgeries were subjected to monitoring at 2-hr intervals immediately following surgery, and vital signs for all subjects tended to be monitored at 8-hr intervals immediately prior to a patient's discharge from hospital.

Patients' systolic (SBP) and diastolic (DBP) blood pressures were measured in mm Hg with the sphygamomanometer-and-cuff procedure. Radial pulse rate in beats per minute (bpm) was assessed manually. Body temperature (degrees Centigrade) was measured with an oral thermometer.

Body Mass Index

Patients' body mass indices were calculated in order to determine whether or not degree of body adiposity was associated with the physiological and recovery measures. For example, per cent body fat might affect patients' cardiovascular conditions (e.g., blood pressure) and may also impact on the rate at which cardiovascular homeostasis is regained following surgery (cf. Pollock et al., 1980). A widely accepted measure of adiposity is the Quetelet body mass index which has demonstrated good concurrent validity with hydrostatic measures of body fat (r = .71; Revicki et al., 1986). The Quetelet index is also considered an optimal measure because it correlates minimally with height and maximally with weight. Patients' weight (lb) and height (in), therefore, were recorded at admission and were entered into the calculation for the Quetelet index, with higher scores indicative of greater degree of body fat:

$$weight/(height)^2$$

Measures of Patients' Surgical Outcome

Postsurgical Stay

Length of patients' postoperative stay was recorded in hours from the time at which the surgical procedure was completed to time of discharge.

Recovery Indices

A recovery index was developed in order to assess the length of time patients needed to reach a criterion of physical restabilization following surgery. It was assumed that patients would only be discharged from hospital when their vital signs fell within acceptable ranges. Therefore, the criteria for the recovery indices were defined for each patient individually as the respective means of all SBP, DBP, pulse rate, and body temperature readings within an approximate 24-hr period prior to discharge ($\underline{M}$ = 24.5 hr; range = 10 to 38 hr). In order to compensate for variability due to measurement techniques, critical ranges were determined for each criterion mean: 1) Mean $\pm$ 4 mm Hg for SBP and DBP (Blood Pressure Study, 1980), 2) Mean $\pm$ 4 bpm for pulse rate, and 3) Mean $\pm$ .10 degree Centigrade for temperature (Note 2).

After a patient's criterion ranges were determined, means were then calculated for SBP, DBP, pulse rate, and temperature for each consecutive 12-hr period from postsurgery to discharge. For example, a patient whose length of postsurgical stay was 60 hr would have scores for five periods. The first 12-hr period in which at least three of the four measures fell within their respective critical ranges was designated Recovery Point I. Thus, patients with higher scores for Recovery Point I required more time to reach the criteria for physiological restabilization.

It was also of interest to determine whether or not a patient demonstrated a consistent course of recovery. Accordingly, Recovery Point II refers to the next 12-hr period when at least three of the four vital signs reached their respective critical ranges. The consistency

of a patient's course of physical recovery is then inversely

proportionate to the difference between Recovery Points I and II. For

example, a consistent recovery would be reflected by Recovery Points I

and II at the first and second 12-hr postsurgical periods, respectively.

A less consistent recovery would be reflected by Recovery Points I and

II at the first and fourth 12-hr postsurgical periods, respectively.

Medication

Aggregate scores. Patients' postsurgical use of narcotic and mild

analgesics, and anxiolytics was recorded. Narcotic analgesics refer to

demerol and morphine administered intramuscularly (i.m.) to control

severe postsurgical pain. Mild analgesics included acetaminophen and

aspirin, with codeine being the only narcotic in this group; these

analgesics were given orally (p.o.) to control mild and moderate

postsurgical pain. Anxiolytics refer to minor tranquilizers and

sedative drugs (all p.o. benzodiazepenes) and included Valium

(diazepam), Ativan (lorazepam), and Halcion (triazolam).

For each of the three categories of medications, equivalence

standards were used to permit comparison across different types of drugs

and across patients (Table 3). The standards for comparison across

narcotics, mild analgesics, and benzodiazepenes were demerol,

acetaminophen, and valium, respectively. For example, in regard to

narcotic anaglesics, a 75 mg. i.m. dose of demerol is equivalent to 10

mg i.m. morphine (Table 3; American Pain Society, 1987). Using demerol

as a standard of comparison, the potency ratio of 75 mg demerol is 1

(i.e., 75/75) while the potency ratio for morphine is 7.5 (i.e., 75/10).

In other words, morphine is 7.5 times more potent than demerol. The

Table 3

Equivalence Doses for Narcotics, Analgesics, and Anxiolytics

Drug Classification	Name	Equivalence Dose (mg)
1) Narcotics (i.m.)	Morphine	10
	Demerol	75
2) Analgesics (p.o)	Acetaminophen	650
	Aspirin	650
	Codeine	60
3) Anxiolytics (p.o)	Diazepam	5
	Ativan	1
	Halcion	0.5

Note. Demerol, acetaminophen, and diazepam served as the standards of comparison for the narcotic analgesics, mild analgesic, and anxiolytics, respectively. I.M. is intramuscular. P.O. is oral administration.

formula for determining the potency of X mg of demerol then is:

$$X/75 \times 1$$

The formula for determining the potency of X mg of morphine is:

$$X/10 \times 7.5$$

A Narcotic Analgesic Aggregate score for total postsurgical use of narcotics was calculated by summing the potency scores from each administration of both demerol and morphine to the individual patient. The aggregate score, therefore, reflected both potency and incidence of postoperative use of narcotics.

Mild Analgesic and Anxiolytic Aggregate scores were similarly derived, and all scores were rounded off to the nearest whole number (Table 3). The only complication in the calculation of potency scores was for the use of Empracet, a mild analgesic that also contains codeine. As an example, a patient who was given Empracet 30 on three occasions would be scored in the following manner. Empracet 30 contains 300 mg acetaminophen and 30 mg codeine (Compendium of Pharmaceutical Specialties, 1988). Hence, the potency ratio for a single administration is calculated as 0.5 for acetaminophen (i.e., 300/650 x 1) plus 5.5 for codeine (i.e., 30/60 x 11) for a total potency score of 6.0. Three administrations of the same dosage of Empracet 30 would result in a Mild Analgesic Aggregate score of 18 (i.e., 6.0 x 3).

Duration of medication use. In regard to all three classes of medications, a separate index for duration of use was also recorded in hours from completion of surgery to the last administration. This index provided information about length of time that a patient required medications following surgery.

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$$X/10 \times 7.5$$

A Narcotic Analgesic Aggregate score for total postsurgical use of narcotics was calculated by summing the potency scores from each administration of both demerol and morphine to the individual patient. The aggregate score, therefore, reflected both potency and incidence of postoperative use of narcotics.

Mild Analgesic and Anxiolytic Aggregate scores were similarly derived, and all scores were rounded off to the nearest whole number (Table 3). The only complication in the calculation of potency scores was for the use of Empracet, a mild analgesic that also contains codeine. As an example, a patient who was given Empracet 30 on three occasions would be scored in the following manner. Empracet 30 contains 300 mg acetaminophen and 30 mg codeine (Compendium of Pharmaceutical Specialties, 1988). Hence, the potency ratio for a single administration is calculated as 0.5 for acetaminophen (i.e., 300/650 x 1) plus 5.5 for codeine (i.e., 30/60 x 11) for a total potency score of 6.0. Three administrations of the same dosage of Empracet 30 would result in a Mild Analgesic Aggregate score of 18 (i.e., 6.0 x 3).

Duration of medication use. In regard to all three classes of medications, a separate index for duration of use was also recorded in hours from completion of surgery to the last administration. This index provided information about length of time that a patient required medications following surgery.

Other medications.   It was also of interest to examine patients'

postsurgical use of three major classes of medications: 1) antibiotics

(e.g., Keflex, Kefzol), 2) anticoagulants (e.g., Heparin, Hepalean), and

3) antiemetics (e.g., scopolamine). Although equivalence standards were

unavailable for these medication groups, the dose per administration was

generally standard across patients (e.g., 500 mg Keflex; 5000 units

Heparin; 2 mg scopolamine). Therefore, incidence (i.e., total number of

administrations) and duration (in hours) of postsurgical use of

antibiotics, anticoagulants, and antiemetics were recorded for each

patient.

Complications and Complaints

Information regarding patients' postsurgical complications and

complaints was obtained from staff's daily charting. Patients'

complaints were noted only if they led to some form of treatment (e.g.,

medication). Overscoring was avoided by noting when complications and

complaints were associated with the same situation, in which case the

incident was recorded only once. The two general classifications were:

1) Pain, and 2) Other Complications. The latter category included

postsurgical difficulties related to nausea, urinary retention,

constipation/diarrhea, fever, and any other complaints not associated

with pain (e.g., insomnia). Three measures for each category were

recorded: 1) onset (in hours) from postsurgery to the first incident of

complication or complaint, 2) duration (in hours) from the first to the

last incident, and 3) incidence (total number) of complications or

complaints.

Staff Observations

Patients' courses of recovery were rated by the staff. At time of discharge from hospital, the patient's doctor and primary nurse were presented the Staff Rating of Patient's Recovery sheet (Appendix H). They were asked to rate their patient's outcome in comparison to the recovery of other patients they had treated for similar surgical procedures. The three recovery adjectives were presented on 8-point scales, ranging from "Not Difficult" to "Extremely Difficult", "No Complications" to "Many Complications", and "Not Slow" to "Extremely Slow", respectively. Higher scores on each scale indicated poorer recovery.

Procedure

All patients were assessed once prior to admission and three times during their hospitalization (Table 4).

Pre-admission

Participants were solicited at the pre-admission clinic an average of 18.1 days before hospitalization. Individuals who expressed interest when approached by the experimenter were presented the consent form and invited to ask any questions that they might have regarding the study. Patients who agreed to participate were then asked to sign the consent form. At this time, they also completed the Background Information Sheet and provided information regarding the reason for their upcoming surgery and, if available, the scheduled date of their admission.

At pre-admission, patients completed the first assessment regarding a hospital event. Since subjects had not yet been hospitalized at this point, they were only provided the preselected event (i.e., the thought

Table 4

Procedural Flow-Chart

	Pre-admission	Admission	Postsurgery	Discharge
Assessment Period:	-Consent Form -Background Information Sheet -Social Support Rating			-Social Support Rating
Hospital Event:	Preselected (Pain)	-Preselected (Pain) -Most Unpleasant -Least Unpleasant	-Preselected (Pain) -Most Unpleasant -Least Unpleasant	-Preselected (Pain) -Most Unpleasant -Least Unpleasant
Psycho-affective Measures:	-Mood Checklist -Appraisal Form -Coping Checklist -Control Scale	-Mood Checklist -Appraisal Form -Coping Checklist -Control Scale	-Mood Checklist -Appraisal Form -Coping Checklist -Control Scale	-Mood Checklist -Appraisal Form -Coping Checklist -Control Scale
Physiological and Recovery Measures		-Vital Signs -Medication Use -Complications	-Vital Signs -Medication Use -Complications	-Vital Signs -Medication Use -Complications -Staff Ratings of Patient's Recovery

Individual Differences Measures (Take-Home):
-Health Locus of Control - Revised
-State-Trait Anxiety Inventory-Trait Form
-Personal Illness Questionnaire
-Self-rating Depression Scale

Note. Preselected Event - "Thought of pain associated with surgery or test procedures".

of pain). They then rated their psycho-affective (i.e., appraisal, coping, affective, and perceived control) responses relative to this event.

Following the assessment, patients were given the test package of individual differences measures (i.e., HLC-R, PIQ, STAI, and SDS) with instructions about how they should be completed at home. Specifically, they were told to set an hour aside to complete the entire test package, and to respond to all items in an open, straightforward manner. A self-addressed, stamped envelope was provided so that they could return the test package prior to admission. Finally, in order to ensure that all participants were interviewed upon admission, the experimenter requested permission to maintain telephone contact with each individual around their scheduled date of admission. The pre-admission interview required approximately 30 min and was completed prior to the presurgical examination by medical staff.

Admission

Upon admission, each participant was given time to settle into their room and accomodate to the hospital environment. There was an average of 19.5 hr (range = 3 to 99 hr) between time of admission and the first in-hospital assessment. During the admission interview, each participant was first presented the preselected pain event and asked to complete the four psycho-affective measures. They were then asked to identify and describe the most and least unpleasant events that they had encountered since being admitted to hospital and to provide retrospective reports of their psycho-affective responses for each event. Finally, they rank-ordered the three events from least to most

unpleasant. The admission interview was conducted an average of 24.3 hr

prior to surgery (range = 1 to 145 hr).

Postsurgery

The postsurgery assessment was conducted an average of 26.9 hr

following the completion of surgery (range = 4 to 145 hr) and only when

the participants had returned to their room. The interview followed the

same protocol as that used for the admission assessment, with the

exception that the patient was now asked to identify the most and least

unpleasant events encountered since the admission interview. If a

patient's postsurgical condition interfered .ith ability to write, the

interviewer recorded the responses.

Discharge

The discharge assessment was conducted an average of 66.1 hr after

the postsurgery interview (range = 4 to 243 hr) and an average of

16.1 hr prior to discharge (range = 1 to 144 hr). This assessment

followed the same protocol as the two previous interviews, except that

the participant was asked to identify the most and least unpleasant

events encountered since the postsurgery assessment. The patient

completed psycho-affective reports for each of the three hospital events

and then rated level of satisfaction with social support received to

help them deal with the hospitalization. At the end of this interview,

patients were invited to ask questions or express concerns regarding the

study and were thanked for their participation.

Results

The statistical analyses were accomplished in four steps. First,

descriptive statistics were generated to provide information about

sample characteristics and patients' hospitalization experiences.
Subsequent analyses were guided by the two main objectives of this
study. First, in order to identify types and patterns of coping
responses reported by patients during surgical hospitalization,
nonparametric analyses were performed on the frequency scores for coping
endorsements across assessment periods. Secondly, path analyses were
conducted to examine the relationship between patients' psycho-affective
responses to stressors at various stages of their hospitalization and
their psychophysiological adaptation. Specifically, linear structural
relations (LISREL) analyses were used to identify paths among constructs
representing psycho-affective responses and outcome. Finally, it was of
interest to examine outcome among patients who demonstrated consistency
in their endorsement of psycho-affective responses across the assessment
periods. Whereas the path analyses examined outcome associated with
psycho-affective responses for specific assessment periods, this final
set of analyses focused on psychophysiological adaptation associated
with coping stability.

A preliminary analysis was applied to all variables to identify
extreme values (outliers) in the data set. Univariate outliers were
identified via a tabulation of the number of extreme standardized scores
for each continuous variable, using a cut-off of $\pm$ 3.00 (Tabachnick and
Fidell, 1983). The maximum number of subjects with extreme scores for
any variable was three, which translates to a maximum proportion of 4.0%
(i.e., 3/75). This was considered a relatively acceptable proportion of
outliers that would not duly influence the analyses (cf. Cohen and
Cohen, 1983).

Given the primary focus of the study on the relationship between coping and outcome, multivariate outliers were examined within groups of subjects based on coping endorsement. Separate discriminant function analyses were conducted on physiological and recovery variables for each coping group identified in each assessment period. Outliers were defined as cases with a significant Mahalanobis D value, based on comparison to a critical X^2 value with degrees of freedom equal to 32, the number of outcome variables (Tabachnick and Fidell, 1983). These analyses did not indicate significant multivariate outliers within the sample.

Sample Characteristics

Descriptive statistics were calculated from the demographic and individual differences variables. The means, standard deviations, and ranges for these variables are presented in Table 5. Examination of these statistics shows that the sample is comprised of relatively middle-aged individuals who have more than a high school education. T-test comparisons reveal no significant differences in the mean ages of participants, those who refused participation (mean age = 53.5 years), and subjects eliminated from the study (mean age = 48.8 years); all $p >$ .05. Additional frequency tabulations reveal that 50 of the patients were either married or in common-law relationships (66.7%), while 17 (22.7%) were single and 8 (10.6%) were either widowed, separated, or divorced. In comparison with published norms, this sample typically reported a moderate level of trait anxiety (Wallace, 1987) and a minimal level of depression (Zung, 1974). The present sample scored lower on all three dimensions of the HLC-R scale than did Larde and Clopton's

Table 5

Descriptive Statistics for Demographic and Individual Differences Variables

Variable	Mean	Standard Deviation	Range (min-max)
Demographic			
Age	48.8	14.7	20-70
Education (yr)	14.4	4.4	6-26
Individual Differences[a]			
State-Trait Anxiety Inventory			
- Trait Form	37.7	9.6	22-73
Self-rating Depression Scale	43.3	8.5	28-66
Health Locus of Control - Revised			
-Internal	24.2	4.5	12-34
-Powerful Others	20.6	6.0	7-35
-Chance	17.4	6.2	6-36
Personal Illness Questionnaire			
-Medical Procedure Fear	0.8	1.1	0-4
-Disease Fear	1.1	1.2	0-4
-Somatic Sensitivity	1.2	1.0	0-4

[a] One patient did not complete the test battery, n = 74.

sample of 24 cholecystectomy patients, and both samples scored

relatively higher on Internal than on the Powerful Others and Chance

items. The present sample also reported minimal fear associated with

medical procedures.

Previous Hospitalization

Descriptive statistics that were calculated for the variables

reflecting previous hospitalization are summarized in Table 6. A total

of 64 patients (85%) reported previous surgical hospitalizations, 30

(40%) had medical admissions, and 26 (35%) patients within these two

groups had a history of both medical and surgical admissions.

Examination of the mean number of all previous admissions also indicates

that the participants generally had more experience with surgical than

medical hospitalizations.

In regard to most recent hospitalizations, patients were generally

able to recall the years rather than exact dates of admissions prior to

the last decade. Accordingly, the time between patients' last surgical

or medical admission and the Pre-admission assessment was coded in 6-

month periods in order to provide an ordinal measure of elapsed time.

For example, an individual whose most recent admission was 12 months ago

is given a score of 2 (i.e., 12/6) whereas a patient whose last

hospitalization was 10 yr ago receives a score of 20 (i.e., 120/6).

Scores based on this calculation indicate that patients' most recent

surgical or medical admissions occurred an average of 7 yr prior to the

current hospitalization. These admissions were rated as being

relatively more unpleasant than difficult, however, the absolute mean

scores for both variables indicate that participants did not rate

Table 6

Descriptive Statistics for Previous and Present Hospitalization Variables

Variable		Mean	Standard Deviation	Range (min-max)
Previous Hospitalizations				
Number of Admissions[a]				
More than 10 Years Ago	-Surgical	1.7	2.8	0-17
	-Medical	0.2	0.5	0-2
Within the Preceding 10 Years	-Surgical	0.9	1.4	0-7
	-Medical	0.4	0.8	0-5
Total Number of Admissions	-Surgical	2.6	3.5	0-20
	-Medical	0.6	0.9	0-5
Most Recent Admission[b]				
Time Since Last Admission (6-month periods)	-Surgical	13.6	7.4	1-20
	-Medical	12.9	7.7	1-20
Duration of Stay (days)	-Surgical	10.2	10.6	2-53
	-Medical	10.5	8.2	1-28
Degree of Difficulty	-Surgical	2.7	2.0	1-8
	-Medical	3.0	2.2	1-8
Degree of Unpleasantness	-Surgical	3.9	2.5	1-8
	-Medical	3.6	2.2	1-8
Present Hospitalization				
Duration of Surgical Procedure (min)		80.4	61.6	10-335
Social Support[c] -Pre-admission		1.8	1.4	1-6
-Discharge		1.5	1.2	1-6
-Difference Score[d]		-0.3	1.5	I-5I -4

[a]For number of admissions, surgical group $\underline{n}$ = 64 and medical group $\underline{n}$ = 30. [b]For most recent admission, surgical group $\underline{n}$ = 33 and medical group $\underline{n}$ = 18. [c]Lower social support ratings = greater satisfaction. [d]Social Support Difference score = Discharge score - Pre-admission score.

previous hospital stays as particularly stressful. Finally, among the majority of this sample, the reason for their most recent hospitalization was unrelated (86%) rather than related (14%) to the problem associated with the present admission.

Present Hospitalization

Descriptive statistics for variables regarding patients' current hospitalization are also presented in Table 6. Although the duration of surgery averaged approximately 80 min, results from a one-way analysis of variance (ANOVA) indicate that cardiac surgery required the longest duration ($\underline{M}$ = 231 min), $\underline{F}$ (5,69) = 12.92, $\underline{p}$ < .001. Cross-tabulation analysis reveals that a predominant number of patients who underwent either urinary or hernia repair surgery were male (88% and 93%, respectively) while the majority of individuals who had musculoskeletal surgery were female (69%), X^2 (5) = 17.2, $\underline{p}$ < .01. The majority of all patients were administered either a general anesthetic (62%) or spinal block (25%) while few individuals were given either an epidural (8%) or nerve block (5%).

In regard to patients' social environment, the majority of subjects were housed in four-bed wards (67%) as opposed to private rooms (33%). Examination of Table 6 shows that, in general, patients were extremely satisfied with the support they received from family and friends to help them deal with their hospital stay. Moreover, there was no significant difference in patients' ratings of satisfaction with their social supports at pre-admission and at discharge (correlated $\underline{t}$ (1,74) = 1.67, $\underline{p}$ > .05).

Relationships Among Demographic, Individual Differences, and
Hospitalization Variables

Correlational analyses and cross-tabulations were conducted in
order to examine relationships among the demographic, individual
differences, and hospitalization variables. Given the large number of
analyses, a Bonferroni adjustment was made to minimize the Type I error
rate (Hays, 1981). Specifically, a critical alpha level was calculated
by dividing a p-value of .05 (two-tailed) by the number of correlation
coefficients calculated for a given variable.

In regard to correlational analyses among the eight individual
differences variables, the most consistent associations were found
between the STAI-trait scores and other psychometric measures, as
summarized in Table 7. Examination of this table reveals that patients
who reported high levels of trait anxiety endorsed more symptoms of
depression. High trait-anxious individuals also reported more fear
about undergoing medical procedures and contracting diseases, and they
reported greater awareness of stress-related physical symptoms. Further
examination of Table 7 shows that belief in powerful others as important
determinants of one's own health was more strongly endorsed by older
participants, males, and patients with lower levels of education.

Descriptive Analyses of Patients' Psycho-affective Responses
to Hospital Events

Before examining the types of coping strategies reported by
patients, it was of interest to first provide descriptive summaries of
event classifications, cognitive appraisals, affective responses, and
control ratings for the preselected pain and self-selected events.
Since the focus of the study was on patients' responses to stressful

Table 7

Summary of Bivariate Correlation Coefficients Among Demographic, Personality, and
Hospitalization Variables

	Age	Sex[d]	Education	State-Trait Anxiety Inventory (Trait Form)
Personality[a]				
State-Trait Anxiety Inventory				
-Trait Form	-.12	-.09	.08	-
Self-rating Depression Scale	.06	-.08	-.05	.72*
Health Locus of Control - Revised				
-Internal	-.09	.05	-.12	-.11
-Powerful Other	.41*	-.29*	-.51*	.04
-Chance	.15	-.20	-.19	.27
Personal Illness Questionnaire				
-Medical Procedure Fear	-.16	.05	.07	.36*
-Disease Fear	.27	-.17	-.12	.30*
-Somatic Sensitivity	-.03	-.12	-.09	.52*
No. of Previous Hospitalizations				
Surgical[b]	.32*	.07	-.32*	.01
Medical[c]	.30*	-.03	-.09	.09

[a] One patient did not complete the test battery, $n = 74$. [b] $n = 64$. [c] $n = 30$.
[d] Male = 0/Female = 1.

*$p \leq .01$, two-tailed (group-wise Bonferonni adjustment).

events, data regarding patients' responses to the least unpleasant events were considered primarily as a comparative basis from which to assess their responses to pain and the most unpleasant situations.

Initially, it was important to determine whether or not the type of surgery that patients underwent influenced their reports of events and coping responses. Accordingly, chi-square analyses were conducted to assess relationships between type of surgery, and event and coping variables for each period. Results from the 36 analyses reveal only one significant relationship between type of surgery and coping focus for the most unpleasant event at postsurgery, x^2 (10) = 19.26, p < .05, Cramer's V = .36. The overall absence of association between type of surgery and patients' reports of hospital events is consistent with the basic assumption that most hospitalized individuals encounter and deal with a common set of experiences.

Event Categories

Patients provided a total of 225 most unpleasant and 225 least unpleasant events, which were subsequently categorized by three raters. Cohen's (1960) kappas were calculated to assess the initial levels of agreement between each pair of raters across the two interpersonal and eight situation category codes. In regard to the interpersonal coding, the kappas for each pair of raters were .64, .71, and .86, which indicate significantly high levels of interrater agreement (all p < .01). The pair-wise kappas for situation coding were .63, .83, and .92, also indicating high interrater agreement (all p < .01). Final decision regarding interpersonal and situation categories was based on the agreement of at least two of the three raters. In cases where all

three judges disagreed on a situation code, they were asked to provide

an alternate category and this procedure always resulted in agreement

between a minimum of two raters. Initial ratings determined 100% of the

interpersonal and 94% of the situation classifications.

Percentages of self-selected situations in the interpersonal and

non-interpersonal categories for the most unpleasant events are

presented in Figure 1. Overall, the most unpleasant events were more

frequently of the non-interpersonal type. Cochran's Q test, a

nonparametric test for analysis of repeated measures (Hays, 1981), was

used to determine whether or not these classifications varied

significantly across successive periods. Results from the analysis show

that the proportion of interpersonal/non-interpersonal events

significantly increased between admission and postsurgical periods

(Cochran's Q (2) = 9.30, $p < .01$).

Frequency of specific situation classifications for the most

unpleasant events are summarized in Figure 2. Cochran's Q tests

indicate significant changes over period in the frequencies of

Environmental Restriction (Cochran's Q (2) = 17.88, $p < .001$) and

Personal Demand situations (Cochran's Q (2) = 17.02, $p < .001$).

Specifically, Environmental Restriction tended to decrease in frequency

from admission to discharge while Personal Demand was more prevalent

following surgery. The relatively low frequency of Personal Limitation

over all periods is also notable.

Positive-valence event categories are not represented in Figure 2

due to low frequencies, the highest being 3% of most unpleasant events

at admission being classified as Personal Demand/Limitation Removed.

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Figure 1

Percentages of Interpersonal Categories for

Most Unpleasant Events

($N = 75$)
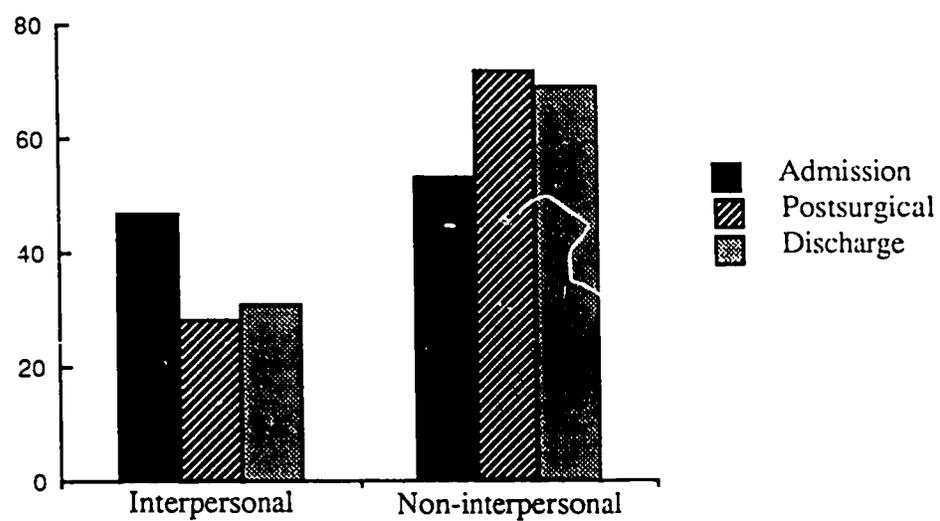
Figure 2

Percentages of Situation Categories for Most Unpleasant Events ($\underline{N}$ = 75)
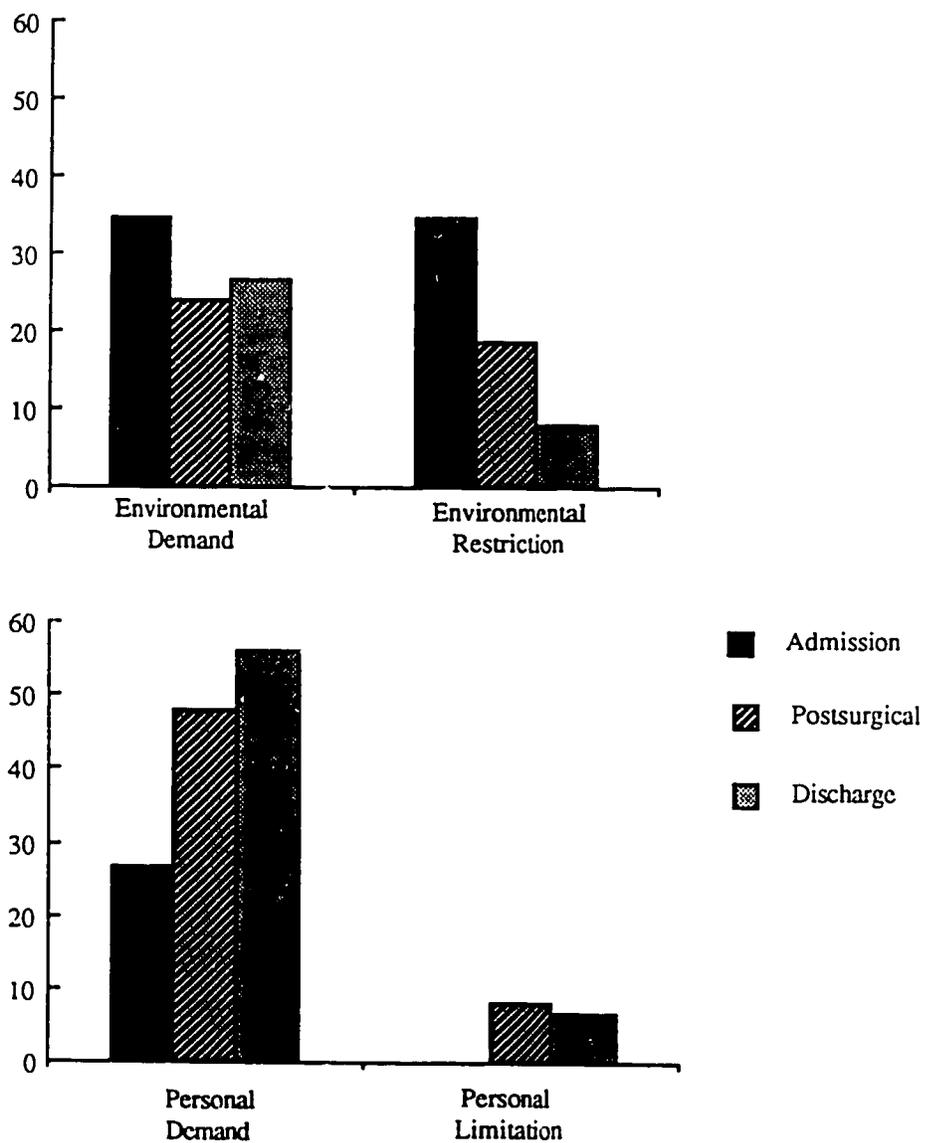
Conversely, a greater proportion of all least unpleasant events were categorized as positive-valence (80%) rather than negative-valence (20%) situations. Hence, there was good correspondence between the raters' and patients' judgements of situation valence.

Patients' own rankings of unpleasantness for the pain and two self-selected events also reflect good differentiation between the positive and negative valence of these situations (Table 8). That is, across periods, patients' least unpleasant events were almost always ranked as the least unpleasant event and the most unpleasant events were typically rated as most unpleasant among the three situations. It is notable that patients' self-selected most unpleasant event ranked as more unpleasant than the preselected pain situation across all periods. The greatest amount of variation in ranking was associated with the pain event which became less unpleasant over time for many patients.

Patients' Cognitive Appraisals of Events

Patients' reported cognitive appraisals of the pain and most unpleasant events are summarized in Figure 3. Overall, the majority of patients perceived these events as challenges. Appraisals of the least unpleasant events were also characterized by a high proportion of challenge endorsements (73% to 79%) across all periods. Results from Cochran's Q tests show that, in regard to the pain situation, more patients endorsed a threat appraisal prior to than following the surgical procedure (Cochran's Q (3) = 20.40, p < .01). Conversely, more patients endorsed a harm appraisal of the pain situation following than prior to the procedure (Cochran's Q (3) = 16.01, p < .01). Similarly, more patients endorsed a harm appraisal of the most unpleasant event

Table 8

Proportion of Patients' Rankings Regarding Degree of Unpleasantness for the Pain and Self-Selected Hospital Events ($\underline{N} = 75$)

Degree of Unpleasantness

Event Type:	Admission			Postsurgery			Discharge		
	Least	Intermediate	Most	Least	Intermediate	Most	Least	Intermediate	Most
Self-Selected									
Least Unpleasant	93.3	6.7	0.0	92.0	8.0	0.0	86.7	13.3	0.0
Preselected (Pain)	6.7	50.6	42.7	8.0	58.7	33.3	13.3	60.0	26.7
Self-Selected									
Most Unpleasant	0.0	42.7	57.3	0.0	33.3	66.7	0.0	26.7	73.3

Figure 3

Percentages of Patients' Cognitive Appraisal Endorsements
($\underline{N}$ = 75)

Pain

Most Unpleasant Event
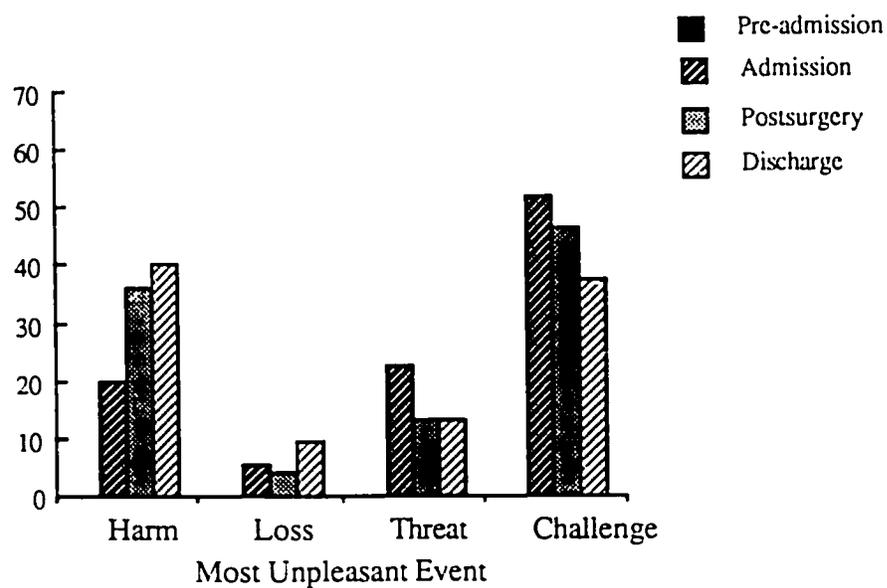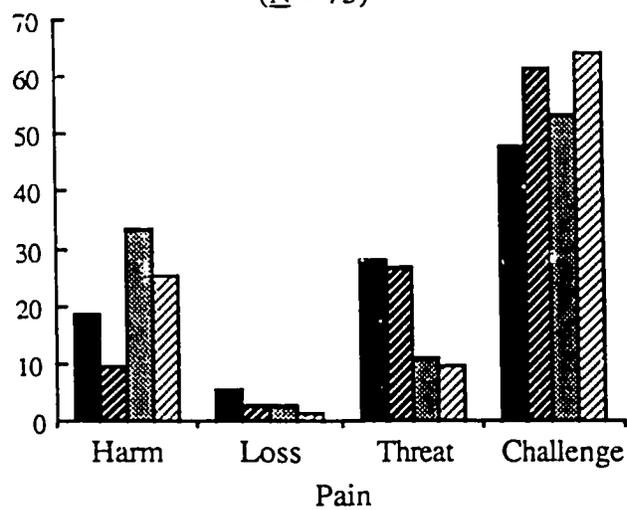
following than prior to the procedure (Cochran's Q (2) = 9.45, p < .05).

<u>Patients' Affective Responses to Events</u>

Means for the six mood factors associated with the pain and most unpleasant events across all periods are presented in Figures 4 and 5, respectively. For clarity, the four affect indices and two energy-related variables are summarized separately. Examination of the mean scores indicates that patients generally rated their affective responses on the lower end of the mood scales, maximum score for each factor being 16.

Correlated t tests were conducted to compare mood-factor scores pertaining to the pain and most unpleasant events with scores for the least unpleasant situations. A group-wise Bonferroni adjustment was used to reduce the Type I error rate for each set of analyses pertaining to the six mood factors. Results reveal that patients reported higher levels of energy in response to the least unpleasant events than to both pain (t (1,74) = -3.79 to -4.08, all p < .01) and most unpleasant situations (t (1,74) = -5.69 to -8.04, all p < .01). Moreover, all the negative mood descriptors (i.e., anxiety, anger, sadness, hopelessness) were rated higher for pain (t (1,74) = 2.99 to 6.21, all p < .01) and most unpleasant events (t (1,74) = 4.34 to 7.85, all p < .01) than for the least unpleasant situations. Thus, patients' affective ratings were consistent with the global affective valence of the situations.

It is also of interest that patients tended to report more negative affective responses to the most unpleasant events than to pain. For example, across all in-hospital periods, patients reported more anger (t (1,74) = -4.00 to -4.95, all p < .01) and hopelessness (t (1,74) =

Figure 4

Mean Mood Factor Scores for Pain ($\underline{N}$ = 75)

Anxiety
Anger
Sadness
Hopelessness

Energy
Fatigue
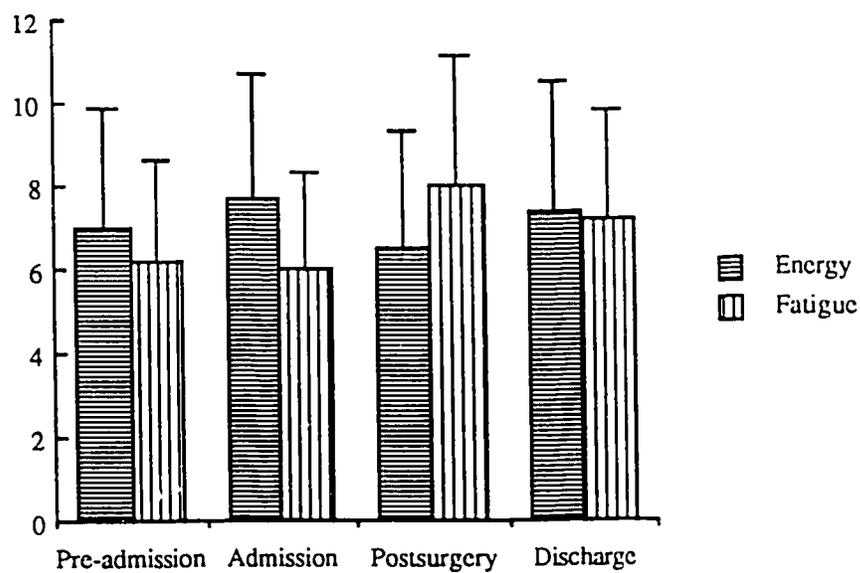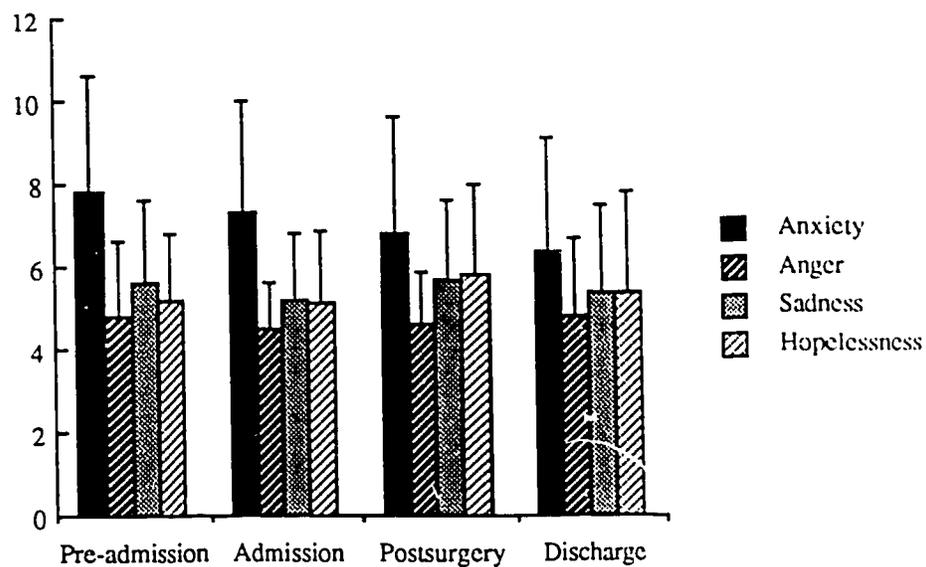
Figure 5

Mean Mood Factor Scores for Most Unpleasant Events (N = 75)
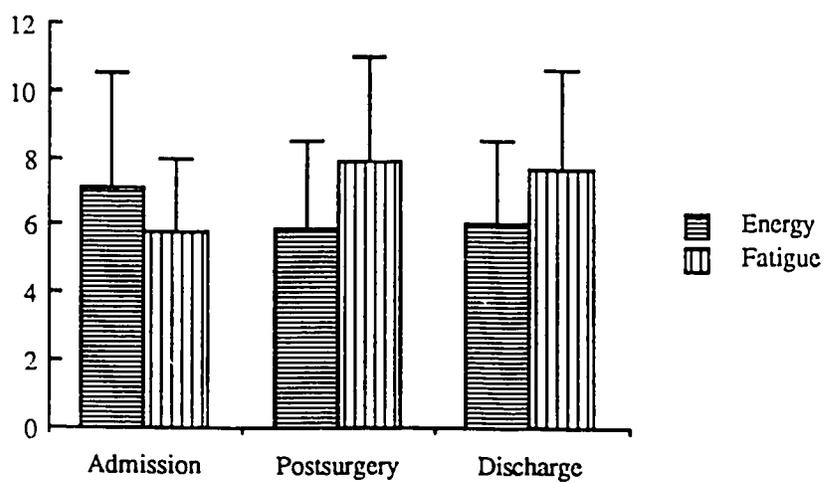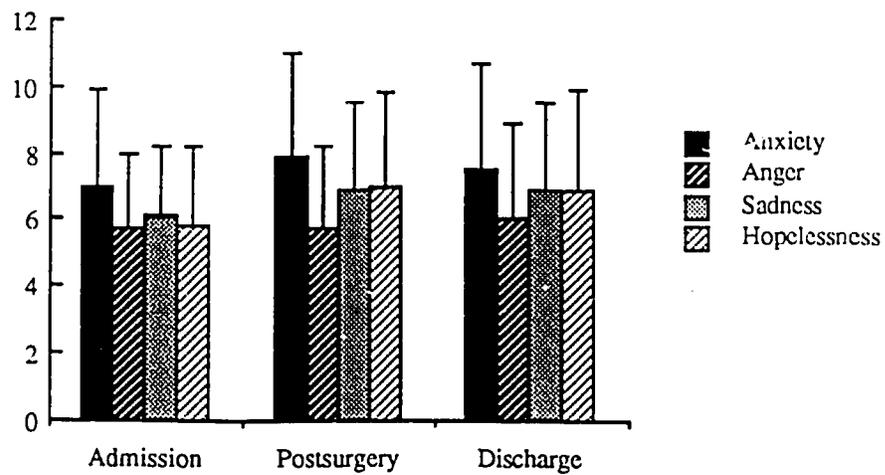
-3.35 to -4.67, all p < .01) about the most unpleasant events. Patients

also reported more anxiety in regard to the most unpleasant event at

postsurgery (t (1,74) = -3.99, p < .01) and at discharge (t (1,74) =

-4.08, p < .01).

Patients' Ratings of Situational Control

Means and standard deviations for patients' control ratings

regarding pain and the most unpleasant events are presented in Figure 6.

Correlated t tests, with a group-wise Bonferroni adjustment of the

critical alpha level, reveal that patients rated lower control in regard

to the most compared to the least unpleasant events across all in-

hospital periods (t (1,74) = -3.64 to -6.45, all p < .01). Patients

also reported less control in response to the most unpleasant events

than to pain (t (1,74) = 3.17 to 4.67, all p < .01). No significant

differences were found in patients' ratings of control regarding pain

and the least unpleasant events (all p > .02).

Patients' Coping Responses to Hospital Events

Frequencies of patients' endorsements for coping method and focus

regarding pain and the most unpleasant events are summarized in Figures

7 and 8, respectively. In general, most patients endorsed a cognitive

coping method to deal with pain but demonstrated more variability in

their selection of coping methods for the most unpleasant events.

Cochran's Q tests reveal no significant variability across periods in

coping method endorsements for both pain and the most unpleasant events

(all p > .05).

Coping Focus for Pain

In regard to coping focus for pain, more patients endorsed an

Figure

Mean Situational Control Ratings for Pain
and Most Unpleasant Events ($\underline{N}$ = 75)
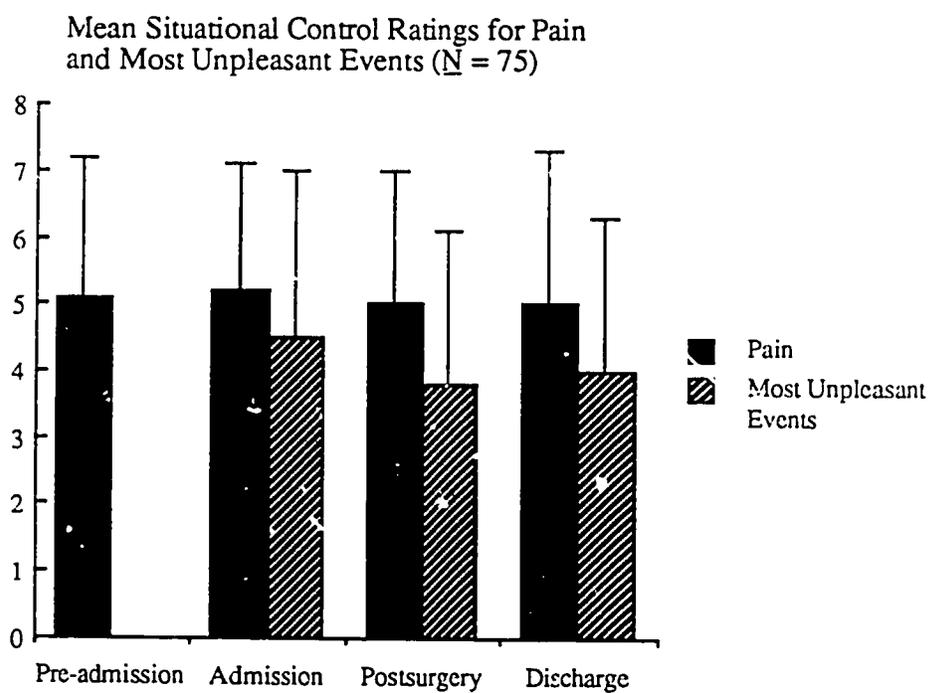
Figure 7

Percentages of Patients Coping Method Endorsements
($\underline{N} = 75$)

Pain

Most Unpleasant Event

■ Pre-admission
▨ Admission
▨ Postsurgery
▨ Discharge
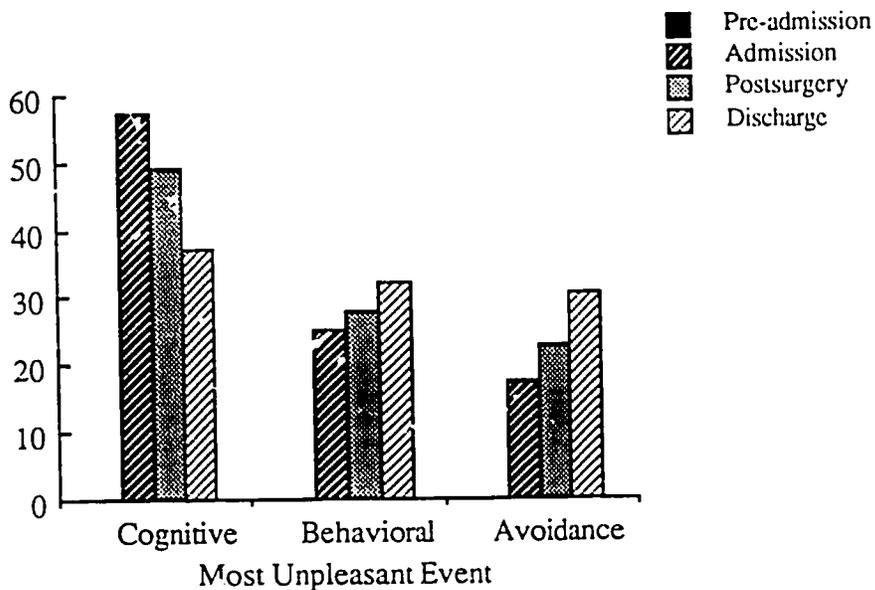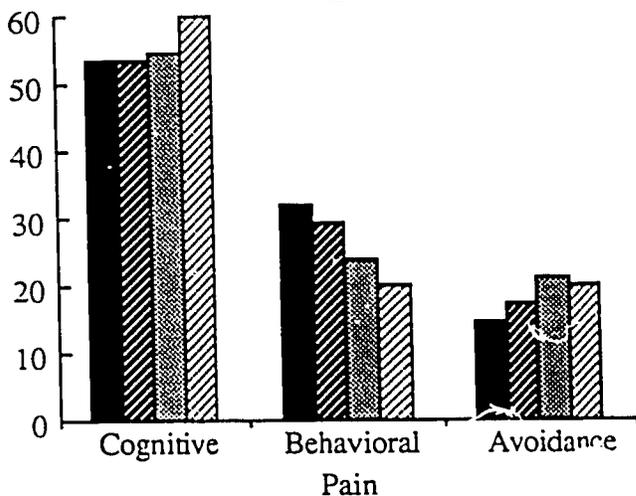
Figure 8

Percentages of Patients' Coping Focus Endorsements
($\underline{N}$ = 15)

Pain

Most Unpleasant Event

Pre-admission
Admission
Postsurgery
Discharge
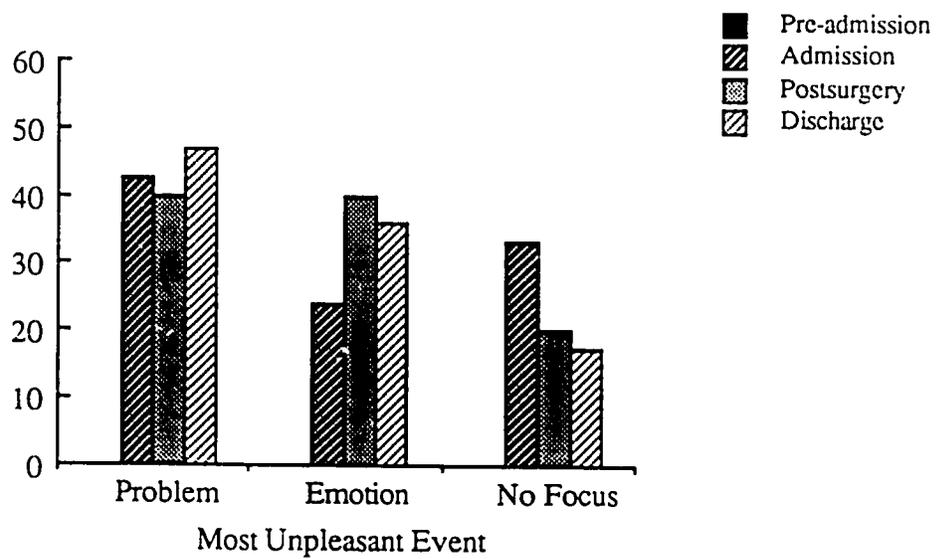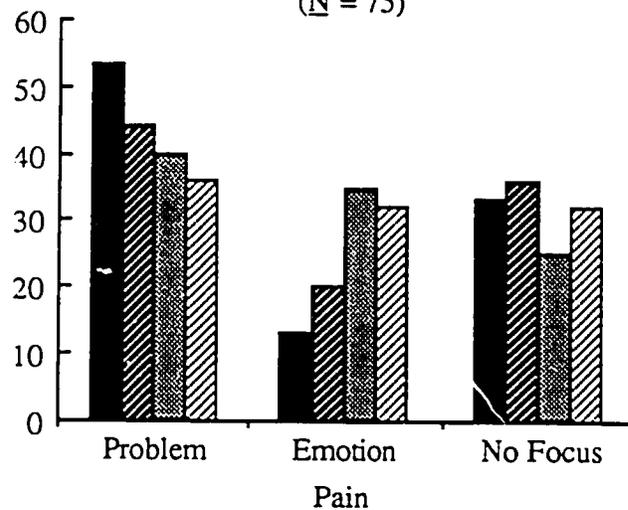
emotional coping focus following than prior to surgery (Cochran's Q (3) = 16.39, p < .01). In order to identify factors that might explain the shift in emotion-focused coping, an investigation was made for parallel changes in patients' cognitive appraisals, affective responses, and ratings of situational control regarding pain. Results show that more patients tended to endorse a threat appraisal prior to than following the surgical procedure (Cochran's Q (3) = 20.40, p < .01). Conversely, more patients endorsed a harm appraisal following than prior to the procedure (Cochran's Q (3) = 16.01, p < .01). Chi-square analyses, however, reveal no significant associations between coping focus and cognitive appraisal.

In regard to parallel changes in patients' affective responses to pain, mood scores were entered in a one-way within-subject repeated measures analysis. Mood scores were entered in a stepdown order based on theoretical interest, the sequence from first to last variable being anxiety, sadness, anger, fatigue, energy, and hopelessness. A Scheffe-type adjustment was applied to all post-hoc comparisons (Footnote 2). Significant across-period findings are presented in Table 9 (multivariate summary Table I-1). Overall, patients tended to report less anxiety but more sadness about the pain experience following surgery. Moreover, patients reported more fatigue immediately following the surgical procedure.

In a separate univariate repeated-measures analysis, no significant differences were found in patients' ratings of situational control across periods (F (3,222) = 0.44, p > .05). In addition, results from correlational analyses of within-period relationships reveal no

Table 9

Summary of Significant Across-Period Differences in Mood Factor Scores for Pain Event
($\underline{N}$ = 75)

Period

	Pre-admission	Admission	Postsurgery	Discharge
Anxiety	7.8^a	7.3^{ab}	6.8^b	6.4^c
Sadness	5.6^{ab}	5.2^a	5.7^b	5.4^{ab}
Fatigue	6.2^{acd}	6.0^{ac}	8.0^b	7.1^{ad}

Means with different letters differ significantly (p $\leq$ .05).

*$\underline{p}$ < .05. **$\underline{p}$ < .01.

Significant post-hoc comparisons for

Anxiety: a vs. b F (3, 222) = 9.16*

ab vs. c F (3, 222) = 18.50*

ab vs. c F (3, 222) = 8.06*

Sadness: a vs. b F (3, 222) = 9.08*

Fatigue: acd vs. b F (3, 222) = 22.27**

ac vs. b F (= 38.77**

ac vs. ad . ..·   ) = 15.35**

b vs. ad F (3, 222) = 8.06*

significant association between emotion-focus endorsements and affective ratings for pain (all $p > .01$).

Thus, a pattern of parallel changes appears to exist across patients' coping focus, appraisal, and affective responses to pain. Specifically, patients tended to perceive postsurgical pain as a harmful and tiring experience. However, analyses revealed no significant associations between coping focus and both cognitive appraisal and mood variables. It appears, then, that patients' coping focus, appraisal, and affective responses to pain followed parallel but unrelated courses across assessment periods.

Coping Focus for Most Unpleasant Events

In regard to the self-selected most unpleasant events, more patients endorsed an emotion focus in the postsurgical and discharge periods as compared to pre-admission (Cochran's Q (2) = 6.16, $p < .05$). Conversely, fewer patients endorsed no focus for the most unpleasant events following than prior to surgery (Cochran's Q (2) = 8.86, $p < .02$). Again, it was of interest to identify parallel and potentially interrelated changes in patients' responses to the most unpleasant events.

Results from chi-square analyses reveal that coping-focus endorsements and situation categories were significantly associated at admission (x^2 (8) = 15.97, $p < .05$, Cramer's V = .33). That is, more patients endorsed No Focus in regard to Environmental Restrictions than any other situation category. The lower frequency of No Focus endorsements following surgery parallel the earlier reported decrease of Environmental Restrictions across assessment periods. No significant

associations were found between coping focus and either coping method or appraisal endorsements.

Significant post-hoc comparisons from a stepdown one-way within-subject repeated measures analysis for mood scores are presented in Table 10 (summary Table I-2). Patients tended to report higher levels of anxiety and fatigue postsurgery, findings that are consistent with the evidence that more patients reported a focus on how they felt following surgery. Results from point-biserial correlational analyses indicate expected, albeit nonsignificant, associations between Emotion-focused coping and Fatigue at postsurgery (r (73) = .27, $\underline{p}$ > .01). Similarly, the negative association of No Focus coping with Fatigue at postsurgery (r (73) = -.28, $\underline{p}$ > .01) and Anxiety at discharge (r (73) = -.27, $\underline{p}$ > .01) suggests that unfocused coping was incongruent with patients' acknowledgement of negative mood states following surgery. Results from a univariate repeated-measures analysis indicate no significant differences across periods in patients' perceptions of control during the most unpleasant events (F (2,148) = 2.98, p > .05).

Patients' Physiological and Surgical Outcome During Hospitalization

The primary focus of the present study was to examine whether patients' coping responses were related to their physiological status and surgical outcome during hospitalization. Linear structural relations (LISREL) path analyses were conducted to address this question, but preliminary steps were taken to reduce the large set of physiological and surgical outcome variables. The first step was to provide a descriptive summary of physiological and recovery measures

Table 10

Summary of Significant Across-Period Differences in Mood Factor Scores for the Most
Unpleasant Events (N = 75)

	Period		
	Admission	Postsurgery	Discharge
Anxiety	7.0^a	7.9^b	7.5^{ab}
Fatigue	5.8^a	7.9^b	7.7^{bc}

Means with different letters differ significantly ($p \leq .05$).

$*p \leq .05$. $**p \leq .01$.

Significant post-hoc comparisons for

Anxiety: a vs. b $F(2, 148) = 9.09*$

Fatigue: a vs. b $F(2, 148) = 37.87**$

a vs. bc $F(2, 148) = 34.49**$

across the six surgical groups of patients. Secondly, principal-component analysis was conducted to reduce the large number of outcome variables into meaningful groups for subsequent statistical tests. Third, steps were taken to determine whether or not type of surgical procedure was associated with the outcome variables and should, therefore, be treated as a covariate in subsequent analyses.

Physiological Variables

The large set of SBP, DBP, pulse, and body temperature data were summarized as 12-hr Vital Signs (Table 11). Specifically, for each of the four variables, means were calculated from data recorded during approximate 12-hr periods following admission, after surgery, and prior to discharge. The overall mean number of observations for all four physiological measures over the three periods was 1.9 for the 12-hr Vital Signs (Note 3).

Variability across periods in patients' 12-hr Vital Signs was examined via one-way within-subject repeated measures analyses (summary Table I-3). SBP preceded DBP in stepdown multivariate analyses in order to provide an adjustment for the correlations between the two sets of blood pressure values. Pulse and temperature variables were entered in separate univariate analyses. A Scheffe-type adjustment was applied to all post-hoc comparisons of differences across periods (Footnote 2). Significant results from the repeated measures analyses presented in Table 11 indicate that both SBP and DBP values were significantly higher at admission than at discharge.

Recovery Variables

Descriptive statistics for patients' recovery measures are

Table 11

Descriptive Statistics and Significant Across-Period Differences for 12-hr Vital Signs

(N = 75)

	Admission		Postsurgery		Discharge	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
12-hr Vital Signs						
Systolic Blood Pressure (mm Hg)	127.8[a]	18.1	127.1[ab]	15.9	122.8[b]	15.1
Diastolic Blood Pressure (mm Hg)	79.7[a]	10.8	76.0[ab]	9.6	75.6[b]	10.3
Pulse (bpm)	75.9	10.0	76.3	11.2	78.6	10.0
Temperature (degrees Centigrade)	36.7	0.4	36.8	0.5	36.8	0.3

Means with significantly different letters differ significantly at $p \leq .05$.

$*p \leq .05$. $**p \leq .01$.

Significant post-hoc comparisons for

12-hr SBP: a vs. b $F(1, 74) = 9.73*$

12-hr DBP: a vs. b $F(1, 74) = 10.13*$

presented in Table 12. In regard to temporal patterns in surgical

outcome, average length of postsurgical stay was 4.5 days. Patients

tended to reach their first recovery point two days following surgery,

to attain the second point one day later, and to be discharged one day

after reaching Recovery Point II. The relatively short period of time

between the two recovery periods indicates that patients generally

demonstrated a stable course of physiological restabilization.

Examination of Table 12 also reveals that patients complained of pain

sooner and for a longer time following surgery than they did in regard

to other complications. It is of interest that while patients tended to

complain of pain for less than one day following surgery, many received

mild analgesics for more than two postsurgical days. Finally,

attending surgeons and nurses tended to rate their patients' recovery

courses as minimally problematic.

Factor Analysis of Physiological and Recovery Measures

In order to reduce the large set of physiological and recovery

measures into meaningful subgroups for subsequent analyses, the 51

variables were entered in a factor analysis. Physiological and recovery

indices were combined because both sets of variables reflected patients'

outcome during hospitalization and were potentially interrelated

(e.g., physiological measures as bases for Recovery Points). All

variables were, therefore, subjected to principal-component analysis

with varimax rotation, unities on the diagonal and no iterations. On

the basis of the Scree test (Cattell, 1966) and eigenvalue-one criterion

(Tabachnick and Fidell, 1983), a five-factor rotation accounting for

54.0% of the total variance was selected as the final solution (Appendix

Table 12

Descriptive Statistics for Recovery Variables (N = 75)

Variable	Mean	Standard Deviation	Range
Postsurgical Stay (hr)	108.0	68.5	24-287
Recovery Point I (12-hr period)	4.5	2.6	1-13
Recovery Point II (12-hr period)	6.3	3.7	1-22
Medication Aggregate Scores:			
Narcotic Analgesic	3.5	4.2	0-18
Mild Analgesic	31.7	47.3	0-230
Anxiolytic	8.5	15.3	0-65
Incidence of Medication Use:			
Antibiotic	3.6	8.2	0-44
Anticoagulant	2.3	4.7	0-10
Antiemetic	0.9	1.9	0-25
Duration of Medication Use (hr):			
Narcotic Analgesic	19.1	20.4	0-82
Mild Analgesic	51.4	53.5	0-225
Anxiolytic Agents	32.0	57.2	0-228
Antibiotic	24.2	49.8	0-245
Anticoagulant	27.9	53.2	0-210
Antiemetic	9.7	20.7	0-128
Pain:			
Incidence	1.9	2.0	0-9
Onset (hr postsurgery)	15.4	26.0	0-118
Duration (hr)	23.0	35.2	0-171
Other Complaints/Complications:			
Incidence	1.1	1.5	0-6
Onset (hr postsurgery)	30.7	54.2	0-267
Duration (hr)	8.9	28.0	0-176
Staff Ratings of Patients' Recovery:			
Doctor's Rating of Difficulty	1.6	1.1	1-7
Nurse's Rating of Difficulty	1.7	1.0	1-4
Doctor's Rating of Slowness	1.6	1.2	1-7
Nurse's Rating of Slowness	1.8	1.2	1-7
Doctor's Rating of Complications	1.4	0.7	1-7
Nurse's Rating of Complications	1.5	1.1	1-5

J). All communality values were 0.40 or greater and the minimum absolute factor loading for an item was 0.41. The five factors were generally characterized by combinations of several types of physiological and recovery measures, with the exception of Factor 1 which was comprised solely of blood pressure values. The measures within each factor presented in Appendix J are listed in the hierarchical order used in subsequent multivariate analyses.

Type of Surgery as a Covariate

Since the primary focus of subsequent analyses was on the relationship between coping and outcome, it was necessary to identify and statistically control for other variables that might influence patients' physiological and recovery scores. A preliminary examination of bivariate correlation coefficients between both physiological and recovery measures and all possible moderating variables (e.g., sex, age, body mass index) indicated significant relationships among the outcome measures and type of surgery. A two-step procedure was then used to confirm whether or not the six surgical groups, in fact, differed significantly in regard to the physiological and recovery indices. Details regarding the two-step procedure, which was also used in subsequent multivariate analyses, are presented in Note 4.

Basically, stepwise discriminant analysis was first performed on each of the five groups of physiological and recovery measures in order to obtain a reduced number of variables that maximally distinguished the surgical groups. The subset of significantly discriminant variables was then entered in a stepdown multivariate analysis of variance (MANOVA) to identify specific between-group differences in regard to these

variables. Results of the numerous post-hoc tests revealed that type of surgery was significantly associated with patients' outcome (Appendix K). Therefore, the impact of surgical procedure was duly considered in subsequent analyses in which physiological and recovery measures were dependent variables.

Path Analyses of Patients' Psycho-affective Responses as Predictors of Physiological and Surgical Outcome

The primary focus of the present study was to examine the relationship between patients' coping responses and outcome during hospitalization. It was of particular interest to identify the predictive relationship of patients' psycho-affective responses with their physiological and surgical outcome. Linear structural relations (LISREL) path analysis was conducted to determine the overall goodness-of-fit of data from the present study to a theoretical model of coping and outcome during hospitalization.

LISREL analysis is a method for: 1) determining the degree to which observable variables reflect hypothetical (i.e., latent) constructs, and 2) assessing both the degree and magnitude of the paths between the constructs (Joreskog and Sorbom, 1984; Lomax, 1982). Essentially, LISREL analysis is comprised of a measurement component and a structural equation model. The measurement model is evaluated via the construction of linear combinations of observable scales to estimate standardized scores on the construct variables, analogous to factor-analytic procedures. Loadings of the observable measures on the linear combinations indicate the degree of covariance of each scale with the construct (cf. Kline, Canter, and Robin, 1987). The structural equation

component of LISREL is represented by the path coefficients which are equivalent to regression weights (Dillon and Goldstein, 1984). Residual variance, that is due to both random sources of measurement error and to nonrandom variance specific to the observable measures, influences the LISREL estimates of path coefficients between constructs. Thus, LISREL path analysis provides a comprehensive evaluation of both the scales used to measure constructs and the conceptual model that links these constructs.

Lazarus et al.'s cognitive model of coping served as the basis for an hypothesized model of the relationships between surgical patients' psycho-affective responses and their outcome during hosptalization. The hypothetical cognitive coping model as illustrated in Figure 9 represents the prototype for examining coping and outcome in regard to each period and situation category (e.g., Admission Most Unpleasant Event data). In accordance with LISREL notation, latent constructs are indicated with circles and observable variables are presented in rectangles. A unidirectional arrow between a construct and an observable measure represents the factor loading of the observed scale. A unidirectional or bidirectional path coefficient indicates the presumed effect of one construct on another (Dillon and Goldstein, 1984).

The cognitive coping model for each period and situation category was subjected to path analysis via Joreskog and Sorbom's (1986) LISREL VI statistical program. However, the large numbers of observable measures and recursive paths between constructs resulted in a much larger set (i.e., > 100) of parameters to be estimated than could be

Figure 9

Path-analytic Representation of the Cognitive Coping

Model Applied to the Present Study
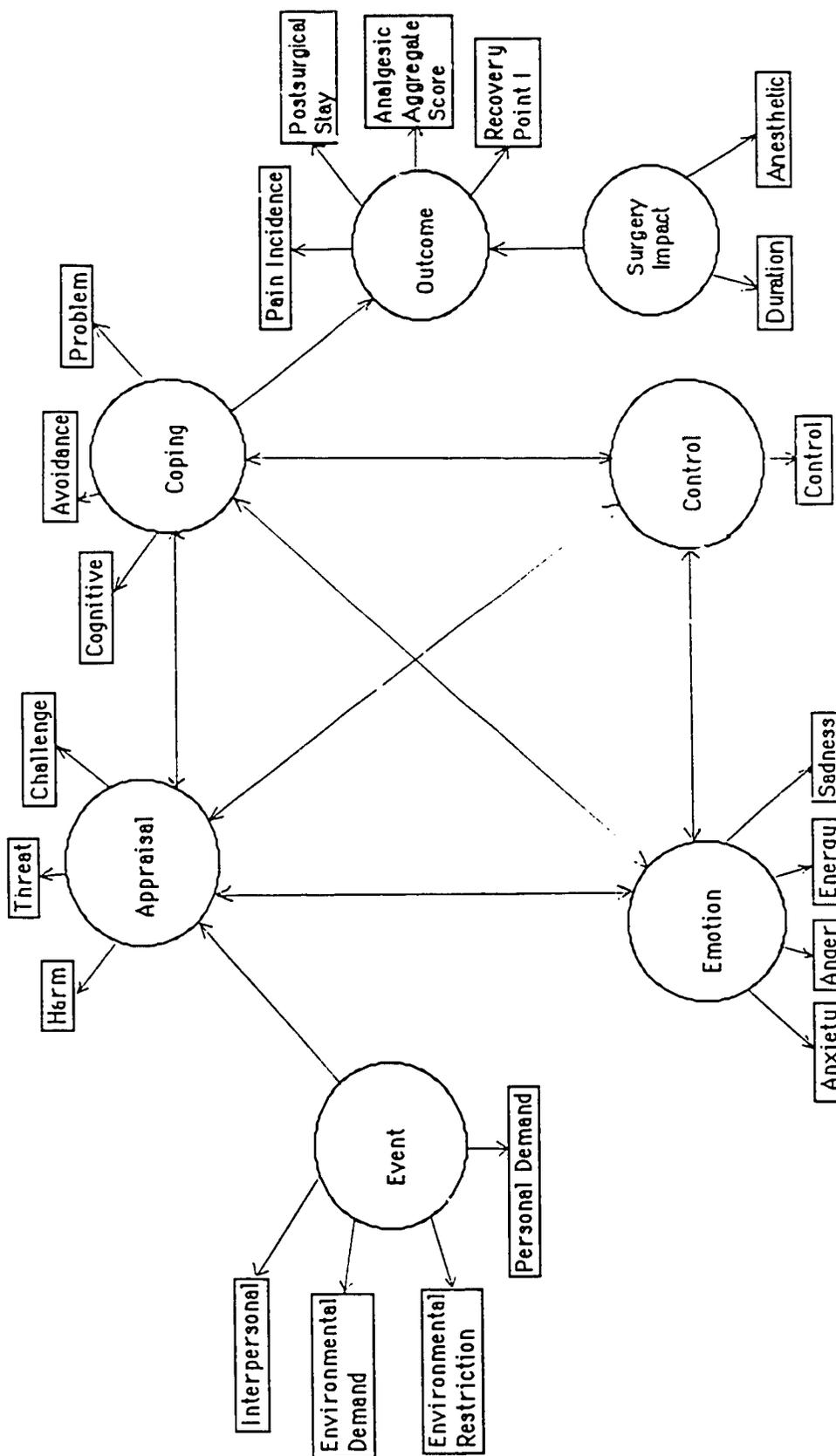
supported by the sample size ($\underline{N} = 75$' Moreover, the initial

correlation matrix for most analyses was positive definite, signifying a

high degree of intercorrelation among all the observable measures.

Basically, the preliminary LISREL results indicated that the cognitive

coping model was not a sufficiently parsimonious means of organizing the

present data set and, therefore, a revised model of coping was needed.

Given the significant correlations among the coping, appraisal,

emotion, and control variables in the positive definite matrices, it

appeared that these observable scales were measures of a single

construct which could be labelled Psycho-affective Response. Moreover,

results from earlier chi-square analyses indicated an overall absence of

association between type of surgery and coping (psycho-affective)

responses. Hence, a simplified model was developed that hypothesized

Psycho-affective Response as predictive of Outcome, Surgery Impact as

predictive of Outcome, and no relationship between Psycho-affective

Response and Surgery Impact.

The selection of observable measures for Surgery Impact was

influenced by the need to exclude nominal variables from the measurement

model. Accordingly, type of anesthetic administered during surgery and

duration of surgery were chosen as the observable measures. In regard

to observable measures for Outcome, stepdown multivariate analyses of

covariance (MANCOVAs), controlling for type of surgery, were initially

conducted to identify physiological and recovery indices that

significantly differentiated groups based on each of the six measures

associated with psycho-affective response to hospital events (i.e.,

event category, coping method, coping focus, appraisal, mood, and

situational control) for each assessment period. For example, stepdown MANCOVAs were used to determine outcome among groups based on patients' endorsement of coping method for the pain event during admission (i.e., behavioral, cognitive, and avoidance groups). A set of five outcome variables that consistently and significantly differentiated the various groups were identified for the pain and most unpleasant events; five was considered the maximum number of outcome variables that could be supported by the present sample size. According to this selection procedure, observable measures for Outcome pertaining to the pain event consisted of Analgesic Aggregate score, nurses' ratings of slowness in patients' recovery, and both 12-hr DBP and temperature. In regard to the most unpleasant events, Outcome variables were length of postsurgical stay, Recovery Point II, Anxiolytic Aggregate score, and nurses' ratings of slowness in patients' recovery.

Whereas the observable measures for Surgery and Outcome remained fixed for each analysis, adjustments were made for inclusion of the observable (i.e., appraisal, coping, emotion, control) variables for Psycho-affective Response. While the structural equation model is guided by a theoretical knowledge of psycho-affective response and outcome, there is some flexibility in the development of the measurement model (e.g., Pedhazer, 1982). Selection of observable measures for Surgery Impact and Outcome was determined by preliminary correlational and multivariate analyses, respectively. Given earlier LISREL evidence that an undetermined combination of the event, coping, appraisal, mood, and control variables reflects a common construct (i.e., Psycho-affective Response), flexibility was used in selecting observable

measures for the construct. In each analysis, the final set of observable measures was determined by the magnitudes of the variables' factor loadings on the construct and by the overall fit of the data to the model.

The revised path-analytic model was applied to patients' data for the pain and most unpleasant events separately. In order to incorporate temporal factors in coping, analyses examined the effects of psycho-affective response during two assessment periods on outcome. Analyses for the most unpleasant events failed to indicate significant paths between Psycho-affective Response and Outcome. However, the analyses regarding pain did yield significant findings for the hypothesized path models.

Figure 10 presents a path-analytic model which hypothesized that Pre-admission Psycho-affective Response predicted Admission Psycho-affective Response and that the two Response constructs predicted Outcome, independent of the impact of Surgery. The overall goodness-of-fit of the data to the model can be evaluated by two methods (Joreskog and Sorbom, 1986). The chi-square value indicates the fit of the entire model but this statistic is valid only when: 1) the observable variables have a multivariate normal distribution, 2) the analysis is based on the sample covariance matrix, and 3) the sample size is fairly large. Since these conditions were not met in the present data set, a more meaningful measure of fit for the conceptual model was the goodness-of-fit (GFI) index which is relatively robust against deviations from normality in the data and is independent of sample size. This index indicates the relative amount of observed

Figure 10

Path-analytic Model for Surgical Outcome Based on Patients' Psycho-affective
Responses to Pain Events at Pre-admission and Admission (N = 75)
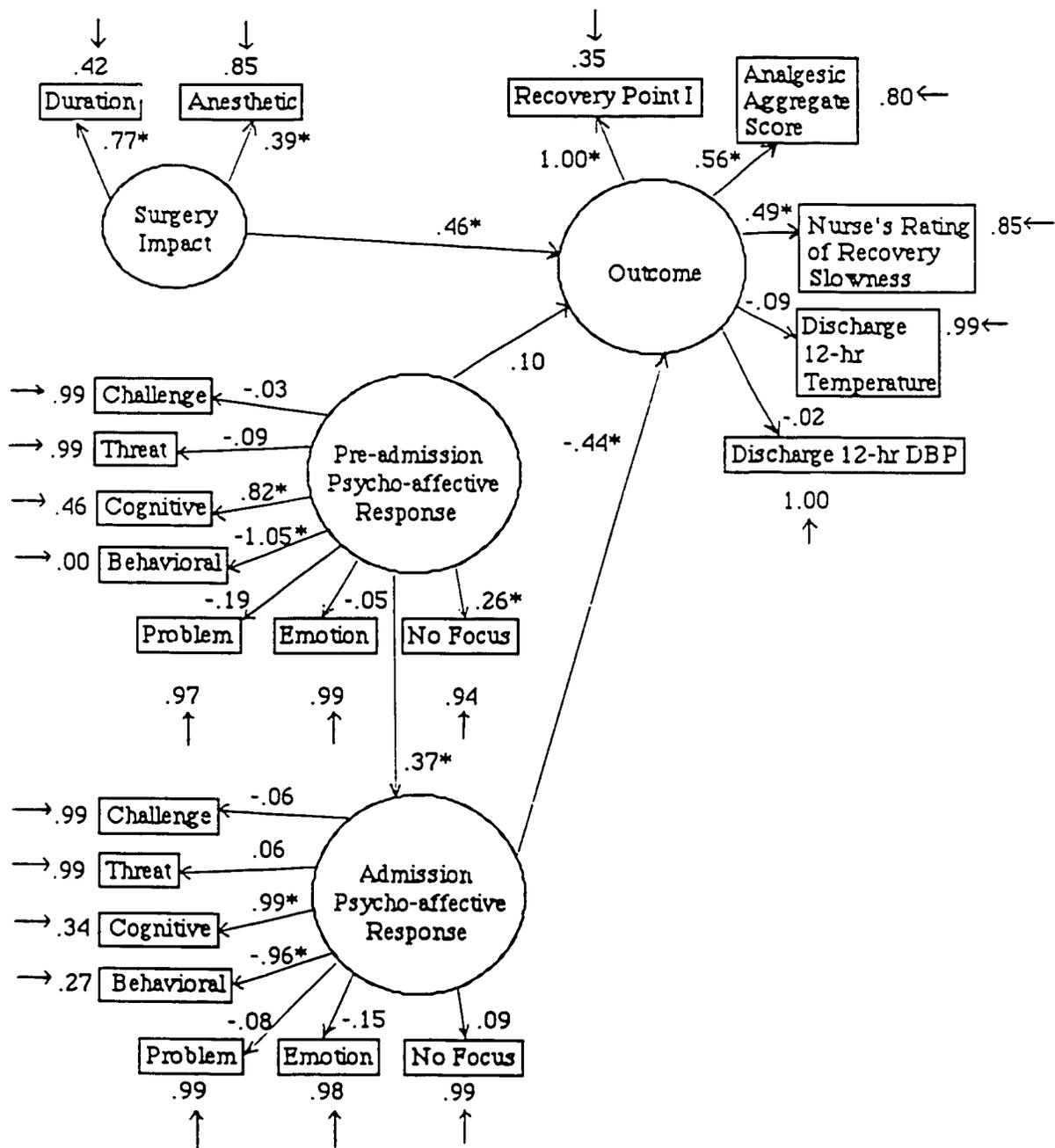
*p < .05.

variance and covariance acc. inted for by the model and ranges from 0 to 1, with 1 representing a maximum fit. Unfortunately, the GFI does not have a known statistical distribution and, hence, there is no comparative standard to assess significance.

The GFI for the model presented in Figure 10 was .64, which indicates a moderate fit of the data given that the maximum GFI is 1. The figure indicates that patients' method and focus of coping with the thought of pain prior to hospitalization did not directly predict their physiological and surgical outcome. However, coping at pre-admission did predict patients' coping responses once they were admitted to hospital. In particular, patients who endorsed a cognitive (but not behavioral) coping method and an absence of focus regarding the thought of pain at pre-admission subsequently reported a cognitive (but not behavioral) method of coping following admission to hospital. Patients' self-reports of cognitive coping following admission then predicted less use of analgesics, speedier physiological recovery, and nurses' ratings that indicated faster recovery. Thus, the LISREL results indicate that a cognitive method of coping for the thought of pain was associated with good outcome and that patients' reports of cognitive coping prior to their hospital admission can affect recovery via an influence on psycho-affective responses following admission.

Figure 11 presents the path-analytic model that links Admission Psycho-affective Response regarding the pain experience to Postsurgery Psycho-affective Response and these two constructs to Outcome, accounting for Surgery. The GFI was .79 which indicates a good fit of the data to the model. It is of interest that patients' coping

Figure 11

Path-analytic Model for Surgical Outcome Based on Patients' Psycho-affective
Responses to Pain Events at Admission and Postsurgery   (N = 75)

.26   .88

Duration   Anesthetic

.84*   .34*

Surgery
Impact

.47*

.98 Emotion   -.16   .37   .78

.99 Problem   -.03   Admission   Recovery   Analgesic
                             Psycho-affective   Point I   Aggregate
.36 Behavioral -.83*   Response   Score

                  .92*   -.38*   1.00*   .59*
.25 Cognitive

                                              Outcome
           .08   .01
                                                        .47*
       Threat

        .99   .22*   Nurse's Rating
                                                  -.02 -.11   of Recovery
                                                                 Slowness
   Postsurgery   Discharge Discharge   .86
   Psycho-affective   12-hr DBP 12-hr
   Response   Temperature
                                      1.00   .99

  -.99*   .78*   .31*

Challenge Harm Emotion

  .02   .42   .91

*p < .05

responses at admission did not predict psycho-affective responses at

postsurgery and that each Psycho-affective Response construct had a

direct effect on Outcome. Basically, the present model suggests that

patients who endorsed a cognitive rather than behavioral method of

coping with the thought of pain at admission had quicker physiological

recovery, used less potent analgesics, and were rated by nurses as

having speedier recoveries. Patients' postsurgical appraisal of pain as

a challenge predicted the same adaptive outcome.

Results from the second LISREL analysis are consistent with the

first model that examined the impact of pre-admission and admission

psycho-affective responses to the pain experience on outcome. In both

models, Admission Psycho-affective Response was primarily characterized

by a cognitive coping method. Whereas the Pre-admission Psycho-

affective Response was also characterized by cognitive coping method,

Postsurgery Psycho-affective Response in the present model was

identified by a harm appraisal, emotion-focused coping, and absence of a

challenge appraisal.

It is notable that, in all LISREL models regarding the pain

experience, affect and control variables did not significantly load on

Psycho-affective Response constructs. This finding is consistent with

the Lazarus et al. model in which appraisal and coping are primary

psychological responses to situations whereas emotion and perception of

control are secondary (i.e., mediating) factors.

Analysis of Outcome Associated with Aggregate Psycho-affective Responses

In order to identify overall relationships between psycho-

affective responses and outcome during hospitalization, it was of

interest to examine physiological and recovery measures among patient groups based on consistent psycho-affective ratings. Groups were determined by patients' endorsements across assessment periods of coping method, coping focus, and cognitive appraisal for the pain and self-identified most unpleasant events. In regard to the pain situation, for each psycho-affective variable, consistent groups were comprised of patients who endorsed a particular category a minimum three of four assessment periods. The inclusion criteria resulted in the formation of Cognitive (n = 36) and Non-cognitive (n = 39) coping groups for the pain event. In regard to coping focus, Problem (n = 24) and No Focus (n = 16) groups were derived but insufficient endorsements across periods (n = 8) resulted in the exclusion of an Emotion group. Given the high frequency in endorsements of challenge appraisal for the pain and most unpleasant events, a Challenge (n = 41) and Non-challenge (n = 34) group reflected responses to both types of hospital events.

In regard to the most unpleasant events, consistent groups endorsed a specific psycho-affective category a minimum two of three periods for the most unpleasant events. Similarly, consistent Event groups consisted of patients whose most unpleasant events were classified in the same situation category a minimum two of the three assessment periods. The inclusion criteria for aggregate psycho-affective responses to the most unpleasant events resulted in Cognitive (n = 41) and Non-cognitive (n = 34) coping method groups. Problem (n = 29), Emotion (n = 27), and No Focus (n = 13) groups were derived for consistent coping focus endorsements. For situation category, Personal Demand (n = 33) and Other Events (n = 42) groups were identified. Given

the diverse types of unpleasant events encountered by patients, consistent psycho-affective endorsements truly represented stability in responses across periods and situations.

Separate LISREL path analyses were conducted for the pain and most unpleasant events to test models, similar to that represented in Figure 12, in which Aggregate Psycho-affective Response to the most unpleasant events predicted Outcome, independent of Surgery Impact. The procedure for selection of observable variables described earlier was used in the present analyses. That is, duration of surgery and type of anesthetic served as observable variables for Surgery Impact. The observable measures for Outcome were identified via preliminary MANCOVA results which revealed physiological and recovery indices that maximally differentiated the aggregate psycho-affective groups. Finally, combinations of all aggregate psycho-affective groups were tested in the path analysis, with the final set of observable variables for Aggregate Psycho-affective Response determined by the magnitude of factor loading for the measure and by the highest goodness-of-fit index (GFI) for the model.

The path model pertaining to the pain event hypothesized that patients' physiological condition and recovery are predicted by their aggregate psycho-affective ratings, independent of the impact of type of surgery on outcome. Results from the LISREL analysis are presented in Figure 12. The GFI for the model was .86 which indicates a good fit of the data. Examination of Figure 12 reveals that the direct effect of Aggregate Psycho-affective Response on Outcome, independent of Surgery Impact, was significant. A key finding is that patients who

Figure 12

Path-analytic Model for Surgical Outcome Based on Patients' Aggregate

Psycho-affective Responses to the Pain Event   (N = 75)
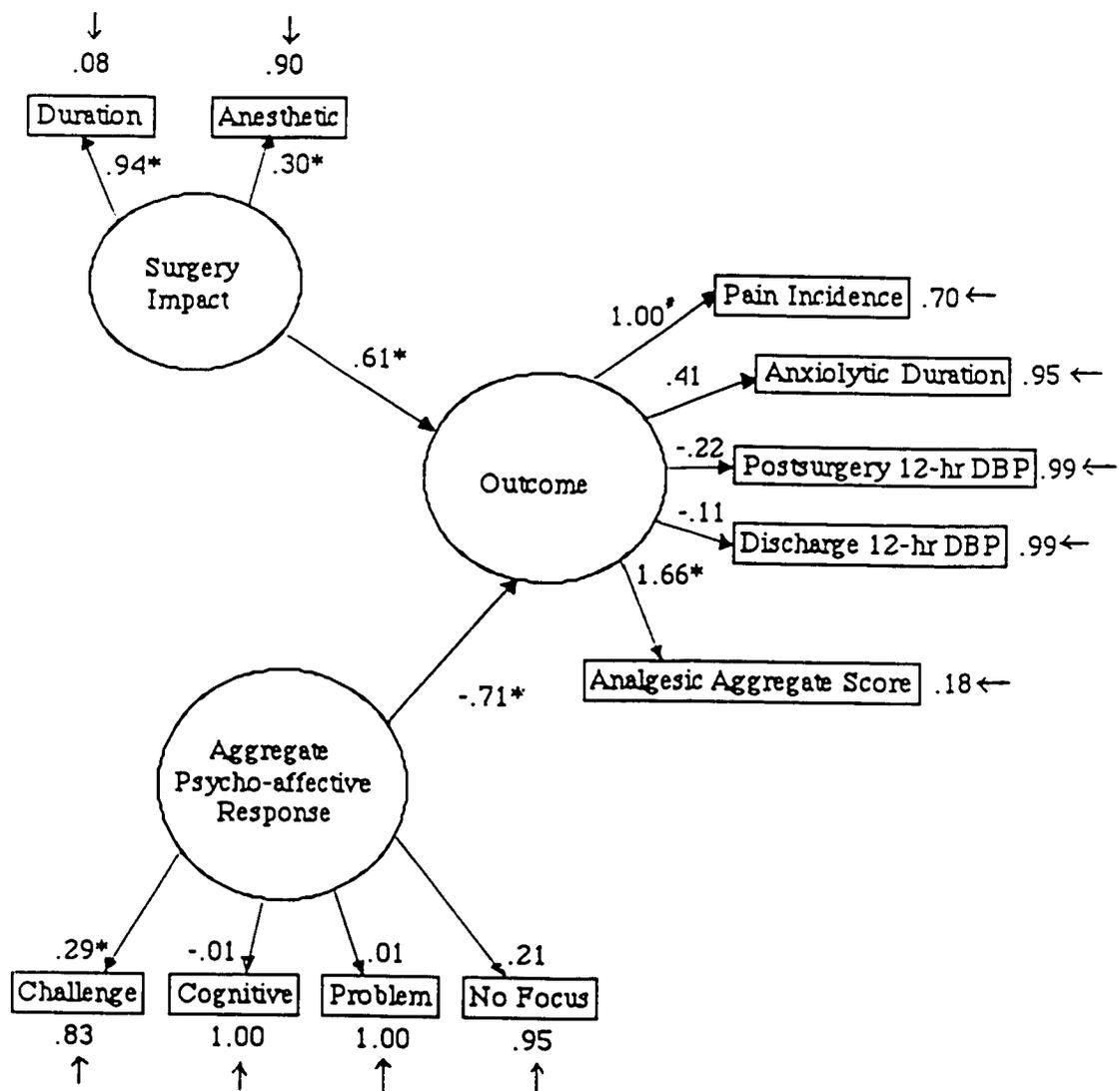
*p < .05

consistently appraised pain as a challenge were administered less potent analgesics and had a lower incidence of pain.

In regard to the most unpleasant events, situation categories significantly loaded on the Aggregate Psycho-affective Response construct but significant paths were not found between Response and Outcome. Thus, results from the LISREL analysis pertaining to aggregate psycho-affective ratings parallel findings from the period-by-period path models for the most unpleasant events.

Multivariate Analyses of Outcome Associated with Ratings for the Most Unpleasant Events

Given the absence of significant paths between patients' psycho-affective ratings to their most unpleasant events and outcome in the LISREL analyses, stepdown multivariate analyses of covariance (MANCOVAs, controlling for type of surgery) were conducted to address this issue. Specifically, stepdown MANCOVAs were used to identify outcome for groups based on event categories and on patients' endorsements of coping method, coping focus, and appraisal. The six types of surgery were coded as dummy variables and served as covariates for the multivariate analyses. In order to reduce the number of dependent variables for each MANCOVA, each of the five factor groupings of physiological and recovery variables were first entered into stepwise discriminant analyses (order of variable entry presented in Appendix J). Variables from each of the five factor groupings that significantly distinguished the various psycho-affective groups were then entered into separate stepdown MANCOVAs. A Scheffe-type adjustment was applied to all post-hoc comparisons among three groups such that:

$$\text{adjusted critical } \underline{F} = (k-1) \; \underline{F}\text{-value}$$

where k refers to the number of groups (Tabachnick and Fidell, 1983).

In order to parallel the types of groups studied in the LISREL analyses,

the multivariate analyses examined outcome among groups based on psycho-

affective responses for each assessment period and on aggregate ratings.

Within-Period Cope Groups

Significant results from stepdown MANCOVAs performed on the

physiological and recovery variables for groups based on coping method

and focus endorsements in each period are presented in Table 13 (summary

Table I-4), with mean outcome scores adjusted for type of surgery.

Examination of Table 13 reveals that significant differences in outcome

were found primarily among groups based on coping method rather than

coping focus. Specifically, patients who endorsed a cognitive coping

method tended to demonstrate better outcome than other cope groups in

regard to shorter durations of antiemetic use and pain reports, and

ratings of good recovery by attending nurses. Although the stepdown

MANCOVA resulted in significant differences between postsurgery cope

focus groups, Scheffe adjustments for post-hoc comparisons yielded

nonsignificant between-group differences in outcome.

Aggregate Cope Groups

In order to examine the relationships between stable psycho-

affective responses to the most unpleasant events and outcome, MANCOVAs

were conducted to examine outcome among groups based on consistent

coping endorsements. The aggregate groups for the LISREL analyses

pertaining to the most unpleasant events were used in the present

multivariate analyses. Specifically, repeated-measures and stepdown

Table 13

Most Unpleasant Event: Summary of Significant Differences in Adjusted Mean Physiological and

Recovery Scores for Cope Groups in Each Assessment Period

Variable	Group Category	Group (n)		
		Admission		
	Cope Method	Cognitive (43)	Behavioral (19)	Avoidance (13)
Incidence of Antiemetic Use		0.9^{ab}	0.4^{a}	2.2^{b}
Duration of Antiemetic Use (hr)		8.0^{c}	5.6^{cd}	24.4^{c}
		Postsurgery		
	Cope Method	Cognitive (37)	Behavioral (21)	Avoidance(17)
Nurse's Rating of Difficulty		1.4^{a}	2.4^{b}	1.6^{ac}
Nurse's Rating of Slowness		1.4^{d}	2.6^{c}	1.7^{df}
		Discharge		
	Cope Method	Cognitive (42)	Behavioral (17)	Avoidance (16)
Analgesic Aggregate Score		35.2^{ab}	54.3^{a}	8.0^{b}
Pain Duration (hr)		17.6^{c}	42.1^{d}	22.2^{cd}

Note. All means are adjusted for Type of Surgery covariates. Means with different letters are significantly different at $p \leq .05$, with the following Scheffe results:

Admission - 1) a vs. b F (2, 67) = 8.24, 2) c vs. e F (2, 67) = 7.50; cd vs. c F (2, 67) = 7.48

Postsurgery - 1) a vs. b F (2, 67) = 18.75; ac vs. b F (2, 67) = 8.64,

2) d vs. e F (2, 67) = 13.73; df vs. e F (2, 67) = 6.40

Discharge - 1) a vs. b F (2, 67) = 8.80, 2) c vs. d F (2, 67) = 6.41

MANCOVA analyses, controlling for type of surgery, were applied to the five factor groupings of outcome variables.

An examination of differences in the 12-hr Vital Signs among the aggregate cope groups was conducted via one between-subject (group) and one within-subject (period) repeated measures analysis, with covariates reflecting type of surgery. Multivariate stepdown analyses (SBP preceding DBP) were performed on the 12-hr blood pressure values, while univariate tests were applied to each set of pulse and temperature scores. No significant group-by-period interaction effects were found in the repeated-measures analyses (all p > .05).

Stepdown MANCOVAs, following reduction of variables via discriminant analyses, were used to examine differences in outcome for the remaining four factor groupings of outcome variables (excluding the physiological measures). The Scheffe-type adjustment for comparisons among three groups described earlier was applied to the present post-hoc tests. Significant between-group differences identified by the MANCOVAs are presented in Figure 13 (summary Table I-5). It appears that patients who consistently endorsed a cognitive method in regard to their most unpleasant events requi j anxiolytic and antiemetic medications for shorter durations than did patients who tended to endorse non-cognitive coping methods.

Aggregate Event and Appraisal Groups

Given the finding from LISREL path analyses for the pain event that psycho-affective (e.g., appraisal) variables other than coping impacted on adaptation, it was of interest to examine outome among the groups based on aggregate event and appraisal ratings. The event and appraisal

Figure 13

Most Unpleasant Events:

Adjusted Mean Duration (hr) of Anxiolytic

and Antiemetic Use Among Aggregate

Coping Method Groups ($\underline{N} = 75$)
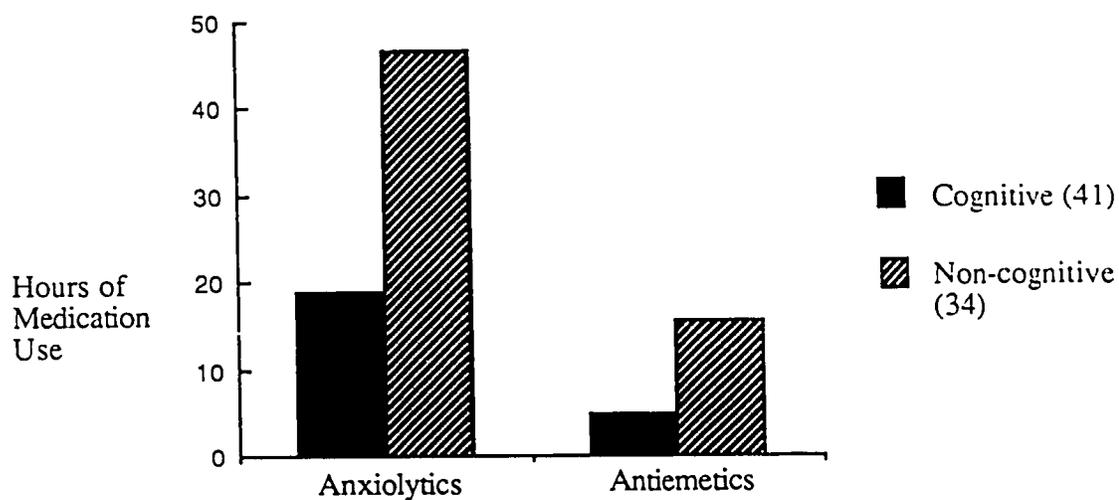
groups described earlier in the LISREL analyses pertaining to the most unpleasant events were used in the present multivariate analyses; note that the Challenge and Non-challenge groups were based on patients' endorsements for both the pain and most unpleasant events. Significant between-group difference in outcome among event and appraisal groups are presented in Table 14 (summary Table I-6). Results indicate that patients whose most unpleasant events were consistently classified as personal demands demonstrated slower recovery. Moreover, patients who tended to appraise both the pain and most unpleasant events as challenges used less potent non-narcotic analgesics than did individuals with variable appraisals.

Individual Differences Associated with Cognitive Coping and Challenge Appraisal

In view of the overall adaptive outcome associated with a cognitive coping method and challenge appraisal, it was of interest to identify individual differences associated with these psycho-affective variables. Stepdown MANOVAs, following variable reduction via discriminant analyses, were conducted to identify differences in individual differences among the aggregate cope and appraisal groups. An a priori stepdown order for the individual differences variables was determined by theoretical interest (Appendix L). An examination of the significant between-group differences presented in Figure 14 (summary Table I-7) reveals that a cognitive coping method for pain and a challenge appraisal for both pain and the most unpleasant events were associated with low levels of somatic sensitivity (assessed via the Personal Illness Questionnaire). That is, patients who reported minimal concern

Table 14

Summary of Significant Differences in Adjusted Mean Recovery Scores for Aggregate

Event and Appraisal Groups

Variable	Group (n)	
	Event	
	Personal Demand(33)	Non-personal Demand (42)
Recovery Point II (12-hr period)	7.5	5.5
Postsurgical Stay (hr)	115.0	103.4
	Appraisal	
	Challenge (41)	Non-challenge (34)
Analgesic Aggregate Score	19.7	46.0
Duration of Anxiolytic Use (hr)	37.2	25.5

Note. All means adjusted for Type of Surgery covariates.

Figure 14

Significant Differences in Somatic Sensitivity Scores Among Groups

Based on Aggregate Coping and Appraisal Endorsements ($\underline{N}$ = 75)
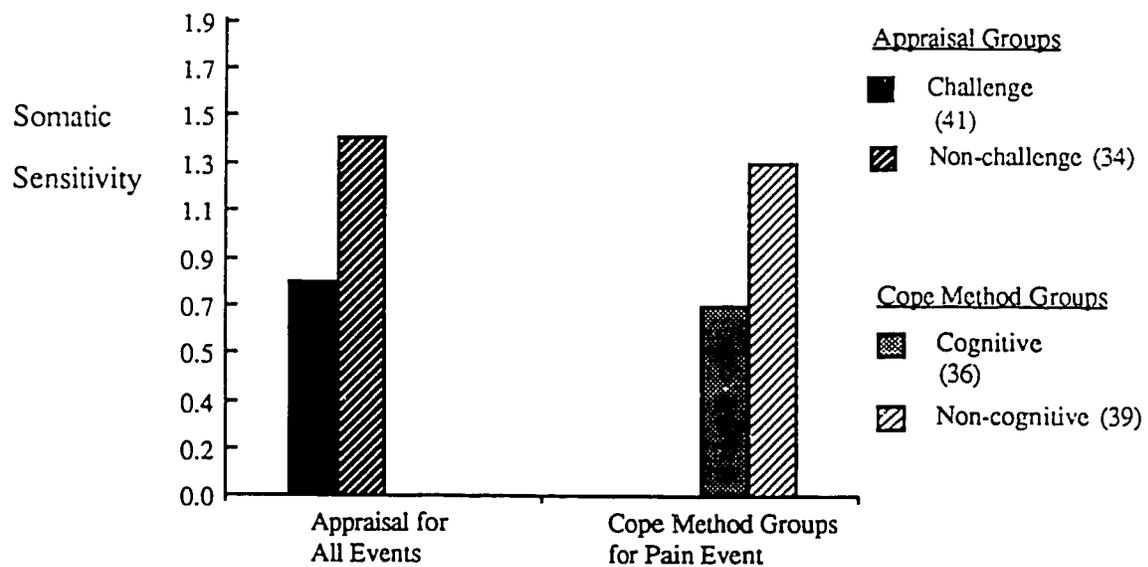
about their physical condition tended to engage in adaptive psycho-affective responses to the pain and most unpleasant events.

Discussion

Review of Findings

A review of the descriptive statistics reveals that the present sample was generally comprised of middle-aged individuals who were married and had more than a high school education. On average, the participants reported low levels of both trait anxiety and depression, minimal fear regarding medical procedures, and they rated previous medical and/or surgical hospitalizations as minimally stressful experiences.

In regard to the present admission, the types of most unpleasant events reported by patients tended to pertain either to the hospital environment (e.g., environmental restrictions) or to intrapersonal events (e.g., personal demands). Analysis of primary event characteristics revealed that the frequency of environmental restrictions tended to decrease following surgery while personal demands tended to increase in the postoperative periods. Patients' rankings of situations in regard to unpleasantness indicated that the self-identified most unpleasant events were generally more stressful than the preselected pain situation. Analyses regarding patients' affective responses and ratings of situational control were also consistent with the observation that pain was less stressful than patients' self-identified most unpleasant events.

An examination of patients' coping responses showed that a

cognitive coping method was most frequently endorsed as a strategy to deal with pain. In regard to both the pain and most unpleasant events, more patients endorsed emotion-focused coping following surgery than prior to it.

Results from LISREL path analyses and MANCOVAs indicated that a cognitive coping method and challenge appraisal were generally associated with better outcome (e.g., less need for analgesics postoperatively). Analyses regarding relationships between outcome and both aggregate coping and appraisal responses provided support for these findings and further revealed that patients who consistently encountered personal demands during hospitalization tended to require longer postsurgical stay.

It is notable that results from LISREL analyses pertaining to the most unpleasant events yielded nonsignificant paths between Psycho-affective Response and Outcome. Perhaps, this finding is associated with patients' greater variability in coping responses to the most unpleasant event. Indeed, results revealed that patients' coping method endorsements were less consistent in regard to the most unpleasant events than to pain and that cognitive coping is highly associated with good outcome. A review of the LISREL analyses pertaining to the most unpleasant events generally indicated that coping method endorsements did not load significantly on the Psycho-affective Response constructs, a result that may have significantly decreased the strength of association between Psycho-affective Response and Outcome.

Patients' Psycho-affective Responses to
and Outcome during Surgical Hospitalization

The primary aim of the present study was to examine the
relationship of patients' psycho-affective responses to stressful events
with their outcome during surgical hospitalization. It was of
particular interest to identify coping behaviors that predict patients'
physiological condition and surgical outcome. A review of the findings
indicates that a cognitive coping method (i.e., reappraisal of the
situation) was consistently associated with both lower physiological
arousal and better recovery. More importantly, patients who endorsed
cognitive coping during early stages of hospitalization subsequently
demonstrated better recovery. For example, patients who endorsed
cognitive coping as their strategy for dealing with the thought of pain
at admission had a lower incidence of postoperative pain and quicker
recovery than did those who endorsed behavioral coping. Similarly,
individuals who endorsed cognitive coping for the most unpleasant event
they encountered during admission subsequently required antiemetic
medications for a shorter duration than did those who endorsed avoidant
coping. Overall, then, cognitive reappraisal appears to be an adaptive
means of coping with stress associated with surgical hospitalization.

This pattern is consistent with Langer, Janis, and Wolfer's (1975)
finding that general elective surgery inpatients who were instructed in
cognitive coping required minimal amounts of postsurgical sedatives and
analgesics. Instructions for cognitive coping involved a reappraisal
strategy whereby the patient was encouraged to generate realistic
positive perspectives regarding unpleasant events encountered during the
hospital stay. Langer et al. speculated that as a result of focusing on

positive features of potentially stressful events, patients were able to minimize their negative emotional responses to their hospitalization. Ridgeway and Mathews (1982) similarly found that a group of hysterectomy inpatients who were instructed in cognitive coping required less analgesic medications and reported fewer days of postsurgical pain than did both an information-provision and attention-control group.

Although Langer et al (1975) have proposed that cognitive strategies enable individuals to attentuate their anxiety levels, no association was found between surgical patients' endorsement of cognitive coping and anxiety levels in regard to either pain or the self-identified most unpleasant events. Ridgeway and Mathews (1982) similarly failed to observe a significant association between anxiety ratings and coping responses in their patient sample. The therapeutic impact of cognitive coping, therefore, may involve direct mediation of pain behaviors (e.j., need for analgesics, pain complaints) rather than indirect impact via reduction of affective distress. Indeed, patients in the present sample who endorsed a cognitive strategy to deal with the pain experience at admission subsequently had minimal complaints of pain. The phrasing of the cognitive coping statement suggests that these patients acknowledged the unpleasantness of their pain but endured the discomfort because it was perceived as an integral feature of surgical hospitalization. The features of pain associated with the postoperative healing process (e.g., need to increase activity level despite pain) may have made this "grin and bear it" strategy particularly adaptive in the hospital setting (cf. Butler, Damarin, Beaulieu, Schwebel, and Thorn, 1989).

In the final analysis, it is not possible to identify the precise therapeutic role of cognitive strategies in the present study because coping impact was examined in terms of psychophysiological outcome rather than in terms of adaptation to the immediate situation for which the coping endorsement was made. Thus, the outcome was somewhat removed from the coping actions. On the other hand, results from the LISREL analyses suggest that patients' coping responses to the pain experience at one stage of hospitalization affected recovery via an influence on coping at later phases of the hospital stay. Thus, the impact of situational coping on outcome may be best conceptualized as a cumulative effect across all hospital events.

The relationship of a behavioral coping method with outcome is less consistent than that for cognitive coping. For example, it was found that individuals who endorsed a behavioral method (i.e., seeking information) to deal with the pain experience at admission subsequently demonstrated a high incidence of postsurgical pain and prolonged physiological destabilization. Conversely, individuals who endorsed a behavioral method to deal with their most unpleasant events during admission required antiemetic medications less and for a shorter postsurgical period than most other patients. These findings suggest that situational features may moderate the impact of behavioral coping. That is, most unpleasant events at admission were generally classified as either environmental restrictions or demands, for which a behavioral strategy may be effective. In contrast, behavioral coping may be ineffective or detrimental with regard to interpersonal events such as pain.

Finally, individuals who appraised the pain experience and their self-selected most unpleasant events as challenges rather than as either harms, threats, or losses generally demonstrated better outcome. Given the overall absence of association between challenge and coping responses, it is difficult to speculate about the adaptive mechanism of this specific appraisal. However, results from McCrae's (1984) assessment of 151 individuals' primary appraisals and coping responses to three different life events suggest that challenges tend to elicit a variety of confrontative and potentially adaptive behaviors (e.g., rational action, positive thinking). This hypothesis is supported by the finding that surgical patients who consistently endorsed a challenge appraisal also demonstrated less need for analgesic medications, suggesting that they confronted and actively managed their postsurgical pain. Successful outcome was less significant for patients who inconsistently endorsed challenge appraisals, further indicating the adaptiveness of a generalized positive attitude about one's potential to manage the stress of hospitalization.

Patients' Coping Responses to Hospital Events

A secondary aim of the present study was to identify the types of stressful events encountered by patients during surgical hospitalization and the untrained coping strategies they report using during these events. It has generally been assumed that the surgical procedure represents one of the most stressful events during surgical hospitalization (e.g., MacDonald and Kuiper, 1983). The present results reveal that, regardless of type of surgery, patients identified and coped with a variety of stressful events during their hospital stay.

While the most unpleasant event reported by some patients did pertain to surgical or test procedures, others reported events that were related to demands or restrictions imposed by the hospital environment, and to psychophysiological demands or limitations identified by the patient. For example, while some patients reported postsurgical somatic discomforts (e.g., feeling nauseous, cold, and helpless) as the most unpleasant event immediately following the procedure, they tended to identify environmental demands (e.g., not admitted to a private room as expected, not allowed to eat solid foods) as stressors at admission. Moreover, prior to discharge from hospital, many patients reported stressful personal demands such as worrying about the outcome of surgery and concern about convalescence at home. Johnston (1987) similarly found that the main cause for concern among 135 female surgery inpatients pertained to rehabilitation from surgery rather than to specific aspects of the procedure itself.

Patients' most unpleasant events also share common features with stressful situations described in previous research on non-surgical hospitalization. For example, Wilson-Barnett's (1976) sample of medical inpatients identified stressors such as "being away from the family" and "anticipating a procedure which is likely to be painful", situations which can be classified as environmental restriction and personal demand, respectively. Similarly, Volicer et al.'s (1976) hospital-event factors characterized by isolation from family and loss of independence are analogous to environmental restrictions and personal limitations, respectively. The findings suggest that preparatory interventions directed at minimizing stress associated specifically with

the surgical procedure have been too narrowly focused.

Temporal Shifts in Patients' Coping Responses

Variability in responses to the pain and most unpleasant events provides some evidence for temporal shifts in patients' coping focus during hospitalization. Specifically, a greater number of patients focused on minimizing their negative emotional responses to the pain experience following surgery than prior to it. Perhaps the salience of physical discomfort following surgery prompted patients to focus on and deal with how they felt. The high frequency of harm appraisals regarding postoperative pain supports the proposal that many patients acknowledged their emotional and physical discomfort following surgery. In their model of adaptation to illness, Leventhal and Nerenz (1983) concur that somatic pain is a significant factor in producing an emotional disequilibrium which the individual must then work toward managing. Indeed, Wong and Kaloupek (1986) found that more dental patients engaged in emotion-focused coping at the point of anesthetic injection (i.e., acute pain) than at both the pre-injection and posttreatment stages of an amalgam restoration procedure. Overall, the findings suggest that many individuals focus on affective regulation in response to relatively acute somatic discomfort.

The pattern of cognitive coping across all events and periods supports Vogele and Steptoe's (1986) finding that a rational-cognitive coping strategy was consistently endorsed among 8 hip-replacement inpatients who were assessed daily in the period from two days before surgery through discharge. In this study, a derivative of Billings and Moos' (1981) coping inventory was also used to assess patient's stress-

management responses. Cognitive coping was defined as an effort at minimizing the negative impact of a stressful event by actively reappraising the situation so that its positive or benign features are emphasized. Using a different conceptual basis to assess preferred coping strategies, Viney and Westbrook (1984) also found that cardiac patients tended to endorse optimism strategies (e.g., "Things usually work out fine") which could be classified as cognitive coping. It, therefore, appears that many individuals spontaneously use cognitive reappraisal strategies as a means of managing stressors encountered during hospitalization.

A preference for cognitive strategies among hospital patients contrasts with the fairly consistent finding that individuals tend to engage in avoidant coping during blood donation (e.g., Kaloupek et al., 1984) and dental treatment (e.g., Wong and Kaloupek, 1986). Avoidant coping refers to any attempt to not actively deal with a stressful event whereas cognitive strategies pertain to efforts ac acknowledging and redefining the stressor. Preference for avoidant strategies was also observed among a replication sample of 50 blood donors (Kaloupek et al., 1984) and demonstrated to a lesser extent in a second replication sample of 73 donors (Kaloupek and Stoupakis, 1985).

Situational features that differentiate surgical hospitalization from both blood donation and dental treatment may account for the predominant use of cognitive and avoidant coping during these respective events. In terms of temporal considerations, avoidant coping strategies may be more appropriate for the acutely stressful situation of blood donation than for the relatively protracted stressful experience of

hospitalization. For example, Suls and Fletcher's (1985) meta-analytic review of coping research revealed that avoidant strategies are easier to maintain and are most beneficial in short-term contexts. Avoidant coping may prove both difficult to sustain, and it may even be detrimental to surgical patients at times when successful adaptation depends on attending to stressors (e.g., working through discomfort associated with physical rehabilitation). Conversely, blood donors and dental patients are required to assume a fairly passive stance during the respective medical procedures, and such situational characteristics probably encourage relatively passive (i.e., avoidant) coping strategies (cf. Chaves and Brown, 1987).

Implications for Psychological Preparation of Surgical Patients

Two important issues were raised in the earlier review of psychological preparation for patients. First, little information is available regarding the most effective means of coping with surgical hospitalization. Second, little is known about types of person variables that can identify individuals who would maximally benefit from particular types of coping preparation. Essentially, information about who would benefit from what type of coping instruction at which stage of hospitalization is needed to develop guidelines for the psychological preparation of surgical patients. In regard to the most effective type of coping strategy, a cognitive rather than avoidant or behavioral strategy appears to be consistently associated with better outcome. Similarly, a challenge appraisal seems to attenuate negative effects of unpleasant hospital experiences. These two findings suggest that cognitive restructuring is a primary factor in the general effectiveness

of cognitive-behavioral interventions for management of stress

associated with hospitalization (e.g., Ludwick-Rosenthal and Neufeld,

1988).

Results from the present study suggest that the greatest stress-

management potential is associated with cognitive coping which is

initiated at early stages of the surgical procedure. It, therefore,

appears that individuals might benefit from cognitive coping

instructions that are provided even before they enter hospital. The

present study also suggests a target group that could benefit from this

type of cognitive restructuring. Specifically, the negative association

between somatic sensitivity and cognitive coping suggests that physical

reactivity during stress is a moderating variable in the selection of

coping responses. If somatic sensitivity is conceptualized as a

substrate of generalized distress or neuroticism (Kaloupek et al.,

1986), then it is reasonable that individuals less anxious or less

somatically-focused will be better able to apply cognitive restructuring

techniques to stressful situations such as surgical hospitalization. On

the other hand, patients who are more anxious may require interventions

specifically targetted at anxiety reduction (e.g., relaxation) before

they can benefit from training in cognitive coping.

Examination of the Cognitive Coping Model

The present study of coping and outcome among surgical inpatients

was guided by Lazarus et al.'s cognitive coping model. Essentially,

this model proposes that coping responses to stressful situations are

determined by a complex transaction between the objective event and the

individual's cognitive appraisal of that event (e.g., Lazarus and

Folkman, 1984). In this process-oriented framework, coping is dynamic

behavior that changes as a function of the individual's continuous

appraisals and reappraisals of the person-situation relationship. The

person-environment interaction constantly changes as the individual's

responses impact on and alter the subjective experience (and possibly

objective conditions) of the situation. In the present study, evidence

for the postulated interrelationships would have been demonstrated in

significant and meaningful associations among the event, appraisal, and

coping variables for a given class of situations. As mediating

variables, emotion and control indices were expected to have significant

but less clearly identifiable patterns of association with the event,

appraisal, and coping measures.

Initial attempts to examine the transactional coping model via

path analyses failed for two reasons, one statistical and the other

methodological. First, conceptualization of coping as a complex

interplay among individuals' appraisal and coping responses during a

situation necessitated the proposal of numerous bidirectional paths

among the latent variables in the LISREL models. The present sample

size was insufficient to support these complex path models. Secondly,

the basic premise of the transactional model suggests that coping during

a situation is determined by a sequence of feedback loops among

appraisal and coping responses, and that coping responses feed back into

the sequence to impact on subsequent coping efforts. Accurate

assessment of coping within this framework may require a detailed

analysis of one segment in this transactional process. Given that the

surgical patients provided retrospective reports of their characteristic

responses to a given situation, the present methodology may have provided insufficiently precise information to adequately tap the causal links among the appraisal and coping variables (cf. Forsythe and Compas, 1987).

The present methodology was also insufficiently precise to assess the role of mediating factors (i.e., affective and situational control variables) in regard to patients' coping responses. By definition, mediating variables are generated during a situation and then alter the original relationship between antecedent and outcome conditions (Folkman and Lazarus, 1988b). In the present study, patients' reported responses to the stressful hospital events were retrospective and global. No attempt was made to determine temporal sequence in coping, emotional, and perception of control responses to a given situation. These considerations may account for the failure of emotion and control indices to enter significantly into the Psycho-affective Response constructs of the LISREL models pertaining to the pain experience.

Finally, it is of interest that social support was not indicated as a significant mediating factor in patients' coping and outcome during surgical hospitalization. While individuals' coping responses provide important cues about need for support (e.g., Dunkel-Schetter, Folkman, and Lazarus, 1987), situational factors may also impact on support receipt. Specifically, surgical patients encountered stressors within the physical confines of the hospital setting, often apart from their usual support network. Since assessment of satisfaction with support pertained exlusively to assistance received from family and friends, patients' perceptions of support provided by co-patients and hospital

staff were not adequately monitored. Indeed, a general observation that patients' least unpleasant events often involved positive interactions with co-patients and staff suggests that the social network in the hospital setting was an important buffer in attenuating stress (cf. Johnson, 1984; Kulik and Mahler, 1987).

Implications for Future Research

The present study represents a step in advancing knowledge about stressors encountered by surgical patients and about the types of coping and appraisal responses to these events that are associated with positive adaptation during surgical hospitalization. The multiple assessment of patients' coping responses meets the general demand for sequential as well as aggregated analysis of health behavior in medical settings (e.g., Edwards and Cooper, 1988; Feifel, Strack, and Nagy, 1987). However, repeated measurement of patients' responses at various stages of hospitalization entails certain methodological challenges. The present measure relied on a forced-choice format that was time-efficient but did not address the possibility of multiple strategies used at any one time. Recent evidence indicates that individuals do, in fact, use a combination of both problem- and emotion-focused coping during many stressful encounters (e.g., Folkman and Lazarus, 1985; Forsythe and Compas, 1987). Perhaps, a viable compromise to meet both practical and conceptual considerations is a variation of the present methodology. For example, patients could be administered the Coping and Appraisal checklists with instructions to report relative use of each response on Likert scales. This assessment format would be time-efficient and more adequately tap complex coping responses.

An understanding of the relationship between coping and outcome would also be further advanced by an examination of adaptation following discharge. Essentially, the present study focused on the cumulative influences of coping on psychophysiological adaptation during surgical admission. It would be of interest to identify the types of coping strategies that individuals use to deal with the postoperative rehabilitation process and outcome in a longitudinal perspective. Follow-up investigations, for example, could provide information about whether a cognitive coping method is more likely elicited during hospitalization, or whether it is a preferred strategy for most individuals who are dealing with stresses associated with the relatively protracted experience of surgical admission and recovery.

Furthermore, although the present study provides evidence that a cognitive strategy is generally beneficial for most surgical patients, a definitive statement about coping efficacy must await replication studies. Future investigations might examine the relationship between coping and outcome across different surgical populations in various settings to determine the generalizability of the present findings. Given the need for multiple assessments of coping, it will also be important to include a limited-assessment control condition in future research. The absence of such a control group in the present study makes it difficult to determine the influence of potentially confounding factors (e.g., attention from researcher, focus on psychological issues) on patients' responses and outcome.

In summary, the present study represents an effort at identifying stress-management responses associated with adaptive outcome during

hospitalization, with the ultimate aim being specification of paramenters for the psychological preparation of surgical candidates. This investigation was guided by a process-oriented assessment methodology and a theoretical model of coping, two factors which have been lacking in much of the previous research in this area (Auerbach, 1989). More generally, this research represents an attempt to address the need for naturalistic observation of individuals' untrained psychological responses to stressful situations (e.g., Chaves and Brown, 1987). Indeed, findings from the present study suggest that further refinement of a methodology for coping assessment is needed before experimental investigations of coping and adaptation to hospitalization are undertaken. More importantly, this naturalistic study of patients' coping responses and outcome during surgical hospitalization demonstrates the viability of examining complex human behaviors in clinically-relevant settings.

Footnotes

1. The three judges for classification of patients' self-selected
events were the author, Dr. Dan Kaloupek, and Perry Adler (a graduate
student in Applied Psychology).

2. A Scheffe-type adjustment was applied to post-hoc comparisons
following repeated-measures analyses (Cohen and Cohen, 1983), with

$$\text{critical } \underline{F} = (a-1) \, \underline{F}_{((a-1), \, (a-1)(s-1))}$$

where a refers to the number of periods and s to the number of subjects.
Essentially, the $\underline{F}$ value used in the calculation of the critical $\underline{F}$ was
taken from the multivariate (or univariate) mean squares error term.

Notes

1. Patients' respiration rates (cpm) were also monitored. Due to low variability in respiration readings, these data were not included in the present analyses.

2. The values used to calculate the critical ranges for pulse rate and body temperature were provided by Dr. Dan Kaloupek.

3. The overall low number of observations ($\underline{M}$ = 1.9) for the 12-hr Vital Signs, due to reduction of physiological monitoring for patients in the period prior to discharge, raised some concerns about the reliability of this set of data. A set of Composite Vital Signs were, therefore, calculated. Composite Vital Signs represented means for the physiological data recorded during the period between admission and surgery, Postsurgery Vital Signs covered the period from surgery to the second in-hospital psycho-affective assessment, and Discharge means covered the time from the second assessment to patients' discharge. The Composite means generally reflected a larger set of recordings than the 12-hr means. However, the relatively short time between the second in-hospital assessment and discharge did not permit physiological monitoring for seven subject, resulting in complete Composite date for only 68 patients. Examination revealed little difference between the two sets of data. Therefore, although Composite Vital Signs were included in the factor and multivariate analyses, they are not included in the present discussion.

4. A two-step procedure was used for all multivariate analyses. First, stepwise discriminant analysis was performed on each of the five groups of physiological and recovery measures in order to obtain a reduced

number of variables that maximally distinguished the groups. The

stepwise criterion was Wilk's lambda which maximized the differences

between the group centroids (Klecka, 1975), and the minimum significance

of F-to-enter in each stepwise analysis was set at 0.10. The subset of

significantly discriminant variables was then then entered into a

stepdown multivariate analysis of variance (or covariance) to identify

specific between-group differences in regard to these variables, with

the multivariate F-value derived from the Hotelling trace criterion. A

stepdown procedure was used to control for the correlations between

dependent variables.

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Appendix A

Physician's Consent Form

Dr. D.G. Kaloupek and his research associate, May Wong, from the Department of Psychology at Concordia University are conducting a research project in cooperation with the Royal Victoria Hospital surgical department and Dr. L. MacLean. The goal of this project is to develop ways of helping surgical patients be more relaxed and comfortable during their stay in hospital. This work is presently at a preliminary stage which simply involves examining the ways in which patients manage the experience on their own.

We would like to have your patients participate in this project. As part of the study, participants will be asked to complete a set of self-report measures regarding their perceptions of and responses to various events they encounter during their hospital stay. They also will be asked to provide demographic information (e.g., age, education, and previous hospitalizations) and to complete four brief personality measures. The confidentiality of all information concerning patients will be protected by a numerical coding system for participant identification. Finally, in order to assess health status and recovery, we will ask participants to grant limited access to their daily medical records.

We will also ask for your help in assessing recovery from surgery for your patients. On the day that they are scheduled for discharge, you will be provided a three-item rating sheet on which to indicate the course of recovery. These ratings require only a few seconds to complete.

If you have any questions about this project, please feel free to contact May Wong at 738-2881. This project is expected to run from April 1986 to September 1986.

Your signature below indicates that you consent to athe general inclusion of your patients as participants in this study (if they so desire) and that you allow us access to the individual daily medical records of consenting patients. Please note that any reservations you may have concerning the participation of a particular patient will be respected. You are asked to notify May Wong before the patient is seen at the pre-admission clinic. This information can be left either with the staff at the pre-admission clinic, or directly relayed to May Wong at 738-2881.

Signature   _____

Date   _____

_____

_____ If you do not consent to the general inclusion of your patients in this study, please mark the adjacent space.

Appendix B

Patient Consent Form

Dr. D.G. Kaloupek at his research associate, May Wong, from the Department of Psychology at Concordia University are conducting a research project in cooperation with the Royal Victoria Hospital surgical staff. The goal of this project is to develop ways of helping surgical patients be more relaxed and comfortable during their stay in hospital. This work is presently at a preliminary stage which simply involves examining the ways in which patients manage the experience on their own.

We would like to have you participate in this project. _Your participation is completely voluntary and is not required as part of the treatment you will receive at this hospital_. There is no fee associated with the project. Also, if you decide to participate and later change your mind, you may withdraw from the project at any time without affecting your treatment in any way.

As part of the project, you will be asked to do the following:

1) Provide information concerning your age, marital status, education, social support, and previous hospitalizations.

2) Complete a set of brief questionnaires which concern your usual emotions and moods, typical responses to health-related situations, and beliefs about the factors that influence your health.

3) At the pre-admission clinic, you will be presented one event that most surgical patients experience and you will be asked to give brief reports of what you feel and think about this event.

4) Three times during your hospital stay, you will be asked to report the most and least unpleasant events that you have encountered while in the hospital and to give brief ratings of what you felt and thought during these events. At each of these three times, you will also be presented one event that most hospitalized patients experience and you will be asked to give brief reports of what you felt and thought during this event. The three times will be once before surgery, once after surgery, and once prior to your discharge from the hospital.

5) You will be asked to allow us to gather limited information from your hospital records concerning your recovery from surgery. The information that will be collected about you is: a) blood pressure and temperature, b) medications, and c) postoperative problems (e.g., vomiting, infection).

6) Your attending doctor and nurses will be asked to rate your recovery from surgery.

Please note that all information collected about you for the project is completely confidential. To insure this fact, your name will not appear on any of the project materials - except for this consent form. All other information is coded by a number which will be assigned to you.

If you have any questions about this form or the project itself, please ask now. If questions arise later, please feel free to ask.

If you are interested in participating in this study, please sign below. Your signature indicates that you have read and understood this form, are volunteering your participation, and are allowing us limited access to your medical record.

Signature _____

Date _____ Witness _____

Appendix C

Background Information

Subject No. _____   Date _____

Sex _____   Age _____   Civil Status _____

Education _____   Beds/Room _____

How long ago did you learn that you would need this operation?

_____

Previous Hospitalizations

A)   During the last 10 years:

1) How many times were you hospitalized for medical (not surgical) reasons? _____

2) What was the nature of the problem(s) for these hospitalizations? _____

_____

_____

3)   How long ago was the most recent hospitalization?

_____

4)   How long did you stay in the hospital during this most recent hospitalization? _____

B)   Before the last 10 years:

1)   How many times were you hospitalized for medical (not surgical) reasons? _____

2)   What was the nature of the problem(s) for which you were admitted? _____

_____

_____

Background Information (cont.)

Subject No. _____   Date _____

C) During the last 10 years:

1) How many times were you hospitalized for surgical reasons? _____

2) What was the nature of the problem(s) for which you were admitted? _____

_____

_____

3) How long ago was the most recent hospitalization?

_____ _____

4) How long did you stay during this most recent hospitalization? _____

D) Before the last 10 years:

1) How many times were you hospitalized for surgical reasons? _____

2) What was the nature of the problem(s) for which you were admitted? _____

_____

_____

Background Information

Subject No. _____   Date _____

How satisfied are you with the support or assistance that you are getting from your family and friends to help you deal with this hospital stay?

```
—1———1———1———1———1———1———1———1—
  1     2     3     4     5     6     7     8
Extremely              Satisfed            Not at all
satisfied                                  Satisfied
```

In regard to your most recent stay in the hospital for medical reasons:

A) Rate how difficult the experience was for you to manage:

```
—1———1———1———1———1———1———1———1—
  1     2     3     4     5     6     7     8
 Not                Difficult            Extremely
difficult                                difficult
```

B) Rate how unpleasant the experience was for you:

```
—1———1———1———1———1———1———1———1—
  1     2     3     4     5     6     7     8
 Not               Unpleasant            Extremely
unpleasant                               unpleasant
```

In regard to your most recent stay in the hospital for surgical reasons:

A) Rate how difficult the experience was for you to manage:

```
—1———1———1———1———1———1———1———1—
  1     2     3     4     5     6     7     8
 Not                Difficult            Extremely
difficult                                difficult
```

B) Rate how unpleasant the experience was for you:

```
—1———1———1———1———1———1———1———1—
  1     2     3     4     5     6     7     8
 Not               Unpleasant            Extremely
unpleasant                               unpleasant
```

Appendix D

Number: _____

Below are a number of statements with which you may agree or disagree. Beside each statement is a scale which ranges from strongly disagree (1) to strongly agree (6). For each item, please circle the number that represents the extent to which you disagree or agree with the statement. Please circle only one number for each statement.

		Strongly Disagree	Moderately Disagree	Slightly Disagree	Slightly Agree	Moderately Agree	Strongly Agree
1.	If I get sick, it is my own behaviour which determines how soon I will get well again	1	2	3	4	5	6
2.	No matter what I do, if I'm going to get sick, I will get sick	1	2	3	4	5	6
3.	Having regular contact with my physician is the best way for me to avoid illness	1	2	3	4	5	6
4.	Most things that affect my health happen to me by accident	1	2	3	4	5	6
5.	Whenever I don't feel well, I should consult a medically trained professional	1	2	3	4	5	6
6.	I am in control of my health	1	2	3	4	5	6
7.	My family has a lot to do with my becoming sick or staying healthy	1	2	3	4	5	6
8.	When I am sick, I am to blame	1	2	3	4	5	6
9.	Luck plays a big part in determining how soon I will recover from an illness	1	2	3	4	5	6
10.	Health professionals control my health	1	2	3	4	5	6
11.	My good health is largely a matter of good fortune	1	2	3	4	5	6
12.	The main thing which affects my health is what I myself do	1	2	3	4	5	6
13.	If I take care of myself, I can avoid illness	1	2	3	4	5	6
14.	When I recover from an illness, it's usually because other people (for example, doctors, nurses, family, friends) have been taking good care of me	1	2	3	4	5	6
15.	No matter what I do, I'm likely to get to sick	1	2	3	4	5	6
16.	If it's meant to be, I will stay healthy	1	2	3	4	5	6
17.	If I take the right actions, I can stay healthy	1	2	3	4	5	6
18.	Regarding my health, I can only do what my doctor tells me to do	1	2	3	4	5	6

SELF-EVALUATION QUESTIONNAIRE

STAI FORM X-2

NAME _____ DATE _____

DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and then blacken in the appropriate circle to the right of the statement to indicate how you *generally* feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

	ALMOST NEVER	SOMETIMES	OFTEN	ALMOST ALWAYS
21. I feel pleasant	①	②	③	④
22. I tire quickly	①	②	③	④
23. I feel like crying	①	②	③	④
24. I wish I could be as happy as others seem to be	①	②	③	④
25. I am losing out on things because I can't make up my mind soon enough	①	②	③	④
26. I feel rested	①	②	③	④
27. I am "calm, cool, and collected"	①	②	③	④
28. I feel that difficulties are piling up so that I cannot overcome them	①	②	③	④
29. I worry too much over something that really doesn't matter	①	②	③	④
30. I am happy	①	②	③	④
31. I am inclined to take things hard	①	②	③	④
32. I lack self-confidence	①	②	③	④
33. I feel secure	①	②	③	④
34. I try to avoid facing a crisis or difficulty	①	②	③	④
35. I feel blue	①	②	③	④
36. I am content	①	②	③	④
37. Some unimportant thought runs through my mind and bothers me	①	②	③	④
38. I take disappointments so keenly that I can't put them out of my mind	①	②	③	④
39. I am a steady person	①	②	③	④
40. I get in a state of tension or turmoil as I think over my recent concerns and interests	①	②	③	④

Identification ° _____

PERSONAL ILLNESS QUESTIONNAIRE II

Please read each statement and indicate whether it is True or False as it applies to you. Circle the letter which corresponds to your answer.

1. I tend to get upset and anxious about the prospect of receiving an injection................................... T   F

2. When I am ill with a cold or flu, it seems that I take longer than my friends to recover and get back to work or school.. T   F

3. Sometimes I notice small pains or irregularities which I think might be signs of serious illness................... T   F

4. When things are not going well in my life, I tend to feel physically upset or ill................................... T   F

5. It often makes me uncomfortable when someone gives a detailed description of a serious injury or major medical procedure... T   F

6. I find that when a doctor talks to me after an examination I am tense because I am anticipating the discovery of a serious disorder........................... T   F

7. I often have minor illnesses or small physical upsets.... T   F

8. It troubles me to have a blood sample drawn.............. T   F

9. My strongest fears involve the prospect of me having a serious disorder such as a heart attack or cancer........ T   F

10. Sometimes I have to make myself stop thinking about or imagining things which might be wrong with me............ T   F

11. If I really think about or imagine the physical process involved in a disorder such as a brain tumor, my heart races and my palms sweat................................. T   F

12. In medical situations I often have to take deep breaths to calm myself... T   F

13. When I don't eat well or sleep enough my body feels like it does during the early stages of the flu............... T   F

14. Even though I try very hard to keep my emotions or bodily reactions under control, I often notice little details of medical procedures which make my heart race... T   F

ZUNG INVENTORY

Please read each statement below and indicate on the adjacent scale how frequently it applies to you. Use your past experience as a guide as much as possible. Circle the number on the scale which corresponds to your answer.

1	2	3	4
None or A little of the time	Some of the time	Good part of the time	Most or All of the time

1. I feel down-hearted, blue and sad........................... 1 2 3 4

2. Morning is when I feel the best.............................. 1 2 3 4

3. I have crying spells or feel like it........................ 1 2 3 4

4. I have trouble sleeping through the night................... 1 2 3 4

5. I eat as much as I used to.................................. 1 2 3 4

6. I enjoy looking at, talking to and being with attractive women / men.. 1 2 3 4

7. I notice that I am losing weight............................ 1 2 3 4

8. I have trouble with constipation........................... 1 2 3 4

9. My heart beats faster than usual............................ 1 2 3 4

10. I get tired for no reason.................................. 1 2 3 4

11. My mind is as clear as it used to be....................... 1 2 3 4

12. I find it easy to do the things I used to do.............. 1 2 3 4

13. I am restless and can't keep still......................... 1 2 3 4

14. I feel hopeful about the future............................ 1 2 3 4

15. I am more irritable than usual............................. 1 2 3 4

16. I find it easy to make decisions........................... 1 2 3 4

17. I feel that I am useful and needed......................... 1 2 3 4

18. My life is pretty full..................................... 1 2 3 4

19. I feel that others would be better off if I were dead..... 1 2 3 4

20. I still enjoy the things I used to do...................... 1 2 3 4

Appendix E

Hospital Event Schedule

Here is a list of events that many patients encounter in the hospital. Read through these situations quickly to help you remember the most and/or least unpleasant event that you have encountered during your hospital stay. The event you choose to describe does not necessarily have to be from this list.

---

1. Being aware of unusual smells around you.

2. Having a roommate who is seriously ill or cannot talk with you.

3. Being cared for by an unfamiliar doctor.

4. Having strangers sleep in the same room with you.

5. Having to stay in bed or the same room all day.

6. Knowing you have a serious illness.

7. Thinking about losing income because of your illness.

8. Having medications cause you discomfort.

9. Not having your call light answered.

10. Having to eat at different times than you usually do.

11. Having nurses or doctors talk too fast or use words you can't understand.

12. Not having friends visit you.

13. Not getting relief from pain medications.

14. Worrying about your spouse being away from you.

15. Thinking your appearance might be changed after your hospitalization.

16. Not knowing when to expect things will be done to you.

17. Knowing you have to have an operation.

18. Being in the hospital during holidays or special family occasions.

Mood Checklist

Subject No. _____   Date _____   Assessment A B C D

Time _____

Below are a number of words which describe feelings. Please circle the number that best describes how you felt during this event: _____

```
—|————————|————————|————————|—
  1        2        3        4
Not at    A      Quite   Extremely
 all    little   a bit
```

full of pep

```
—|————————|————————|————————|—
  1        2        3        4
```

miserable

```
—|————————|————————|————————|—
  1        2        3        4
```

tired

```
—|————————|————————|————————|—
  1        2        3        4
```

on edge

```
—|————————|————————|————————|—
  1        2        3        4
```

helpless

```
—|————————|————————|————————|—
  1        2        3        4
```

lively

```
—|————————|————————|————————|—
  1        2        3        4
```

unhappy

```
—|————————|————————|————————|—
  1        2        3        4
```

weary

```
—|————————|————————|————————|—
  1        2        3        4
```

depressed

```
—|————————|————————|————————|—
  1        2        3        4
```

sluggish

```
—|————————|————————|————————|—
  1        2        3        4
```

hopeless

```
—|————————|————————|————————|—
  1        2        3        4
```

<u>Mood</u> <u>Checklist</u>

Subject No. _____   Assessment   A   B   C   D

```
——|———————|———————|———————|—
  1       2       3       4
 Not at    A     Quite   Extremely
  all    little  a bit
```

angry   ——1———————2———————3———————4—

vigorous   ——1———————2———————3———————4—

worthless   ——1———————2———————3———————4—

discouraged ——1———————2———————3———————4—

guilty   ——1———————2———————3———————4—

tense   ——1———————2———————3———————4—

active   ——1———————2———————3———————4—

furious   ——1———————2———————3———————4—

resentful   ——1———————2———————3———————4—

nervous   ——1———————2———————3———————4—

worn out   ——1———————2———————3———————4—

spiteful   ——1———————2———————3———————4—

shaky   ——1———————2———————3———————4—

Appraisal Form

Subject No. _____   Date _____   Assessment A B C D

                         Time _____

Choose <u>one</u> statement that best describes what this event means to

you: _____

    During this event,

_____   I was either emotionally or physically hurt.

_____   I was faced with the possibility that I <u>might</u> <u>be</u> hurt emotionally or physically, or that I <u>might</u> soon lose something of value to me.

_____   I was faced with a challenge.

_____   I lost something of value to me.

Coping Checklist

Subject No. _____   Date _____   Assessment A   B   C   D

                                    Time _____

Please check the statement which best characterizes what you were thinking about or doing during this event: _____

_____ . Check <u>one</u>

statement in Section A and <u>one</u> statement in Section B.

Section <u>A</u>

During this event,

_____   I was trying not to think about or notice unpleasant things.

_____   I was thinking that this is not pleasant, but it is a necesssary part of my hospital stay.

_____   I was trying to prepare myself for what was happening.

Section <u>B</u>

During this event,

_____   I was focusing on what was happening.

_____   I was focusing on how I felt.

_____   I was not thinking about anything.

Control Scale

Rate how much you feel that your thoughts and/or actions had some effect on what happened during this event: _____

_____ . In other words, how

much control do you feel you had over the situation?

1	1	1	1	1	1	1	1
1	2	3	4	5	6	7	8
No control			Some control				Total control

Appendix F   .

Classification of Patients' Self-selected Events

A) Code for interpersonal vs. non-interpersonal.
B) Code for primary characteristics of situation.
   Example: Interpersonal/Category 3

A) Interpersonal vs. Non-interpersonal

Interpersonal - events that involve other individuals in the environment
both directly and indirectly (e.g., responses to others, responses of
others perceived by the patient, social encounters)
Examples: a) Feeling embarrassed during a rectal examination.
           b) Having to sleep with strangers.
           c) Being able to help another patient.

Non-interpersonal - events that have to do with the environment, or
intrapersonal events (e.g., hospital regulations, sensations experienced
by the patient)
Examples: a) Being able to walk on my own.
           b) Having a private room.
           c) Being allowed to go out on pass.

1. Events that have both interpersonal and non-interpersonal components
   should be coded Interpersonal.

B) Codes for Primary Event Characteristics

Negative Events (events that are more negative than positive)

1. Environmental Demands
   - having to do with demands imposed by the hospital surroundings or
     procedures
   Examples: a) Having strangers sleep in the same room with me.
              b) Having to come in early to be admitted.
              c) Having to sleep in noisy surroundings.
              d) Having to deal with mistakes that are actively
                 committed by the staff.
              e) Seeing sick people.

2. Environmental Restrictions
   - having to do with restrictions imposed by or deficits related to
     the hospital surroundings
   Examples: a) Not being allowed to have visitors.
              b) Not being allowed to eat for a certain period of
                 time.
              c) Not having a television in the room.
              d) Having to deal with mistakes passively committed by
                 the staff (i.e., errors of omission).
              e) Having to eat food I don't enjoy.

3. Personal Demands
   - having to do with physical, emotional, or cognitive reactions
     experienced by the individual
   Examples: a) Having difficulty urinating.

        b) Feeling embarrassed during the rectal examination.
        c) Worrying about an upcoming test procedure.

4. Personal Limitations
   - having to do with an inability to exercise autonomous physical, emotional, or cognitive functioning; issues of dependency
   Examples: a) Not being able to eat solid foods.
            b) Not being able to go to the bathroom.
            c) Not being able to go out.

<u>Positive Events</u> (events that are more positive than negative)

5. Environmental Demands or Restrictions Removed
   - having to do with demands or restrictions being removed or not being as bad as expected, or an end to restrictions
   Examples: a) A noisy or ill patient being moved out of the room.
            b) A procedure not being as bad as expected.
            c) Being able to go out on pass.
            d) Being able to get a T.V. to pass the time.
            e) An operation is over with.

6. Environmental Benefits
   - having to do with direct benefits or advantages of being in the hospital surroundings
   Examples: a) Having time to rest.
            b) Having a private room.
            c) The attention and caring from the staff.

7. Personal Demands or Restrictions Removed
   - having to do with relief from physical, emotional, or cognitive restrictions because they have been removed or did not occur; return to autonomous functioning
   Examples: a) Relief because the surgery is over.
            b) The pain is less than I expected.
            c) Recuperating so well.
            d) Recognizing that I am better off than some people.
            e) An end to loneliness when visitors come.
            f) Thinking about going home, although not yet released.

8. Personal Benefits
   - having to do with direct benefits (either physical, emotional, or cognitive) for the individual
   Examples: a) Being able to help another patient.
            b) Being able to walk around on my own.
            c) Being able to relax.

<u>Coding System</u>

1. Determine whether the situation is more negative than positive in order to decide whether you should be looking at Categories 1 to 4, Categories 5 to 8.
2. Determine whether the situation involves the presence or absence of an event based on the idea of positive/negative reinforcement/punishment.

Appendix G

Calculation of Mood Factor Scores

Mood Factor	Items
Anxiety	on edge tense nervous shaky
Sadness	miserable unhappy depressed guilty
Anger	angry furious resentful spiteful
Hopeless	helpless hopeless worthless discouraged
Fatigue	tired weary sluggish worn out
Energy	full of pep lively vigorous active

Mood factors were derived by summing the four scores comprising each general affective factor, with the possible range of scores for each factor being 4 to 16.

Appendix H

Please detach this portion after you have completed the three
scales.

Patient Name: _____

_____

Staff Rating of Patient's Recovery

Subject No. _____ Date _____

Nurse: _____ Physician: _____

In comparison to other surgical patients you have treated for
similar problems, how would you rate this patient's recovery from
surgery on each of these three scales? Please circle one number
on each scale.

$$\frac{1}{1} \quad \frac{1}{2} \quad \frac{1}{3} \quad \frac{1}{4} \quad \frac{1}{5} \quad \frac{1}{6} \quad \frac{1}{7} \quad \frac{1}{8}$$

Not   Difficult   Extremely
difficult   difficult

$$\frac{1}{1} \quad \frac{1}{2} \quad \frac{1}{3} \quad \frac{1}{4} \quad \frac{1}{5} \quad \frac{1}{6} \quad \frac{1}{7} \quad \frac{1}{8}$$

No   Some   Many
complications   complications   complications

$$\frac{1}{1} \quad \frac{1}{2} \quad \frac{1}{3} \quad \frac{1}{4} \quad \frac{1}{5} \quad \frac{1}{6} \quad \frac{1}{7} \quad \frac{1}{8}$$

Not   Slow   Extremely
slow   slow

Please return this completed form to May Wong as soon as
possible. You can leave the form in the Concordia University
envelope marked "May Wong" which is at the nursing station of the
ward.

Appendix I

Table I-1

Summary Table for Repeated Measures Analysis of Mood Factor Scores Regarding the
Pain Event

Source	Multivariate F	Dependent Variable	Univariate F	Stepdown F
Period	4.91*	Anxiety	6.25	6.25*
		Sadness	3.27	6.77*
		Anger	1.92	1.16
		Fatigue	13.01	20.32*
		Erergy	5.28	2.20
		Hopelessness	4.67	2.44

Note. Degrees of freedom for multi F (18, 57), uni F (3, 72), stepdown F (3, 222) to F(3, 217).

*p ≤ .01.

Table I-2

Summary Table for Repeated Measures Analysis of Mood Factors Scores Regarding the
Most Unplea ant Events

Source	Multivariate F	Dependent Variable	Univariate* F	Stepdown F
Period	6.34**	Anxiety	4.49	4.49*
		Sadness	5.18	2.51
		Anger	6.82	1.84
		Fatigue	25.83	19.89*
		Energy	6 62	2.87
		Hopelessness	12.29	2.75

Note. Degrees of freedom for multi F(12, 63), uni F(2, 73), stepdown F(2, 147) to F(2,
143).

*p < .05. ** p < .01.

Table I-3

Summary Table for Repeated Measures Analyses of 12-hr Vital Signs

	Source	Multivariate F	Dependent Variable	Univariate F	Stepdown F
12-hr Vital Signs					
	Period	4.49**	Systolic Blood Pressure	4.53	4.53**
			Diastolic Blood Pressure	5.32	4.47**

Note. Degrees of freedom for 12-hr Blood Pressure: multi $F(4, 294)$, uni $F(2, 148)$, stepdown $F(2, 148)$ to $F(2, 147)$.

*$p \leq .05$. **$p \leq .01$.

Table I-4

Most Unpleasant Event: MANCOVA Summary Table for Comparison of Physiological

and Recovery Variables Among Cope Groups in Each Assessment Period

Source	Multivariate F	Dependent Variable	Univariate F	Stepdown F
Admission:				
Cope Method	3.54*	Doctor's Rating of Complications	3.20	3.20
		Doctor's Rating of Difficulty	0.31	3.71*
	1.95*	Admission Composite Pulse	0.89	0.89
		Admission 12-hr Pulse	2.04	1.97
		Postsurgery 12-hr Pulse	2.59	1.60
		Discharge 12-hr Pulse	0.26	0.85
		Incidence of Antiemetic Use	4.31	4.39*
	3.18**	Discharge 12-hr Temperature	2.74	2.74
		Incidence of Complications	0.94	0.46
		Duration of Antiemetic Use	4.46	3.59*
		Nurse's Rating of Slowness	2.55	5.24*
Postsurgery:				
Cope Method	3.33**	Recovery Point II	0.05	0.05
		Pain Onset	0.69	0.64
		Pain Incidence	1.39	1.79
		Analgesic Aggregate Score	0.35	1.50
		Duration of Narcotics Use	0.89	2.31
		Nurse's Rating of Difficulty	9.65	12.95**
	2.98*	Duration of Complications	0.48	0.48
		Duration of Antiemetic Use	1.85	2.15
		Nurse's Rating of Slowness	7.08	6.38**

Table I-4, continued

Source	Multivariate F	Dependent Variable	Univariate F	Stepdown F
Postsurgery:				
Cope Focus	2.05*	Postsurgical Stay	4.19	4.19*
		Pain Incidence	0.04	1.88
		Narcotic Aggregate Score	0.46	1.58
		Duration of Narcotic Use	0.29	0.53
		Incidence of Anticoagulant Use	0.13	0.01
		Duration of Anticoagulant Use	0.01	3.49*
Discharge:				
Cope Method	2.39*	Recovery Point II	0.04	0.04
		Pain Duration	3.23	3.38*
		Narcotic Aggregate Score	1.92	1.34
		Analgesic Aggregate Score	4.46	4.85*
		Duration of Anticoagulant Use	1.69	2.40
		Nurse's Rating of Difficulty	2.45	1.83

Note. All analyses are adjusted for Type of Surgery covariates.

Degrees of freedom for:

Admission - Cope Method (1) multi $F_{(4, 130)}$, uni $F_{(2, 67)}$, stepdown $F_{(2, 67)}$ to $F_{(2, 66)}$

(2) multi $F_{(10, 124)}$, uni $F_{(2, 67)}$, stepdown $F_{(2, 67)}$ to $F_{(2, 63)}$

(3) multi $F_{(8, 126)}$, uni $F_{(2, 67)}$, stepdown $F_{(2, 67)}$ to $F_{(2, 64)}$

Po __ ope Method (2) multi $F_{(6, 128)}$, uni $F_{(2, 67)}$, stepdown $F_{(2, 67)}$ to $F_{(2, 65)}$

Postsurgery Cope Method (1) and Cope Focus, Discharge Cope Method multi $F_{(12, 122)}$, uni $F_{(2, 67)}$, stepdown $F_{(2, 67)}$ to $F_{(2, 62)}$

*$p < .05$. **$p < .01$.

Table I-5

MANCOVA/ANCOVA Summary Table for Comparison of Recovery Variables Among Groups Based on Aggregate Coping Responses to the Most Unpleasant Events Across Periods

Source	Multivariate F	Dependent Variable	Univariate F	Stepdown F
Cope Method	2.86*	Incidence of Anxiolytic Use	0.01	0.01
		Duration of Anxiolytic Use	5.01	6.08*
		Duration of Antibiotic Use	0.01	2.38
		Duration of Antiemetic Use	4.92*	

Note. All analyses included Type of Surgery as covariates.

Degrees of freedom for multi F (3, 66), uni F (1, 68), stepdown F (1, 68) to F (1, 66).

*p < .05.

Table I-6

MANCOVA Summary Table for Comparison of Recovery Variables Among Aggregate
Event and Appraisal Groups

Source	Multivariate F	Dependent Variable	Univariate F	Stepdown F
Event	3.28*	Recovery Point II	6.39	6.39*
		Postsurgical Stay	0.64	3.86*
		Pain Onset	2.06	1.51
		Narcotic Aggregate Score	0.22	0.99
Appraisal	4.26*	Postsurgical Stay	0.33	0.33
		Pain Onset	0.12	0.03
		Analgesic Aggregate Score	7.06	12.37**
	4.01*	Anxiolytic Aggregate Score	2.88	2.88
		Duration of Anxiolytic Use	1.00	3.84*

Note. All analyses included Type of Surgery as covariates.

Degrees of freedom for Event multi F (4, 65), uni F (1, 68), stepdown F (1, 68) to
F (1, 65)

Appraisal (1) multi F (3, 66), uni F (1, 68), stepdown F (1, 68) to
F (1, 66); (2) multi F (2, 66), uni F (1, 68), stepdown F (1, 68) to F(1, 67)

*p < .05.

Table I-7

MANOVA Summary Table for Comparison of Individual Differences and Previous Hospitalization

Variables Among Groups Based on Aggregate Psycho-affective Responses

Source	Multivariate F	Dependent Variable	Univariate F	Stepdown F
Appraisal	3.31*	Health Locus of Control (Revised) - Internal	0.56	0.56
		Health Locus of Control (Revised) - Chance	2.99	2.80
		Personal Illness Questionnaire		
		- Somatic Sensitivity	6.24	6.31*
Pain Event:				
Cope Method	4.23*	Health Locus of Control (Revised) - Chance	1.68	1.68
		Personal Illness Questionnaire		
		- Somatic Sensitivity	7.32	6.64*

Degrees of freedom for Appraisal: multi F (3,70), uni F (1,72), stepdown F (1,72) to F (2,71)

Preselected Cope Method: multi F (2,66), uni F (1,67), stepdown F (1,67) to F (1,66)

*p < .05. **p < .01.

Appendix J

Table J

Factors Resulting from Principal-Component Analysis of the Physiological
and Recovery Variables

Factor 1

Admission Composite Systolic Blood Pressure (.74)
Admission Composite Diastolic Blood Pressure (.71)
Admission 12-hr Systolic Blood Pressure (.77)
Admission 12-hr Diastolic Blood Pressure (.77)
Postsurgery Composite Systolic Blood Pressure (.67)
Postsurgery Composite Diastolic Blood Pressure (.54)
Postsurgery 12-hr Systolic Blood Pressure (.83)
Postsurgery 12-hr Diastolic Blood Pressure (.66)
Discharge Composite Systolic Blood Pressure (.70)
Discharge Composite Diastolic Blood Pressure (.64)
Discharge 12-hr Systolic Blood Pressure (.80)
Discharge 12-hr Diastolic Blood Pressure (.82)

Factor 2

Recovery Point II (.62)
Postsurgical Stay (.64)
Pain Onset (.63)
Pain Duration (.62)
Pain Incidence (.63)
Narotic Aggregate Score (.76)
Analgesic Analgesice Score (.55)
Duration of Narcotic Use (.76)
Duration of Analgesic Use (.69)
Incidence of Anticoagulant Use (.68)
Duration of Anticoagulant Use (.66)
Nurse's Rating of Difficulty in Recovery (.54)
Nurse's Rating of Complications in Recovery (.43)

Factor 3

Recovery Point I (.44)
Postsurgery Composite Temperature (.43)
Postsurgery 12-hr Temperature (.60)
Anxiolytic Aggregate Score (.68)
Incidence of Antibiotic Use (.68)
Duration of Anxiolytic Use (.70)
Duration of Antibiotic Use (.73)
Doctor's Rating of Difficulty in Recovery (.61)
Doctor's Rating of Complications in Recovery (.51)
Doctor's Rating of Slowness in Recovery (.54)

Table J, cont.

Factor 4

Admission Composite Temperature (.49)
Admission 12-hr Temperature (.52)
Admission Composite Pulse (.66)
Admission 12-hr Pulse (.76)
Postsurgery Composite Pulse (.58)
Postsurgery 12-hr Pulse (.58)
Discharge Composite Pulse (.72)
Discharge 12-hr Pulse (.67)
Incidence of Antiemetic Use (-.41)

Factor 5

Discharge Composite Temperature (.69)
Discharge 12-hr Temperature (.67)
Onset of Complications (.64)
Duration of Complications (.54)
Incidence of Complications (.68)
Duration of Antiemetic Use (.46)
Nurse's Rating of Slowness in Recovery (.43)

Notes. N = 68 due to missing data regarding Composite Discharge SBP and DBP for 7 patients. Order of presentation for variables in each factor reflects order of entry for the measures in multivariate analyses. Figures in parentheses represent factor loadings.

Appendix K

Table K

MANOVA Summary Table for Comparison of Physiological and Recovery Variables Between Surgical Groups

Source	Multivariate F	Dependent Variable	Univariate F	Stepdown F
Group	1.83**	Admission 12-hr DBP	1.45	1.45
		Postsurgery 12-hr DBP	2.27	1.94
		Discharge Composite SBP	1.68	2.05
		Discharge Composite DBP	1.98	1.60
		Discharge 12-hr DBP	2.07	2.38
Group	5.78**	Postsurgical Stay	5.82	5.82**
		Pain Onset	8.53	5.29**
		Pain Duration	3.02	1.53
		Pain Incidence	2.26	5.17**
		Narcotic Aggregate Score	6.38	2.49*
		Analgesic Aggregate Score	3.13	2.83*
		Duration of Narcotic Use	4.51	4.85**
		Incidence of Anticoagulant Use	22.26	7.51**
		Duration of Anticoagulant Use	23.17	2.41
		Nurse's Rating-Complications	2.64	1.50
Group	3.52**	Recovery Point I	1.64	1.64
		Postsurgery Composite Temperature	1.00	0.86
		Postsurgery 12-hr Temperature	1.02	4.48**
		Anxiolytic Aggregate Score	1.71	1.73

Table K, continued

Source	Multivariate F	Dependent Variable	Univariate F	Stepdown F
		Incidence of Antibiotic Use	7.24	7.91**
		Duration of Anxiolytic Use	5.02	4.14**
		Duration of Antibiotic Use	8.47	2.34
		Doctor's Rating of Recovery Difficulty	1.73	1.50
Group	3.02**	Postsurgery 12-hr Pulse	2.94	2.94*
		Admission 12-hr Pulse	2.62	4.55**
		Incidence of Antiemetic Use	2.95	2.91*
		Postsurgery 12-hr Pulse	0.94	1.02
Group	2.13**	Onset of Complications	5.88	5.88**
		Duration of Antiemetic Use	2.97	1.42
		Discharge 12-hr Temperature	1.93	1.24
		Duration of Complications	2.43	1.05
		Incidence of Complications	3.12	1.43

Note. Degrees of freedom for

Analysis 1: multi F (25, 282), uni F (5, 62), stepdown F (5, 62) to F(5, 58)

2: multi F (50, 292), uni F (5, 69), stepdown F (5, 69) to F (5, 60)

3: multi F (40, 302), uni F (5, 69), stepdown F (5, 69) to F (5, 62)

4: multi F (20, 258), uni F (5, 69), stepdown F (5, 69) to F (5, 66)

5: multi F (25, 317), uni F (5, 69), stepdown F (5, 69) to F (5, 65)

*p < .05. **p < .01.

Appendix L

Order of Entry for Individual Differences Variables
in Multivariate Analyses

1) State-Trait Anxiety Inventory - Trait
2) Self-rating Depression Scale
3) Health Locus of Control-Revised - Internal
4) Health Locus of Control-Revised - Powerful Others
5) Health Locus of Control-Revised - Chance
6) Medical Procedures Fear (Personal Illness Questionnaire)
7) Somatic Sensitivity (Personal Illness Questionnaire)
8) Disease Fear (Personal Illness Questionnaire)